UNITED STATES SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

☒ Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 for the fiscal year ended December 31, 2021 or

☐ Transition Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934

Commission file number 1-8002

THERMO FISHER SCIENTIFIC INC.

Delaware
(State of incorporation)

(Exact name of Registrant as specified in its charter)

168 Third Avenue
Waltham, Massachusetts 02451
(Address of principal executive offices) (Zip Code)

Registrant's telephone number, including area code: (781) 622-1000

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, $1.00 par value	TMO	New York Stock Exchange
0.750% Notes due 2024	TMO 24A	New York Stock Exchange
0.125% Notes due 2025	TMO 25B	New York Stock Exchange
2.000% Notes due 2025	TMO 25	New York Stock Exchange
1.400% Notes due 2026	TMO 26A	New York Stock Exchange
1.450% Notes due 2027	TMO 27	New York Stock Exchange
1.750% Notes due 2027	TMO 27B	New York Stock Exchange
0.500% Notes due 2028	TMO 28A	New York Stock Exchange
1.375% Notes due 2028	TMO 28	New York Stock Exchange
1.950% Notes due 2029	TMO 29	New York Stock Exchange
0.875% Notes due 2031	TMO 31	New York Stock Exchange
2.375% Notes due 2032	TMO 32	New York Stock Exchange
2.875% Notes due 2037	TMO 37	New York Stock Exchange
1.500% Notes due 2039	TMO 39	New York Stock Exchange
1.875% Notes due 2049	TMO 49	New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. Yes ☐ No ☒

Indicate by check mark whether the Registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the Registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T during the preceding 12 months. Yes ☒ No ☐

Indicate by check mark whether the Registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act. Large accelerated filer ☒
Accelerated filer ☐ Non-accelerated filer ☐ Smaller reporting company ☐ Emerging growth company ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

As of July 2, 2021, the aggregate market value of the voting stock held by nonaffiliates of the Registrant was approximately $201,672,052,000 (based on the last reported sale of common stock on the New York Stock Exchange Composite Tape reporting system on July 2, 2021).

As of February 5, 2022, the Registrant had 391,191,770 shares of Common Stock outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Sections of Thermo Fisher's definitive Proxy Statement for the 2022 Annual Meeting of Shareholders are incorporated by reference into Parts II and III of this report.

THERMO FISHER SCIENTIFIC INC.

ANNUAL REPORT ON FORM 10-K

FOR THE FISCAL YEAR ENDED DECEMBER 31, 2021

THERMO FISHER SCIENTIFIC INC.

PART I

Item 1. Business

General Development of Business

Thermo Fisher Scientific Inc. (also referred to in this document as "Thermo Fisher," "we," the "company," or the "registrant") is the world leader in serving science. Our Mission is to enable our customers to make the world healthier, cleaner and safer. We serve customers working in pharmaceutical and biotech companies, hospitals and clinical diagnostic labs, universities, research institutions and government agencies, as well as environmental, industrial quality and process control settings. Our global team delivers an unrivaled combination of innovative technologies, purchasing convenience and pharmaceutical services through our industry-leading brands, including Thermo Scientific, Applied Biosystems, Invitrogen, Fisher Scientific, Unity Lab Services, Patheon and PPD.

We continuously increase our depth of capabilities in technologies, software and services, and leverage our extensive global channels to address our customers' emerging needs. We do this through organic investments in research and development and through acquisitions. Our goal is to make our customers more productive in an increasingly competitive business environment, and enable them to solve their challenges, from complex research to improved patient care, environmental, industrial quality and process monitoring, and consumer safety.

On December 8, 2021, the company acquired PPD, Inc., a leading global provider of clinical research services to the pharma and biotech industry. The addition of PPD's clinical research services enhances our offering to biotech and pharma customers by enabling them to accelerate innovation and increase their productivity within the drug development process. PPD is now part of our Laboratory Products and Biopharma Services segment.

Forward-looking Statements

Forward-looking statements, within the meaning of Section 21E of the Securities Exchange Act of 1934 (the Exchange Act), are made throughout this Annual Report on Form 10-K. Any statements contained herein that are not statements of historical fact may be deemed to be forward-looking statements, including without limitation statements regarding: projections of revenues, expenses, earnings, margins, tax rates, tax provisions, cash flows, pension and benefit obligations and funding requirements, and our liquidity position; cost reductions, restructuring activities, new product and service developments, competitive strengths or market position, acquisitions or divestitures; growth, declines and other trends in markets we sell into; new or modified laws, regulations and accounting pronouncements; outstanding claims, legal proceedings, tax audits and assessments and other contingent liabilities; foreign currency exchange rates and fluctuations in those rates; general economic and capital markets conditions; the timing of any of the foregoing; assumptions underlying any of the foregoing; the expected impact of the COVID-19 pandemic on the company's business; and any other statements that address events or developments that Thermo Fisher intends or believes will or may occur in the future. Without limiting the foregoing, the words "believes," "anticipates," "plans," "expects," "seeks," "estimates," and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements are accompanied by such words. While the company may elect to update forward-looking statements in the future, it specifically disclaims any obligation to do so, even if the company's estimates change, and readers should not rely on those forward-looking statements as representing the company's views as of any date subsequent to the date of the filing of this report. A number of important factors could cause the results of the company to differ materially from those indicated by such forward-looking statements, including those detailed under the heading, "Risk Factors" in Part I, Item 1A.

Business Segments and Products

We report our business in four segments – Life Sciences Solutions, Analytical Instruments, Specialty Diagnostics, and Laboratory Products and Biopharma Services.

During 2021, the Life Sciences Solutions and Specialty Diagnostics segments as well as the laboratory products business continued to support COVID-19 diagnostic testing, scaling and evolving their molecular diagnostics solutions and plastic consumables businesses to respond to the on-going COVID-19 pandemic. The biosciences and bioproduction businesses also expanded their capacity to meet the needs of pharma and biotech customers as they rapidly expanded their own production volumes to meet global vaccine manufacturing requirements. Additionally, through our pharma services business, we provided our pharma and biotech customers with the services they needed to develop and produce vaccines and therapies globally.

Life Sciences Solutions Segment

Through our Life Sciences Solutions segment, we provide an extensive portfolio of reagents, instruments and consumables used in biological and medical research, discovery and production of new drugs and vaccines as well as diagnosis of infection

and disease. These products and services are used by customers in pharmaceutical, biotechnology, agricultural, clinical, healthcare, academic, and government markets. Life Sciences Solutions includes four primary businesses – Biosciences, Genetic Sciences, Clinical Next-Generation Sequencing, and BioProduction.

Biosciences

Our biosciences business includes reagents, instruments and consumables that help our customers conduct biological and medical research, discover new drugs and vaccines, and diagnose infection and disease, such as COVID-19.

Our biosciences offerings include:

- Reagents, instruments, and consumables used for protein biology, molecular biology, sample preparation and cell imaging and analysis. The portfolio includes antibodies and products for protein purification, detection, modification, and analysis; and sequencing, detection and purification products used for high-content analysis of nucleic acids. Many of these products are also used in applied markets, including agriculture, forensics, diagnostics product development, toxicology research and diagnostic testing.
- Tools used for genetic engineering, amplification, quantification and analysis as well as RNA isolation, including stem cell reprogramming kits, transfection reagents, RNA interference reagents, along with gene editing tools and gene synthesis products.
- Cell culture media, reagents, and plastics for preserving and growing mammalian cells which are used in many life science research applications.
- Fluorescence-based technologies, which facilitate the labeling of molecules for biological research and drug discovery. These technologies include a wide range of cell analysis instruments, including flow cytometers and imaging platforms that enable fluorescence microscopy.
- Protein analysis products, including precast electrophoresis gels for separating nucleic acids and proteins, and western blotting and staining tools.

Genetic Sciences

Our genetic sciences business combines a wide variety of instruments and related reagents used to provide high-value genomic solutions to assist customer decisions in the research, clinical, healthcare and applied markets.

Our offerings include real-time polymerase chain reaction (PCR) technology used to identify changes in gene expression, genotyping or proteins on an individual gene-by-gene basis and for diagnostic testing to identify infection and disease such as COVID-19; capillary electrophoresis (CE) sequencing, a core technology used in DNA sequencing and fragment analysis and forensic analysis applications; and microarray technology, used in gene expression, genotyping and reproductive health.

Our genetic analyzers served as the foundational platform used to sequence the first human genome. These systems are used in a variety of basic, commercial and clinical research applications.

Clinical Next-Generation Sequencing

Our clinical next-generation sequencing (NGS) business focuses on delivering simple, fast and cost-effective NGS technology for a range of applications. The business is focused on targeted sequencing solutions for research use, the application of NGS in oncology and companion diagnostics.

BioProduction

Our bioproduction business supports developers and manufacturers of biological-based therapeutics and vaccines with a portfolio of premium solutions and services focused on upstream cell culture, downstream purification, analytics for detection and quantitation of process/product impurities, and a suite of single-use solutions spanning the biologics workflow.

Our bioproduction offerings include:

- Single-use bioproduction solutions that provide our customers with faster turnaround and set-up times, minimal validation requirements, reduced investment and running costs, and increased flexibility of manufacturing capacity.
- Production cell culture media solutions, which are used by leading biotechnology and pharmaceutical companies to grow cells in controlled conditions and enable large scale cGMP (Current Good Manufacturing Practices) manufacturing of drugs and vaccines, including the COVID-19 vaccine. We also provide our customers with the associated services to optimize the productivity of these production platforms.

Business (continued)

- Chromatography products, which deliver superior capacity and resolution for process-scale bioseparations, and offer a broad set of scalable options for the purification of antibodies, antibody fragments and proteins.
- Rapid molecular products that deliver accurate results in less than four hours for contaminant detection, identification and quantitation.
- Scalable solutions for the manufacture of cell therapy-based drugs.

Our Doe & Ingalls offerings include chemical distribution and supply chain services that provide primarily life science manufacturers with reliable, secure supply chains for their chemical raw materials.

Analytical Instruments Segment

Through our Analytical Instruments segment, we provide a broad offering of instruments, consumables, software and services that are used for a range of applications in the laboratory, on the production line and in the field. These products and services are used by customers in pharmaceutical, biotechnology, academic, government, environmental and other research and industrial markets, as well as the clinical laboratory. This segment includes three primary businesses – Chromatography and Mass Spectrometry, Chemical Analysis, and Materials and Structural Analysis.

Chromatography and Mass Spectrometry

Our chromatography and mass spectrometry (MS) business provides analytical instrumentation for organic and inorganic sample analysis across both applied technologies and life science research. These products are complemented by laboratory information management systems (LIMS); chromatography data systems (CDS); database analytical tools; automation systems; a range of consumables, such as a line of chromatography columns; and a range of sample preparation and separation products including auto-samplers and multiplexing systems.

Chromatography is a technique for separating, identifying and quantifying individual chemical components of substances based on their specific physical and chemical characteristics. Our chromatography product line includes high-performance liquid chromatography, ion chromatography and gas chromatography systems, all of which are supported by our Chromeleon chromatography data system software.

- *Liquid Chromatography (LC) Systems* analyze complex sample matrices in liquids. Our high-pressure liquid chromatography (HPLC) and ultrahigh-pressure liquid chromatography (UHPLC) systems offer high throughput and sensitivity and are sold either as stand-alone systems or integrated with our mass spectrometers (LC/MS and LC/MS/MS). These systems are used for a range of applications, from complex proteomic analyses to routine industrial quality assurance and quality control (QA/QC).
- *Ion Chromatography (IC) Systems* separate ionic (charged) or highly polar molecules (e.g., sugars and carbohydrates), usually found in water-based solutions, and typically detect them based on their electrical conductivity. Our IC products are used in a wide range of applications, including scientific research, and environmental testing, as well as quality control in pharmaceutical, food and beverage, and other industrial processes.
- *Gas Chromatography (GC) Systems* analyze complex sample matrices in gases, comprising both separation and detection technology. Separation technology is common to all gas chromatography analyzers and is paired with either a conventional detector (GC) or with different types of mass spectrometers (GC/MS). Our GC/MS offering includes a triple-stage quadrupole, a single-stage quadrupole, an Orbitrap, and an ion trap for a range of applications, including food safety testing, quantitative screening of environmental samples, and complex molecular analyses.
- *Elemental Analysis Spectrometers* use atomic spectroscopy techniques to identify trace concentrations of elements in liquid and solid samples primarily in environmental, petrochemical, food safety, metallurgical, geochemical and clinical/toxicology research applications. These products are widely used in growth markets such as China, India and Latin America to support compliance with increasingly stringent international environmental and consumer safety regulations.

Mass spectrometry is a technique for analyzing chemical compounds, individually or in complex mixtures, by forming charged ions that are then analyzed according to their mass-to-charge ratios. In addition to molecular

information, each discrete chemical compound generates a pattern that provides structurally identifiable information. Our comprehensive offering includes life sciences mass spectrometry systems; and inorganic mass spectrometry systems; as well as a range of sample preparation and separation products, including auto-samplers and multiplexing systems.

- *Life Sciences Mass Spectrometers* include triple quadrupole and Orbitrap technologies. Our triple quadrupole systems provide high-performance quantitative analysis of chemicals in biological fluids, environmental samples and food

Business (continued)

matrices. They are also used by the pharmaceutical industry for targeted quantitation during drug discovery. Our Orbitrap technologies provide high-resolution and accurate mass capabilities for both research and applied markets and are well suited for drug metabolism, proteomics, environmental analysis, food safety, toxicology and clinical research applications. We also offer a comprehensive portfolio of instrument control and data analysis software to help customers simplify their workflows and obtain knowledge from often complex data.

- *Inorganic Mass Spectrometers* include four product lines: isotope ratio mass spectrometry (IRMS); multi-collector isotope ratio mass spectrometry (MC/IRMS); inductively coupled plasma mass spectrometry (ICP/MS); and high-resolution trace mass spectrometry (HR Trace/MS). These products are primarily used for qualitative and quantitative analysis of inorganic matter in a range of applications, including environmental analysis, materials science and earth sciences.

Chemical Analysis

Our chemical analysis products fall into three main categories: production, process and analytics; field safety instruments; and environmental and process instruments. Customers use these products to quickly and accurately analyze the composition of materials to optimize workflows primarily in industrial applications or to help them comply with governmental regulations and industry safety standards. Our product lines range from those used on production lines to improve quality and efficiency, to portable systems for rapid and real-time chemical identification in the field or to analyze, measure or respond to hazardous situations.

- *Production, Process and Analytics* includes production line process monitoring and control systems for a range of industrial applications. For example, we offer on-line instruments that analyze bulk materials non-invasively and in real time to improve quality control and ensure safe operation in a mine or cement manufacturing plant, as well as systems that enable high-speed weighing during bulk materials handling. We also offer gauging systems that employ ionizing and non-ionizing technologies to measure the total thickness, basis weight and coating thickness of flat-sheet materials, such as steel, plastics, foil, rubber and glass. We also offer on-line analyzers based on a variety of technologies, such as X-ray imaging and ultra-trace chemical detection, to inspect packaged goods for physical contaminants, validate fill quantities, or check for missing or broken parts on-line and at high speeds in the food and beverage, pharmaceutical production and packaging industries, to maintain safety and quality standards.
- *Field Safety Instruments* are rugged handheld products that provide rapid, precise, real-time analysis at the point of need. Our main product categories are elemental analyzers, optical analyzers and radiation detection instruments. Our portable elemental analyzers use X-ray fluorescence (XRF) or Laser-induced breakdown spectroscopy technologies in QA/QC applications to identify metal alloys in scrap metal recycling; in precious metals analysis; in environmental analysis; and for lead screening in a range of consumer products. Our portable optical analyzers utilize Raman, Fourier transform infrared (FTIR) and near-infrared (NIR) technologies for use in the field by first responders and law enforcement and military personnel who need to quickly and accurately identify chemicals and explosives in critical safety and security situations. Other applications include QA/QC in pharmaceutical production and identification of counterfeit drugs. Our radiation measurement products are used to monitor, detect and identify specific forms of radiation in nuclear power, environmental, industrial, medical, and security applications. Our primary customers include national, regional, and local government agencies responsible for monitoring cargo, vehicles and people traveling across borders. These products are also used by first-responders in safety and security situations, and for worker safety in the nuclear power and other industrial markets.
- *Environmental and Process Instruments* include fixed and portable instrumentation that help our customers protect people and the environment as well as comply with government regulations and industry safety standards. Our products are used by environmental regulatory agencies and power plant operators to measure ambient air, and stack gas emissions for compliance with regulated emissions standards for criteria pollutant gases. Our products are also used in ambient particulate monitoring applications by customers in mining environments to provide continuous measurements and logging of real-time concentrations and median particle sizes of airborne dust, smoke, mist and fumes to improve efficiency and increase worker safety.

In addition to our broad product offerings, we offer a variety of specialized services to our customers, including equipment servicing, instrument calibration services, asset management and training.

Electron Microscopy

Our electron microscopy business (formerly known as materials and structural analysis business) includes electron microscopy, molecular spectroscopy and bulk elemental analysis instruments that are used by customers in life sciences, materials sciences, semiconductor and industrial markets to accelerate breakthrough discoveries.

Business (continued)

- *Electron Microscopy Instruments* include transmission electron microscopes which provide imaging and characterization at the atomic scale, with applications in semiconductor development, materials science research and the characterization of protein structure and function. We also offer scanning electron microscopes which resolve features from the optical regime down to the nanometer length scale and are used for a wide variety of applications from materials characterization in science and engineering to applications in natural resources, manufacturing, and biological systems. Our DualBeam focused ion beam-scanning electron microscope systems are used for sample preparation, 3D characterization, nanoprototyping, and industrial failure analysis. Our focused ion beam microscopes are used in a range of process control, failure analysis, and materials research applications. We also offer electrical failure analysis instruments which are used in root cause failure analysis and quality control; microCT instruments which are micro-computed tomography solutions for quantitative analysis of a broad range of materials, providing 3D visualization of large volumes non-destructively; and a range of surface analysis instruments commonly used in the semiconductor, metals, coatings, and polymer industries as a product development and failure analysis tool. We also provide 3D visualization software that turns the data and images generated by a broad range of instruments into 3D visualizations of the microscopic sample, allowing for quantitative analysis of material properties.
- *Molecular Spectroscopy Instruments* are divided into four primary techniques: FTIR, Raman, NIR and ultraviolet/visible (UV/Vis) spectroscopy. These technologies are typically used in the laboratory to provide information on the structure of molecules to identify, verify and quantify organic materials in pharmaceutical, biotechnology, polymer, chemical, and forensic sciences. Our material characterization instruments include rheometers and extruders that measure viscosity, elasticity, processability, and temperature-related mechanical changes of various materials.
- *Bulk Elemental Analysis Instruments* and analyzers use XRF, X-ray diffraction (XRD), and arc spark optical emission (OES) techniques for accurate and precise analysis of bulk materials in the metals, cement, minerals, and petrochemicals industries.

Specialty Diagnostics Segment

Our Specialty Diagnostics segment offers a wide range of diagnostic test kits, reagents, culture media, instruments and associated products in order to serve customers in healthcare, clinical, pharmaceutical, industrial, and food safety laboratories. Our healthcare products are used to increase the speed and accuracy of diagnoses, which improves patient care in a more cost-efficient manner. This segment has five primary businesses – Clinical Diagnostics, ImmunoDiagnostics, Microbiology, Transplant Diagnostics and our Healthcare Market Channel.

Clinical Diagnostics

Our clinical diagnostics products include a broad offering of liquid, ready-to-use and lyophilized immunodiagnostic reagent kits, calibrators, controls and calibration verification fluids. In particular, we provide products used for COVID-19 testing; drugs-of-abuse testing; therapeutic drug monitoring, including immunosuppressant drug testing; thyroid hormone testing; serum toxicology; clinical chemistry; immunology; hematology; coagulation; glucose tolerance testing; first trimester screening; tumor markers testing; and biomarkers testing for sepsis, acute myocardial infarction and congestive heart failure. We also private-label many of our reagents and controls for major *in vitro* diagnostics companies through OEM arrangements. In many instances, we will work with customers or partners to develop new products and applications for their instrument platforms.

We have developed one of the broadest menus for drugs-of-abuse immunoassays. We also provide a broad offering of immunosuppressant drug immunoassays that can be used on a variety of clinical chemistry analyzers.

Our clinical chemistry systems include analyzers and reagents to analyze and measure routine blood and urine chemistry, such as glucose and cholesterol; and advanced testing for specific proteins, therapeutic drug monitoring and drugs-of-abuse. Our diagnostic test range currently covers approximately 80 different validated methods. We also provide pre- and post-analytical automation for preparation of blood specimens before and after analysis, and specialty diagnostic tests based on patented biomarkers for sepsis, cardiovascular and pulmonary diseases, as well as intensive care treatments and prenatal screening.

ImmunoDiagnostics

Our immunodiagnostics offerings include developing, manufacturing and marketing complete blood-test systems to support the clinical diagnosis and monitoring of allergy, asthma and autoimmune diseases. We offer antibody tests for approximately 20 indications to help diagnose autoimmune diseases such as rheumatoid arthritis, celiac disease, lupus and scleroderma. Our products include ImmunoCAP for allergy and asthma tests and EliA for autoimmunity tests.

Business (continued)

Microbiology

Our microbiology offerings include dehydrated and prepared culture media, collection and transport systems, instrumentation and consumables to detect pathogens in blood, diagnostic and rapid direct specimen tests, quality-control products and associated products for the microbiology laboratory. Our products help customers worldwide to diagnose infectious disease; determine appropriate antimicrobial therapy; implement effective infection control programs; and detect microbial contamination of their products or manufacturing facilities.

Within the food and pharmaceutical industries, our products are used to assure the safety and quality of consumer products by monitoring production environments; raw materials and end products for bacterial contamination; and animal health in the dairy industry.

Transplant Diagnostics

Our transplant diagnostics products include human leukocyte antigen (HLA) typing and testing for the organ transplant market. Our diagnostic tests are used by transplant centers for tissue typing, primarily to determine the compatibility of donors and recipients pre-transplant, and to detect the presence of antibodies post-transplant that can lead to transplant rejection. These transplant diagnostic tests are widely used across the transplant-testing workflow to improve patient outcomes. Our transplant diagnostic offerings include several lines of HLA typing and antibody detection assays utilizing serological, molecular, enzyme-linked immunosorbent assays (ELISA), flow, and multiplexing technologies.

Healthcare Market Channel

Our healthcare market channel offerings include a broad array of consumables, diagnostic kits and reagents, equipment, instruments, solutions and services for hospitals, clinical laboratories, reference laboratories, physicians' offices and other clinical testing facilities. These products are manufactured by Thermo Fisher and third parties and are primarily used in clinical diagnosis. We go to market through our expert sales force, segment-relevant printed collateral and digital content, and a state-of-the-art website, www.fishersci.com/healthcare, containing full product content for more than 1.5 million products.

Laboratory Products and Biopharma Services Segment

Our Laboratory Products and Biopharma Services segment (formerly known as Laboratory Products and Services) offers virtually everything needed for the laboratory. Our unique combination of self-manufactured and sourced products and extensive service offering enables our customers to focus on their core activities and helps them to be more efficient, productive and cost-effective. The segment also includes a comprehensive offering of outsourced services used by the pharmaceutical and biotech industries for drug development, clinical research, clinical trials services and commercial drug manufacturing. We serve the pharmaceutical, biotechnology, academic, medical device, government and other research and industrial markets, as well as the clinical laboratory market through five key businesses: Laboratory Products, Laboratory Chemicals, Research and Safety Market Channel, Pharma Services and Clinical Research.

Laboratory Products

Our laboratory products are used primarily by pharmaceutical companies for drug discovery and development and by biotechnology companies and universities for life science research to advance the prevention and cure of diseases and enhance quality of life. This offering consists of equipment, accessories, and services for sample preparation, storage and protection, and analysis:

- *Laboratory Equipment Technologies* includes our leading laboratory refrigerators and freezers, ultralow-temperature freezers and cryopreservation storage tanks for maintaining samples in a cold environment to protect them from degradation. We also offer temperature control products such as heated bath circulators, immersion coolers, recirculating chillers, water baths, and dry baths in a range of sizes, temperatures and configurations for life science, analytical chemistry, manufacturing and quality-control applications. In addition, we offer sample preparation and preservation equipment, which protects our customers' chemical and biological samples and supports the growth of cells and organisms in optimal conditions such as temperature, carbon dioxide and humidity, as well as incubators and related products. We also offer centrifugation products, which are used to separate biological matrices and inorganic materials, including

microcentrifuges, general use bench-top centrifuges and floor models. Additionally, we offer biological safety cabinets, which enable technicians to handle samples without risk to themselves or their environment and without risk of cross-contamination of samples.

- *Water and Laboratory Products* include water analysis instruments such as meters, electrodes and solutions for the measurement of pH, ions, conductivity, dissolved oxygen, turbidity and other key parameters in the lab and production

Business (continued)

line. We also offer other laboratory equipment such as water purification systems, shakers, vacuum concentrators, microbiological incubators, ovens, furnaces, hotplates, stirrers, stirring hotplates, and other related products.

- *Laboratory Plastics Essentials* include a leading offering of laboratory pipette tips and a complementary range of handheld and automated pipetting systems, supporting low- through high-throughput activity. These products optimize productivity and ergonomics and ensure accurate results. We also offer sample preparation and storage products such as centrifugation consumables as well as vials and organization systems for ultralow temperature and cryogenic storage, with specific products designed for low protein binding and low DNA binding and containers for packaging life science and diagnostic reagents as well for the storage and transport of bulk intermediates and active pharmaceutical ingredients. Additionally, our offerings include a complete selection of clinical specimen collection products, drug-of-abuse collection kits and environmental and food-safety glass and plastic vials, bottles and containers, plastic transfer pipettes, general purpose clinical laboratory consumables and containers for breast milk collection, storage and feeding primarily used in neo-natal units and by lactation specialists. We also provide OEM and custom kit assembly services for clinical and drugs-of-abuse test kits.

Laboratory Chemicals

Our laboratory chemicals offering comprises a broad range of chemicals, solvents and reagents supporting virtually every laboratory application – from research and drug discovery to development and manufacturing. This portfolio includes organic chemicals used to synthesize new materials; essential laboratory chemicals used by scientists to purify, extract, separate, identify and manufacture products; high-purity analytical reagents; bioreagents used in many different applications, from cell growth to detailed protein analysis; novel chemical building blocks, reactive intermediates and screening libraries used to accelerate drug discovery; and precious metals, salts and solutions used in a broad range of applications where highly specific reactions are desired. We provide bulk volumes of many products for scale-up from research to development and customized services for chemical procurement, processing, production, testing, and packaging.

Research and Safety Market Channel

Our research and safety market channel serves academic, pharmaceutical, biotechnology, government and industrial customers. We go to market through our expert sales force, segment-relevant printed collateral and digital content in four languages, a state-of-the-art website, www.fishersci.com, containing full product content for more than 1.5 million products, and our global network of resellers and distributors.

We have an international network of warehouses in our primary markets through which we maintain inventory and coordinate product delivery. With specialized product vaults and warehouse management systems, we are able to handle the complete range of products we offer to our customers. Our transportation capabilities include our dedicated fleet of delivery vehicles as well as parcel shipping capabilities that are closely integrated with our third-party parcel carriers. Throughout the product delivery process, we provide our customers with convenient access to comprehensive electronic systems that offer automated catalog search, product order and invoicing, and payment capabilities.

Our channel offers a mix of products that are manufactured by Thermo Fisher, by third parties for us on a private-label basis, and by third parties under their brand but offered for sale exclusively through us. We also offer a broad range of third-party products representing leading industry brand names on a non-exclusive basis.

Our research products include a complete offering of laboratory products, ranging from capital equipment and instruments to chemicals to consumable products. Our safety products include clean-room and controlled-environment supplies, personal protective equipment, firefighting, military, and first responder equipment and supplies, and environmental monitoring and sampling equipment. Our education products include science-related and laboratory products for the K-12 and secondary education markets.

In addition to our broad product offerings, we offer a variety of specialized services to our customers through our Unity Lab Services team, including training, equipment servicing and asset management, and dedicated supply management personnel. We also offer scientific support services including desktop delivery, coordination of instrument calibration and service, and on-site customer service.

Pharma Services

We provide the entire spectrum of development, manufacturing and clinical trials services for both small-molecule and large-molecule pharmaceuticals. This includes i) development of a suitable formulation and manufacturing process for the active pharmaceutical ingredient (API) or biologic; ii) technology transfer to scale up the manufacturing; iii) labeling, packaging, distribution and logistics for clinical trials; and iv) commercial scale manufacturing and packaging.

Business (continued)

- *Drug Substance Services* - Our service offerings address small molecules, produced through chemical synthesis, and large molecules such as antibodies and proteins produced through mammalian cell culture. We provide development and manufacturing services for small molecule APIs and the biologically active component of pharmaceutical products under current good manufacturing practice (cGMP) conditions from early development through commercial production. We also provide a full range of viral vector development and manufacturing services for customers developing and commercializing gene and cell therapies, including process development, optimization, scale-up, analytical development and qualification of viral vectors for commercial manufacturing. Our breadth of vector platform includes the five most widely used virus types, providing extensive coverage across the gene and cell therapy landscape.
- *Drug Product Services* - We manufacture both small-molecule and large-molecule products for customers in conventional and specialized dosage forms. We differentiate ourselves by our breadth of dosage forms and specialized capabilities in both oral solid and sterile dosage forms. We provide a wide spectrum of advanced formulation, production and technical services and scientific expertise and solutions, from the early stages of a product's development to regulatory approval and commercial scale production.
- *Clinical Trials Services* - We provide a comprehensive global supply chain offering for pharmaceutical and biotechnology companies engaged in clinical trials, including comparator sourcing; specialized packaging; over-encapsulation; multi-lingual and specialized labeling and distribution for phase I through phase IV clinical trials; biological-specimen management and biobanking services; specialty pharmaceutical logistics; clinical supply-chain planning and management; and a global distribution logistics network.
- *Advanced Therapy Services* - We provide a global network of cell and gene therapy development, manufacturing and supply chain services for Plasmid, mRNA drug substance and cell therapy manufacturing.

Clinical Research

We offer comprehensive, integrated clinical development and analytical services to our biopharmaceutical, biotechnology, government and academic customers. Our clinical development services include all phases of development (i.e., Phases I-IV), peri- and post-approval and site and patient access services. Our analytical services include a range of high-value, advanced testing services, including bioanalytical, biomarker, vaccine, cGMP and central laboratory services.

- *Clinical Development Services* - Within our clinical development services business, we provide early development and clinical research management services, site and patient access services, and peri- and post-approval services.

  Through our early development and clinical research management services offering, we provide comprehensive support to early clinical development programs, including Phase I trials. We conduct early-phase studies at our dedicated in-patient clinical facilities and complement these Phase I clinical research units with a global network of affiliated clinical trial sites. We also provide full-service protocol management for Phases II-IV clinical research studies for investigational new drugs, biologics and medical devices. Our suite of services for Phases II-IV clinical trials includes protocol design; clinical trial strategic feasibility and investigator site selection; project management; site study startup activities; patient recruitment; clinical monitoring and data capture; data management; biostatistics; safety medical monitoring/pharmacovigilance; regulatory affairs; medical writing; global clinical supplies; eClinical services; quality assurance; and virtual and digitally enabled trial solutions.

  Through our site and patient access services offering we combine our unique-in-industry patient recruitment capability with a large independent network of dedicated clinical research investigator sites to offer services to complement the traditional site selection model, speeding study enrollment through efficient and predictive centralized recruitment while leveraging our network sites exclusively or in conjunction with independent investigators.

  Through our peri- and post-approval services offering, we provide real-world research and evidence-based solutions to demonstrate the real-world effectiveness, safety, and value of biopharmaceutical and

biotechnology products. We also provide industry inbound and outbound peri- and post-approval contact center solutions focused on medical and clinical support to the biopharmaceutical industry.

- *Analytical Services* - We own and operate an integrated and scaled suite of laboratory services. Our bioanalytical laboratories analyze drug and metabolite concentrations from biological fluid and tissue samples within preclinical and human clinical studies. Our biomarker laboratory is closely aligned with both the central laboratories and bioanalytical laboratories to provide customized solutions for biomarker projects, including ligand binding, flow cytometry and molecular genomics. We also perform testing for vaccines, such as immunogenicity testing to evaluate the efficacy of vaccines in inducing cellular and humoral immune responses, and employ molecular detection methods, such as

Business (continued)

polymerase chain reaction testing to detect the absence of pathogens or to characterize attenuated vaccine strains following administration of a vaccine. We provide early preclinical development through post-approval testing services and product analysis laboratory services that are designed to be compliant with cGMPs, and our central laboratories provide highly standardized safety and biomarker testing services with customized results databases for our customers.

Sales and Marketing

We market and sell our products and services through a direct sales force, customer-service professionals, electronic commerce, third-party distributors and various catalogs.

We offer our products and services through leading brands including:

- The Thermo Scientific brand offers customers in research, diagnostics, industrial, and applied markets a complete range of high-end analytical instruments as well as laboratory equipment, software, services, consumables and reagents. Our portfolio of products includes innovative technologies for mass spectrometry, chromatography, elemental analysis, electron microscopy, molecular spectroscopy, sample preparation, informatics, chemical research and analysis, cell culture, bioprocess production, cellular, protein and molecular biology research, allergy testing, drugs-of-abuse testing, therapeutic drug monitoring testing, microbiology, as well as environmental monitoring and process control.
- The Applied Biosystems brand offers customers in research, clinical and applied markets integrated instrument systems, reagents, and software for genetic analysis. Our portfolio includes innovative technologies for genetic sequencing and real-time, digital and end point PCR, that are used to determine meaningful genetic information in applications such as COVID-19 testing, cancer diagnostics, human identification testing, and animal health, as well as inherited and infectious disease.
- The Invitrogen brand offers life science customers a broad range of consumables and instruments that accelerate research and ensure consistency of results. Our portfolio of products includes innovative solutions for cellular analysis and biology, flow cytometry, cell culture, protein expression, synthetic biology, molecular biology and protein biology.
- Fisher Scientific is our channels brand, offering customers a complete portfolio of laboratory equipment and consumables, chemicals, supplies and services used in scientific research, healthcare, safety, and education markets. These products are offered through an extensive network of direct sales professionals, segment-relevant printed collateral and digital content, a state-of-the-art website, and supply-chain management services.
- Unity Lab Services is our instrument and equipment services brand, offering a complete portfolio of services from enterprise-level engagements to individual instruments and laboratory equipment, regardless of the original manufacturer. Through our network of world-class service and support personnel, we provide services that are designed to help our customers improve productivity, reduce costs, and drive decisions with better data.
- Patheon is our contract development and manufacturing brand, representing the comprehensive offering of services that we provide to customers ranging from small biotech to large pharmaceutical companies. We support our customers' development of innovative medicines, including biologics, gene therapies and vaccines. By leveraging our expanding global network of facilities, we deliver high-quality services at all stages of the drug lifecycle, from discovery to development through clinical trials services and commercial manufacturing.
- PPD is our clinical research services brand, helping customers in the biopharmaceutical industry bring their medicines and other treatments to patients around the world. Our clinical development services include all phases of development (i.e., Phases I-IV), peri- and post-approval and site and patient access services. Our analytical services offer a range of high-value, advanced testing services, including bioanalytical, biomarker, vaccine, cGMP and central laboratory services.

We have approximately 15,000 sales personnel including highly trained technical specialists who enable us to better meet the needs of our more technical end-users. We also provide customers with product standardization and other supply-chain-management services to reduce procurement costs.

New Products and Research and Development

Our business includes the development and introduction of new products and may include entry into new business segments. We anticipate that we will continue to make significant expenditures for research and development as we seek to provide a continuing flow of innovative products to maintain and improve our competitive position.

Business (continued)

Resources

Raw Materials

Our management team believes that we have a readily available supply of raw materials for all of our significant products from various sources. No single supplier is material, although for reasons of quality assurance, regulatory requirements, cost effectiveness, availability or uniqueness of design, certain materials components may be sourced from a single supplier or a limited number of suppliers that can readily provide such materials or components.

Raw material and fuel prices are subject to fluctuations due to market conditions. We employ many strategies, including the use of alternative materials, to mitigate the effect of these fluctuations on our results.

For a discussion of risks related to our supply chain and raw material and fuel prices, refer to "Risk Factors" in Part I, Item 1A.

Patents, Licenses and Trademarks

Patents are important in many aspects of our business. No particular patent, or related group of patents, is so important, however, that its loss would significantly affect our operations as a whole. Where appropriate, we seek patent protection for inventions and developments made by our personnel that are incorporated into our products or otherwise fall within our fields of interest. Patent rights resulting from work sponsored by outside parties do not always accrue exclusively to the company and may be limited by agreements or contracts.

We protect some of our technology as trade secrets and, where appropriate, we use trademarks or register trademarks used in connection with products. We also enter into license agreements with others to grant and/or receive rights to intellectual property rights.

All trademarks, trade names, product names, graphics and logos of Thermo Fisher contained herein are trademarks or registered trademarks of Thermo Fisher or its subsidiaries, as applicable, in the United States and/or other countries. Solely for convenience, we may refer to trademarks in this Annual Report on Form 10-K without the ™ and ® symbols. Such references are not intended to indicate, in any way, that we will not assert, to the fullest extent permitted by law, our rights to our trademarks. To the extent other trademarks appear in this Annual Report on Form 10-K, they are the property of their respective owners.

Seasonal Influences

Revenues in the fourth quarter are historically stronger than in other quarters due to the capital spending patterns of industrial, pharmaceutical and government customers. Sales of flu tests and related diagnostic products vary quarter to quarter and year to year based on the severity and duration of each period's flu season. Sales of allergy tests vary quarter to quarter and year to year based on the severity and duration of each period's airborne pollen allergens.

Government Contracts

Although the company transacts business with various government agencies, no government contract is of such magnitude that a renegotiation of profits or termination of the contract at the election of the government agency would have a material adverse effect on the company's financial results.

Competition

The company encounters aggressive and able competition in virtually all of the markets we serve. Because of the diversity of our products and services, we face many different types of competitors and competition. Our competitors include a broad range of manufacturers, third-party distributors and service providers. Competitive climates in many of the markets we serve are characterized by changing technology and customer demands that require continuing research and development. Our success primarily depends on the following factors:

- technical performance and advances in technology that result in new products and improved price/performance ratios;
- product differentiation, availability and reliability;
- the depth of our capabilities;

- our reputation among customers as a quality provider of products and services;
- customer service and support;
- active research and application-development programs; and
- relative prices of our products and services.

Business (continued)

Government Regulation

Environmental Regulations

We are subject to various laws and governmental regulations concerning environmental matters and employee safety and health in the United States and other countries. U.S. federal environmental legislation that affects us includes the Toxic Substances Control Act, the Resource Conservation and Recovery Act, the Clean Air Act, the Clean Water Act, the Safe Drinking Water Act, and the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). We are also subject to regulation by the Occupational Safety and Health Administration (OSHA) concerning employee safety and health matters. The United States Environmental Protection Agency (USEPA), OSHA, and other federal agencies have the authority to promulgate regulations that have an effect on our operations.

In addition to these federal laws and regulations, various states have been delegated certain authority under the aforementioned federal statutes and have authority over these matters under state laws. Many state and local governments have adopted environmental and employee safety and health laws and regulations, some of which are similar to federal requirements.

A number of our operations involve the handling, manufacturing, use or sale of substances that are or could be classified as toxic or hazardous materials within the meaning of applicable laws. Consequently, some risk of environmental harm is inherent in our operations and products, as it is with other companies engaged in similar businesses.

Our expenses for environmental requirements are incurred generally for ongoing compliance and historical remediation matters. Based on current information, we believe that these compliance costs are not material. For historical remediation obligations, our expenditures relate primarily to the cost of permitting, installing, and operating and maintaining groundwater-treatment systems and other remedial measures.

Our Fair Lawn and Somerville, New Jersey facilities entered into administrative consent orders with the New Jersey Department of Environmental Protection in 1984 to maintain groundwater-remediation activities at these sites, and are currently under the State's Licensed Site Remediation Professional Program. As the owner of the Fair Lawn facility, we are listed as a potentially responsible party for remediation within an area called the Fair Lawn Wellfields Superfund Site, and, in 2008, the company and certain other parties entered into a consent order with the USEPA to complete a Remedial Investigation/Feasibility Study. In 2018, the USEPA issued a Record of Decision, setting forth the scope of required remediation work at the site, which includes upgrading a water treatment plant to address constituents such as chlorinated organic compounds, 1,4-dioxane, and perfluorooctanoic acid/perfluorooctane sulfonate (PFOA/PFOS). In 2020, the court approved a consent decree that requires the company and another responsible party to finance and perform the required remediation work with USEPA oversight.

In 2011, our Life Technologies subsidiary entered into a consent decree with the USEPA and other responsible parties to implement a groundwater remedy at the former Davis Landfill Superfund site in Smithfield, Rhode Island. After years of additional study, in September, 2020, USEPA revised its cleanup plan by selecting an interim remedial approach that includes groundwater treatment followed by additional monitoring of site conditions. Depending on the results of these treatment and monitoring activities over the next several years, USEPA anticipates selecting a final groundwater remedy for the site. In November 2021, the 2011 consent decree was amended to reflect the parties' obligations to implement USEPA's interim remedy.

We record accruals for environmental liabilities based on current interpretations of environmental laws and regulations when it is probable that a liability has been incurred and the amount of such liability can be reasonably estimated. We calculate estimates based upon several factors, including reports prepared by environmental specialists and management's knowledge and experience with these environmental matters. We include in these estimates potential costs for investigation, remediation and operation and maintenance of cleanup sites. Accrued liabilities for environmental matters totaled $65 million at December 31, 2021.

These environmental liabilities do not include third-party recoveries to which we may be entitled. We believe that our accrual is adequate for the environmental liabilities we currently expect to incur. As a result we believe that our ultimate liability with respect to environmental matters will not have a material adverse effect on our financial position, results of operations or cash flows. However, we may be subject to remedial or compliance costs due to

future events, such as changes in existing laws and regulations, changes in agency direction or enforcement policies, developments in remediation technologies, changes in the conduct of our operations, and the effect of changes in accounting rules, which could have a material adverse effect on our financial position, results of operations or cash flows. For a discussion of the environmental laws and regulations that the Company's operations, products and services are subject to and other environmental contingencies, refer to Note 12 to our Consolidated Financial Statements – Commitments and Contingencies.

Business (continued)

Other Laws and Regulations

Our operations, and some of the products and services we offer, are subject to a number of complex and stringent laws and regulations governing the development, testing, approval, production, handling, transportation and distribution of chemicals, drugs and other similar products, including the operating and security standards of the Food and Drug Administration, the Drug Enforcement Administration, the Bureau of Alcohol, Tobacco, Firearms and Explosives, and various state boards of pharmacy as well as comparable state and foreign agencies. As Thermo Fisher's businesses also include export and import activities, we are subject to pertinent laws enforced by the U.S. Departments of Commerce, State and Treasury. In addition, our logistics activities must comply with the rules and regulations of the Department of Transportation, the Federal Aviation Administration and similar foreign agencies. While we believe we are in compliance in all material respects with such laws and regulations, any noncompliance could result in substantial fines or otherwise restrict our ability to provide competitive distribution services and thereby have an adverse effect on our financial condition. To date, no such laws or regulations have had a material impact on our operations.

We are subject to laws and regulations governing government contracts, and failure to address these laws and regulations or comply with government contracts could harm our business by leading to a reduction in revenues associated with these customers. We have agreements relating to the sale of our products to government entities and, as a result, we are subject to various statutes and regulations that apply to companies doing business with the government. We are also subject to investigation for compliance with the regulations governing government contracts. A failure to comply with these regulations could also result in suspension of these contracts, criminal, civil and administrative penalties or debarment.

For a discussion of risks related to changes in governmental regulations, refer to "Risk Factors" in Part I, Item 1A.

Human Capital

The success of Thermo Fisher is fueled by colleagues who are highly engaged and feel empowered to achieve their goals. Everything we do starts with our Mission – to enable our customers to make the world healthier, cleaner and safer. Our colleagues understand the role they play in fulfilling that Mission and that inspires them to bring their best to work each day. Our Mission is not only a differentiator for us externally, but a motivator for us internally.

Our culture is rooted in our 4i Values of Integrity, Intensity, Innovation and Involvement. Within this framework, we strive to create a safe, fair and positive working environment for our colleagues around the world. We want our teams to feel they have a stake in our success, a voice in our direction and to be empowered to make a difference for the key stakeholders we serve.

Every year, we conduct an Employee Involvement Survey to solicit direct feedback from our colleagues on what we're doing well and where we need to improve. We then compile the feedback to measure our progress using three key indices: Leadership, Involvement and Inclusion. In 2021, 86 percent of our workforce completed the survey, and we saw marked improvement in each index and across nearly every survey question, despite the challenges of a sustained pandemic environment. Our continued focus on enhancing our culture helps position our company to be an even better place to work.

We are committed to maintaining the strongest team in our industry, focusing on developing and retaining our colleagues, while leveraging our leadership to attract new colleagues to our company. As of December 31, 2021, we employed approximately 130,000 colleagues globally, with an approximate regional distribution as follows: 67,000 based in the Americas, 20,000 in the Asia Pacific region, and nearly 42,000 in Europe, the Middle East and Africa (EMEA).

Diversity and Inclusion

We recognize that the future aspirations outlined in our Vision for 2030, which serves as our long-term roadmap, will only be achievable if we have a culture that values diversity and inclusion. While diversity of gender and ethnicity are important – and we're focused on continuously improving– for us, diversity of backgrounds, experiences and viewpoints is equally vital to our long-term success. When those differences are welcomed and supported, we create an inclusive workplace that unlocks the true benefits of diversity.

Diversity and Inclusion (D&I) is not an initiative at Thermo Fisher. It's woven into the fabric of our culture, and our colleagues are encouraged to openly share the wide range of perspectives they represent. We work together to create an inclusive culture where our colleagues feel they belong and are empowered to contribute, collaborate and innovate. Embracing individual differences is critical to our success. For example, Thermo Fisher was named as a Top 100 Female Friendly Employer by Forbes in 2021 as well as a Best Place to Work for LGBTQ Equality for the seventh consecutive year. Establishing this kind of environment is critical in empowering our colleagues so they can contribute their best ideas and bring their true selves to work each day.

Business (continued)

Our D&I focus is embedded in every stage of our colleague lifecycle – from recruiting to onboarding, training, development and longer-term career planning. We track our progress on our D&I strategic objectives through a core set of metrics that are reviewed during routine business operating mechanisms, including Quarterly Business Reviews, Human Resource Reviews, Board Reviews and through team dashboards that are shared each month with leaders across the company. This enables frequent, meaningful, data-driven discussions across our businesses and functions on a range of D&I factors, including gender and ethnic representation. This approach also ensures we consistently prioritize our opportunities to improve. We understand the critical role diversity plays in sustained business success, and our teams are empowered to ensure our workforce represents the customers we serve. Further, to provide additional transparency to our U.S. workforce demographics, in 2021, following our report submission to the U.S. Equal Employment Opportunity Commission, we disclosed our EEO-1 report on our website and we plan to continue to do so on an annual basis.

We are committed to ensuring our colleagues have access to resources, awareness training and internal networks that offer support and guidance. Our D&I strategy is greatly enabled by our Employee Resource Groups (ERGs), which bring together individuals with similar interests to share experiences, learn from each other and collaborate to identify solutions to business challenges. Our ERGs reinforce that all colleagues can make a difference for our customers, for each other and for our company. As of December 31, 2021, we had 10 ERGs globally, with more than 220 local ERG chapters.

Talent Development

Our overarching goal from a talent perspective is to create opportunities for our colleagues to achieve their full potential and career aspirations here at Thermo Fisher. We are committed to creating an exceptional colleague experience from their first day throughout their career with us. We focus on the entire lifecycle of a colleague's career, from their initial recruitment, to onboarding, through ongoing development and training to enhance their skills so they are in the best position to deliver on their goals and achieve their career aspirations.

In today's environment, we know talent is a key competitive advantage, and that building the strongest team in the industry is critical to our future. From our colleague referral program, summer internships, university relations, to our Graduate Leadership Development Program, we continue to build strong internal and external sourcing channels.

Once on board, talent development at Thermo Fisher is a key organizational capability. We continue to make significant investments to support our colleagues along every step of their career journey to help support their success. Our talent development framework incorporates a multi-faceted approach, including formal and self-paced training, networking opportunities, on-the-job stretch learning, coaching, mentoring and manager training utilizing contemporary technology solutions to support the broad needs of our workforce.

We provide multiple programs at all career levels, from online learning for all colleagues through Thermo Fisher University, to focused trainings for managers at various experience levels, to our Global Leadership Program for executives. We also support our colleagues' career advancement through our tuition reimbursement program.

In a company our size, we can also actively manage our talent through rotational opportunities across our businesses, functions and geographies that help our colleagues gain new experiences, share knowledge and broaden their skills. Our executives and leaders participate in frequent talent discussions as well as formal reviews, leveraging workforce data and predictive analytics to better anticipate the talent requirements of our business based on our growth opportunities and market demand.

Thermo Fisher is dedicated to talent development to meet our evolving business needs and to provide our colleagues with opportunities for long and fulfilling careers. Our colleagues are passionate about our company, and their role in our success, and it's our responsibility to help them reach their full potential.

Total Rewards

We offer a comprehensive total rewards package that we regularly evaluate and measure against established benchmarks to ensure its effectiveness in recruiting and retention, and to position Thermo Fisher as an employer of choice. In 2021, we reinvested an incremental $1 billion back into our global workforce in the form of pay, benefits, and workplace enhancements.

Our health and wellness programs provide competitive, flexible programs that our global colleagues and their families can count on. For example, for U.S. colleagues, we offer a choice of comprehensive national medical, dental and vision plans; a wellness program, including valuable health incentive opportunities and tax-advantaged savings and spending accounts; as well as commuter benefits, employee assistance programs, optional group legal coverage, and company-paid disability, accident and life insurance. We also offer a company-paid proprietary program for cancer care called the Impact Program, which gives our colleagues and their families access to personalized support and direct lines of communication to experts in cancer genetics and genomics. Similar benefits are available in all countries around the world where we operate.

Business (continued)

We also invest in our colleagues' financial health, helping them to grow and protect their savings, plan for the future and share in the success of the company they are helping to build. We deliver comprehensive rewards, including competitive base pay, and also provide a variety of incentive and equity programs that, by design, directly link the impact of colleague contributions to the company's overall success.

Disclosure Pursuant to Section 13(r) of the Exchange Act

In March 2021, the Russian Federal Security Service (the FSB) was designated as a blocked party under Executive Order 13382. During the quarter ended December 31, 2021, one of our Russian affiliates responded to an official inquiry from FSB in connection with the validity of certain product warranties on certain instruments sold by a reseller of the Russian affiliate to a health center based in Russia. This interaction did not result in any revenue or otherwise contribute to our net income for the quarter and all such dealings were legal and authorized by General License 1B issued by the U.S. Department of the Treasury's Office of Foreign Assets Control. We expect our Russian affiliate to respond to similar regulatory inquiries in the future, as necessary and to the extent permitted by applicable U.S. sanctions laws and regulations.

Available Information

The company files annual, quarterly and current reports, proxy statements and other documents with the Securities and Exchange Commission (SEC) under the Exchange Act. The SEC maintains a website that contains reports, proxy and information statements and other information that issuers, including the company, file electronically with the SEC. The public can obtain any documents that we file with the SEC at www.sec.gov. We also make available free of charge on or through our own website at www.thermofisher.com our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and, if applicable, amendments to those reports filed or furnished pursuant to Section 13(a) of the Exchange Act as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC. In addition, paper copies of these documents may be obtained free of charge by writing to the company care of its Investor Relations Department at our principal executive office located at 168 Third Avenue, Waltham, Massachusetts 02451.

Information about Our Executive Officers

As of February 24, 2022, our executive officers were:

Name	Age	Present Title (Fiscal Year First Became Executive Officer)	Other Positions Held
Marc N. Casper	53	Chairman, President and Chief Executive Officer (2001)	President and Chief Executive Officer (2009-2020) Chief Operating Officer (2008-2009) Executive Vice President (2006-2009)
Mark P. Stevenson	59	Retiring Executive Vice President and Chief Operating Officer (2014)	Executive Vice President and Chief Operating Officer (2017-2021) Executive Vice President and President, Life Sciences Solutions (2014-2017) President and Chief Operating Officer, Life Technologies Corporation (2008-2014)
Michel Lagarde	48	Executive Vice President and Chief Operating Officer (2017)	Executive Vice President (2019-2021) Senior Vice President and President, Pharma Services (2017-2019) President and Chief Operating Officer, Patheon N.V. (2016-2017) Managing Director, JLL Partners* (2008-2016)
Gianluca Pettiti	43	Executive Vice President (2021)	Senior Vice President and President, Specialty Diagnostics (2019-2021) President, Biosciences (2018-2019) President, China (2015-2017)
Michael A. Boxer	60	Senior Vice President, General Counsel and Secretary** (2018)	Executive Vice President and Group General Counsel, Luxottica Group S.p.A. (2011-2017)
Stephen Williamson	55	Senior Vice President and Chief Financial Officer (2015)	Vice President, Financial Operations (2008-2015)
Joseph R. Holmes	43	Vice President and Chief Accounting Officer (2021)	Senior Director, Technical Accounting (2017-2021)

*JLL Partners is a private equity firm focused on healthcare.
**Assumed additional role of Secretary effective November 5, 2021.

Item 1A. Risk Factors

Set forth below are the risks that we believe are material to our investors. This section contains forward-looking statements. You should refer to the explanation of the qualifications and limitations on forward-looking statements in Item 1. Business under the caption "Forward-looking Statements".

Industry and Economic Risks

Our growth would suffer if the markets into which we sell our products and services decline, do not grow as anticipated or experience cyclicality. Our growth depends in part on the growth of the markets which we serve. Any decline or lower than expected growth in our served markets would diminish demand for our products and services, which would adversely affect our financial statements. Certain of our businesses operate in industries that may experience periodic, cyclical downturns.

Our business is affected by general economic conditions and related uncertainties affecting markets in which we operate. Our business is affected by general economic conditions, both inside and outside the U.S. If the global economy and financial markets, or economic conditions in Europe, the U.S. or other key markets, continue to be unstable (including as a result of the COVID-19 pandemic), it could adversely affect the business, results of operations and financial condition of the company and its customers, distributors, and suppliers, having the effect of:

- reducing demand for some of our products;
- increasing the rate of order cancellations or delays;
- increasing the risk of excess and obsolete inventories;
- increasing pressure on the prices for our products and services;
- causing supply interruptions, which could disrupt our ability to produce our products; and
- creating longer sales cycles and greater difficulty in collecting sales proceeds.

Economic, political, foreign currency and other risks associated with international sales and operations could adversely affect our results of operations. International markets contribute a substantial portion of our revenues, and we intend to continue expanding our presence in these regions. The exposure to fluctuations in currency exchange rates takes on different forms. International revenues and costs are subject to the risk that fluctuations in exchange rates could adversely affect our reported revenues and profitability when translated into U.S. dollars for financial reporting purposes. These fluctuations could also adversely affect the demand for products and services provided by us. As a multinational corporation, our businesses occasionally invoice third-party customers in currencies other than the one in which they primarily do business (the "functional currency"). Movements in the invoiced currency relative to the functional currency could adversely impact our cash flows and our results of operations. As our international sales grow, exposure to fluctuations in currency exchange rates could have a larger effect on our financial results. In 2021, currency translation had a favorable effect of $619 million on revenues due to the weakening of the U.S. dollar relative to other currencies in which the company sells products and services.

Some emerging market countries may be particularly vulnerable to periods of global and local political, legal, regulatory and financial instability, including issues of geopolitical relations, the imposition of international sanctions in response to certain state actions and/or sovereign debt issues, and may have a higher incidence of corruption and fraudulent business practices. As a result of these and other factors, our strategy to grow in emerging markets may not be successful, and growth rates in these markets may not be sustainable.

In addition, many of our employees, contract manufacturers, suppliers, job functions, outsourcing activities and manufacturing facilities are located outside the U.S. Accordingly, our future results could be harmed by a variety of factors, including:

- interruption to transportation flows for delivery of parts to us and finished goods to our customers;
- changes in a specific country's or region's political, economic or other conditions;
- changes in diplomatic and trade relationships, including new tariffs, trade protection measures, import or export licensing requirements, trade embargoes and sanctions and other trade barriers;

- tariffs imposed by the U.S. on goods from other countries and tariffs imposed by other countries on U.S. goods, including the tariffs adopted by the U.S. government on various imports from China and by the Chinese government on certain U.S. goods;

Risk Factors (continued)

- the impact of public health epidemics/pandemics on the global economy, such as the COVID-19 pandemic;
- uncertainties regarding the collectability of accounts receivable;
- the imposition of governmental controls;
- diverse data privacy and protection requirements;
- supply interruptions, which could disrupt our ability to produce our products;
- negative consequences from changes in tax laws;
- difficulty in staffing and managing widespread operations;
- differing labor regulations;
- differing protection of intellectual property;
- unexpected changes in regulatory requirements;
- the effects of the U.K.'s departure from the E.U., known as Brexit; and
- geopolitical uncertainty or turmoil, including terrorism and war.

Demand for some of our products depends on capital spending policies of our customers and on government funding policies. Our customers include pharmaceutical and chemical companies, laboratories, universities, healthcare providers, government agencies and public and private research institutions. Many factors, including public policy spending priorities, available resources and product and economic cycles, have a significant effect on the capital spending policies of these entities.

Spending by some of these customers fluctuates based on budget allocations and the timely passage of the annual federal budget. An impasse in federal government budget decisions could lead to substantial delays or reductions in federal spending.

We are subject to risks associated with public health crises and epidemics/pandemics, such as the COVID-19 pandemic. Our global operations expose us to risks associated with public health crises and epidemics/pandemics, such as COVID-19. The global spread of COVID-19 has created significant volatility, uncertainty and worldwide economic disruption, resulting in an economic slowdown of potentially extended duration.

COVID-19 has had an adverse impact on certain of our operations, supply chains and distribution systems, including as a result of impacts associated with preventive and precautionary measures that we, other businesses and governments are taking. National, state and local governments have implemented and may continue to implement safety precautions, including quarantines, border closures, increased border controls, travel restrictions, shelter in place orders and shutdowns and other measures. These measures may disrupt normal business operations and may have significant negative impacts on businesses and financial markets worldwide.

The company has mobilized to support the COVID-19 response with products and services that help diagnose the virus as well as assisting customers to develop therapeutics and vaccines used to protect from the virus. Our ability to continue to manufacture products is highly dependent on our ability to maintain the safety and health of our factory employees. The ability of our employees to work may be significantly impacted by individuals contracting or being exposed to COVID-19. While we are following the requirements of governmental authorities and taking preventative and protective measures to prioritize the safety of our employees, these measures may not be successful, and we may be required to temporarily close facilities or take other measures. While we are staying in close communication with our sites, employees, customers and suppliers and acting to mitigate the impact of this dynamic and evolving situation, the duration and extent of the effect of COVID-19 on the company is not determinable.

In addition, several of the company’s businesses have had an increase in revenues due to sales of products addressing diagnosis and treatment of COVID-19. While these positive impacts are expected to continue into 2022, the duration and extent of future revenues from such sales are uncertain and dependent primarily on customer testing demand.

Business Risks

We must develop new products, adapt to rapid and significant technological change and respond to introductions of new products by competitors to remain competitive. Our growth strategy includes significant investment in and expenditures for product development. We sell our products in several industries that are characterized by rapid and significant technological changes, frequent new product and service introductions and enhancements and evolving industry standards. Competitive factors include technological innovation, price, service and delivery, breadth of product line, customer support, e-business

capabilities and the ability to meet the special requirements of customers. Our competitors may adapt more quickly to new technologies and changes in customers' requirements than we can. Without the timely introduction of new products, services and enhancements, our products and services will likely become technologically obsolete over time, in which case our revenues and operating results would suffer.

Many of our existing products and those under development are technologically innovative and require significant planning, design, development and testing at the technological, product and manufacturing-process levels. Our customers use many of our products to develop, test and manufacture their own products. As a result, we must anticipate industry trends and develop products in advance of the commercialization of our customers' products. If we fail to adequately predict our customers' needs and future activities, we may invest heavily in research and development of products and services that do not lead to significant revenues.

It may be difficult for us to implement our strategies for improving internal growth. Our growth depends in part on the growth of the markets which we serve. Any decline or lower than expected growth in our served markets could diminish demand for our products and services, which would adversely affect our results of operations and financial condition. To address this issue, we are pursuing a number of strategies to improve our internal growth, including:

- strengthening our presence in selected geographic markets;
- allocating research and development funding to products with higher growth prospects;
- developing new applications for our technologies;
- expanding our service offerings;
- continuing key customer initiatives;
- combining sales and marketing operations in appropriate markets to compete more effectively;
- finding new markets for our products; and
- continuing the development of commercial tools and infrastructure to increase and support cross-selling opportunities of products and services to take advantage of our depth in product offerings.

We may not be able to successfully implement these strategies, and these strategies may not result in the expected growth of our business.

Because we compete directly with certain of our larger customers and product suppliers, our results of operations could be adversely affected in the short term if these customers or suppliers abruptly discontinue or significantly modify their relationship with us. Our largest customer in the laboratory products business is also a significant competitor. Our business may be harmed in the short term if our competitive relationship in the marketplace with certain of our large customers results in a discontinuation of their purchases from us. In addition, we manufacture products that compete directly with products that we source from third-party suppliers. We also source competitive products from multiple suppliers. Our business could be adversely affected in the short term if any of our large third-party suppliers abruptly discontinues selling products to us.

Integrating PPD into our business may be more difficult, costly or time consuming than expected and the anticipated benefits and cost savings of the transaction may not be fully realized. The success of the PPD acquisition, including the realization of anticipated benefits and cost savings, depends, in part, on our ability to successfully integrate PPD into our business. The integration is a difficult, costly and time-consuming process. It is possible that the integration process could result in the loss of key employees or the disruption of our ongoing business or that the alignment of standards, controls, procedures and policies may adversely affect our ability to maintain relationships with clients, customers, suppliers and employees or to fully achieve the anticipated benefits and cost savings of the transaction. The loss of key employees could adversely affect our ability to successfully conduct our business in the markets in which PPD now operates, which could have an adverse effect on our financial results.

If we experience difficulties with the integration process, the anticipated benefits and cost savings of the PPD acquisition may not be realized fully or at all, or may take longer to realize than expected, and our business may be unable to grow as planned, which could materially impact our business, cash flow, financial condition or results of

operations as well as adversely impact our share price. The integration process may also result in significant expenses and charges, both cash and noncash.

Our inability to complete any pending acquisitions or to successfully integrate any new or previous acquisitions could have a material adverse effect on our business. Our business strategy includes the acquisition of technologies and businesses that complement or augment our existing products and services. Certain acquisitions may be difficult to complete for a number of reasons, including the need for antitrust and/or other regulatory approvals, as well as disputes or litigation. Any

acquisition we may complete may be made at a substantial premium over the fair value of the net identifiable assets of the acquired company. Further, we may not be able to integrate acquired businesses successfully into our existing businesses, make such businesses profitable, or realize anticipated cost savings or synergies, if any, from these acquisitions, which could adversely affect our business.

Moreover, we have acquired many companies and businesses. As a result of these acquisitions, we recorded significant goodwill and indefinite-lived intangible assets (primarily tradenames) on our balance sheet, which amount to approximately $41.92 billion and $1.24 billion, respectively, as of December 31, 2021. In addition, we have definite-lived intangible assets totaling $18.88 billion as of December 31, 2021. We assess the realizability of goodwill and indefinite-lived intangible assets annually as well as whenever events or changes in circumstances indicate that these assets may be impaired. We assess the realizability of definite-lived intangible assets whenever events or changes in circumstances indicate that these assets may be impaired. These events or circumstances would generally include operating losses or a significant decline in earnings associated with the acquired business or asset. Our ability to realize the value of the goodwill and intangible assets will depend on the future cash flows of these businesses. These cash flows in turn depend in part on how well we have integrated these businesses. If we are not able to realize the value of the goodwill and intangible assets, we may be required to incur material charges relating to the impairment of those assets.

Operational Risks

Our reliance upon sole or limited sources of supply for certain materials or components could cause production interruptions, delays and inefficiencies. Some of our businesses purchase certain materials from sole or limited source suppliers for reasons of quality assurance, regulatory requirements, cost effectiveness, availability or uniqueness of design. If these or other suppliers encounter financial, operating or other difficulties or if our relationship with them changes, we might not be able to quickly establish or qualify replacement sources of supply. The supply chains for our businesses could also be disrupted by supplier capacity constraints, bankruptcy or exiting of the business for other reasons, decreased availability of key raw materials or commodities and external events such as natural disasters, pandemic health issues such as COVID-19, war, terrorist actions, governmental actions and legislative or regulatory changes. Any of these factors could result in production interruptions, delays, extended lead times and inefficiencies.

A significant disruption in, or breach in security of, our information technology systems or violation of data privacy laws could adversely affect our business. As a part of our ongoing effort to upgrade our current information systems, we periodically implement new enterprise resource planning software and other software applications to manage certain of our business operations. As we implement and add functionality, problems could arise that we have not foreseen. Such problems could disrupt our ability to provide quotes, take customer orders and otherwise run our business in a timely manner. When we upgrade or change systems, we may suffer interruptions in service, loss of data or reduced functionality. In addition, if our new systems fail to provide accurate pricing and cost data our results of operations and cash flows could be adversely affected.

We also rely on our information technology systems to process, transmit and store electronic information (including sensitive data such as confidential business information and personally identifiable data relating to employees, customers and other business partners) and to manage or support a variety of critical business processes and activities (such as interacting with suppliers, selling our products and services, fulfilling orders and billing, collecting and making payments, shipping products, providing services and support to customers, tracking customer activity, fulfilling contractual obligations and otherwise conducting business). Our systems may be vulnerable to damage or interruption from natural disasters, power loss, telecommunication failures, terrorist attacks, computer hackers, computer viruses, ransomware, phishing, computer denial-of-service attacks, unauthorized access to customer or employee data or company trade secrets, and other attempts to harm our systems. Certain of our systems are not redundant, and our disaster recovery planning is not sufficient for every eventuality. Despite any precautions we may take, such problems could result in, among other consequences, interruptions in our services, which could harm our reputation and financial results. Our key business partners face similar risks and any security breach of their systems could adversely affect our security posture. Any of the cyber-attacks, breaches or other disruptions or damage described above, if significant, could materially interrupt our operations, delay production and shipments, result in theft of our and our customers' intellectual property and trade secrets, damage customer, business partner and employee relationships and our reputation or result in defective products or services, legal claims and

proceedings, liability and penalties under privacy laws and increased cost for security and remediation, each of which could adversely affect our business and financial results. Our liability insurance may not be sufficient in type or amount to cover us against claims related to security breaches, cyber-attacks and other related breaches.

If we are unable to maintain reliable information technology systems and appropriate controls with respect to global data privacy and security requirements and prevent data breaches, we may suffer regulatory consequences in addition to business consequences. As a global organization, we are subject to data privacy and security laws, regulations, and customer-imposed

controls in numerous jurisdictions as a result of having access to and processing confidential, personal and/or sensitive data in the course of our business. For example, in the U.S., individual states regulate data breach and security requirements and multiple governmental bodies assert authority over aspects of the protection of personal privacy. European laws require us to have an approved legal mechanism to transfer personal data out of Europe, and the EU General Data Protection Regulation imposes significantly stricter requirements in how we collect and process personal data. Several countries, such as China and Russia, have passed laws that require personal data relating to their citizens to be maintained on local servers and impose additional data transfer restrictions. Government enforcement actions can be costly and interrupt the regular operation of our business, and data breaches or violations of data privacy laws can result in fines, reputational damage and civil lawsuits, any of which may adversely affect our business, reputation and financial statements.

We may have difficulty attracting and retaining a highly qualified workforce. Our success is largely dependent upon our ability to attract and retain highly qualified scientific, technical, clinical and management workforce in a highly competitive environment. Qualified individuals are in high demand, and we may incur significant costs to attract them. We may face difficulty in attracting and retaining key talent for a number of reasons, including management changes or recruitment by competitors. Our ability to attract and retain key talent also depends in part on how well we maintain a strong workplace culture that is attractive to employees. We cannot ensure that we will be able to hire or retain the personnel necessary for our operations or that the loss of any personnel will not have a material impact on our financial condition and results of operations.

We may incur unexpected costs from increases in fuel and raw material prices, which could reduce our earnings and cash flows. Our primary commodity exposures are for fuel, petroleum-based resins and steel. While we may seek to minimize the impact of price increases through higher prices to customers and various cost-saving measures, our earnings and cash flows could be adversely affected in the event these measures are insufficient to cover our costs.

Because we rely heavily on third-party package-delivery services, a significant disruption in these services or significant increases in prices may disrupt our ability to ship products, increase our costs and lower our profitability. We ship a significant portion of our products to our customers through independent package delivery companies, such as Federal Express in the U.S. and DHL in Europe. We also maintain a small fleet of vehicles dedicated to the delivery of our products and ship our products through other carriers, including national and regional trucking firms, overnight carrier services and the U.S. Postal Service. If one or more of these third-party package-delivery providers were to experience a major work stoppage, preventing our products from being delivered in a timely fashion or causing us to incur additional shipping costs we could not pass on to our customers, our costs could increase and our relationships with certain of our customers could be adversely affected. In addition, if one or more of these third-party package-delivery providers were to increase prices, and we were not able to find comparable alternatives or make adjustments in our delivery network, our profitability could be adversely affected.

Natural disasters, public health crises, political crises, and other catastrophic events or other events outside of our control may disrupt our facilities or the facilities of third parties on which we depend, and could impact customer spending. We have significant operations in California, near major earthquake faults, which make us susceptible to earthquake risk. An earthquake or other natural disaster such as a fire or hurricane or power shortages or outages could disrupt our operations or impair our critical systems. Any of these disruptions or other events outside of our control, such as strikes or other labor unrest, could have an adverse effect on our results of operations. In addition, if any of our facilities, including our manufacturing or warehouse facilities, or the facilities of our suppliers, third-party service providers, or customers, is affected by natural disasters, such as earthquakes, tsunamis, power shortages or outages, floods or monsoons, public health crises, such as pandemics and epidemics, political crises, such as terrorism, war, political instability or other conflict, or other events outside of our control, such as trade protectionism, strikes or other labor unrest, our results of operations could be adversely affected. Moreover, these types of events could negatively impact customer spending in the impacted regions or depending upon the severity, globally, which could also adversely impact our operating results.

Increasing attention to environmental, social and governance matters may impact our business, financial results or stock price. Companies across all industries are facing increasing scrutiny from stakeholders related to their environmental, social and governance (ESG) practices and disclosures, including practices and disclosures related to climate change, diversity and inclusion and governance standards. Investor advocacy groups, certain

institutional investors, lenders, investment funds and other influential investors are also increasingly focused on ESG practices and disclosures and in recent years have placed increasing importance on the implications and social cost of their investments. In addition, government organizations are enhancing or advancing legal and regulatory requirements specific to ESG matters. The heightened stakeholder focus on ESG issues related to our business requires the continuous monitoring of various and evolving laws, regulations, standards and expectations and the associated reporting requirements. A failure to adequately meet stakeholder expectations may result in noncompliance, the loss of business, reputational impacts, diluted market valuation, an inability to attract customers and an

inability to attract and retain top talent. In addition, our adoption of certain standards or mandated compliance to certain requirements could necessitate additional investments that could impact our profitability.

Legal, Quality and Regulatory Risks

Changes in governmental regulations may reduce demand for our products or increase our expenses. We compete in many markets in which we and our customers must comply with federal, state, local and international regulations, such as environmental, health and safety and food and drug regulations. We develop, configure and market our products to meet customer needs created by those regulations. Any significant change in regulations could reduce demand for our products or increase our expenses. For example, we manufacture pharmaceuticals and many of our instruments are marketed to the pharmaceutical industry for use in discovering and developing drugs. Changes in the U.S. Food and Drug Administration's (the FDA) regulation of the drug discovery and development process could have an adverse effect on the demand for these products.

We are subject to laws and regulations governing government contracts, and failure to address these laws and regulations or comply with government contracts could harm our business by leading to a reduction in revenues associated with these customers. We have agreements relating to the sale of our products to government entities and, as a result, we are subject to various statutes and regulations that apply to companies doing business with the government. The laws governing government contracts differ from the laws governing private contracts and government contracts may contain pricing terms and conditions that are not applicable to private contracts. We are also subject to investigation for compliance with the regulations governing government contracts. A failure to comply with these regulations could result in suspension of these contracts, criminal, civil and administrative penalties or debarment.

Our pharma services offerings are highly complex, and if we are unable to provide quality and timely offerings to our customers, our business could suffer. Our pharma services offerings are highly exacting and complex, due in part to strict quality and regulatory requirements. Our operating results in this business depend on our ability to execute and, when necessary, improve our quality management strategy and systems, and our ability to effectively train and maintain our employee base with respect to quality management. A failure of our quality control systems could result in problems with facility operations or preparation or provision of products. In each case, such problems could arise for a variety of reasons, including equipment malfunction, failure to follow specific protocols and procedures, problems with raw materials or environmental factors and damage to, or loss of, manufacturing operations. Such problems could affect production of a particular batch or series of batches of products, requiring the destruction of such products or a halt of facility production altogether.

In addition, our failure to meet required quality standards may result in our failure to timely deliver products to our customers, which in turn could damage our reputation for quality and service. Any such failure could, among other things, lead to increased costs, lost revenues, reimbursement to customers for lost drug product, registered intermediates, registered starting materials, and active pharmaceutical ingredients, other customer claims, damage to and possibly termination of existing customer relationships, time and expense spent investigating the cause and, depending on the cause, similar losses with respect to other batches or products. Production problems in our drug and biologic manufacturing operations could be particularly significant because the cost of raw materials for such manufacturing is often high. If problems in preparation or manufacture of a product or failures to meet required quality standards for that product are not discovered before such product is released to the market, we may be subject to adverse regulatory actions, including product recalls, product seizures, injunctions to halt manufacture and distribution, restrictions on our operations, civil sanctions, including monetary sanctions, and criminal actions. In addition, such problems or failures could subject us to litigation claims, including claims from our customers for reimbursement for the cost of lost or damaged active pharmaceutical ingredients, the cost of which could be significant.

We are subject to product and other liability risks for which we may not have adequate insurance coverage. We may be named as a defendant in product liability lawsuits, which may allege that products or services we have provided from our pharma services offerings have resulted or could result in an unsafe condition or injury to consumers. Additionally, products currently or previously sold by our environmental and process instruments and radiation measurement and security instruments businesses include fixed and portable instruments used for chemical, radiation and trace explosives detection. These products are used in airports, embassies, cargo facilities, border crossings and other high-threat facilities for the detection and prevention of terrorist acts. If any of these products

were to malfunction, it is possible that explosive or radioactive material could fail to be detected by our product, which could lead to product liability claims. In addition, patients involved in our clinical services trials conducted by our clinical development services business or taking drugs approved on the basis of those trials may also bring personal injury claims against us. There are also many other factors beyond our control that could lead to liability claims, such as the reliability and competence of the customers' operators and the training of such operators.

Any such product liability claims brought against us could be significant and any adverse determination may result in liabilities in excess of our insurance coverage. Although we carry product liability insurance, we cannot be certain that our current insurance will be sufficient to cover these claims or that it can be maintained on acceptable terms, if at all.

Risk Factors (continued)

We are required to comply with a wide variety of laws and regulations, and are subject to regulation by various federal, state and foreign agencies. We are subject to various local, state, federal, foreign and transnational laws and regulations, which include the operating and security standards of the FDA, the U.S. Drug Enforcement Agency (the DEA), various state boards of pharmacy, state health departments, the U.S. Department of Health and Human Services (the DHHS), the European Medicines Agency (the EMA), the EU member states and other comparable agencies and, in the future, any changes to such laws and regulations could adversely affect us. In particular, we are subject to laws and regulations concerning current good manufacturing practices and drug safety. Our subsidiaries may be required to register for permits and/or licenses with, and may be required to comply with the laws and regulations of the DEA, the FDA, the DHHS, foreign agencies including the EMA, and other various state boards of pharmacy, state health departments and/or comparable state agencies as well as certain accrediting bodies depending upon the type of operations and location of product distribution, manufacturing and sale.

The manufacture, distribution and marketing of many of our products and services, including medical devices, and our pharma and clinical development services, are subject to extensive ongoing regulation by the FDA, the DEA, the EMA, and other equivalent local, state, federal and non-U.S. regulatory authorities. In addition, we are subject to inspections by these regulatory authorities. Failure by us or by our customers to comply with the requirements of these regulatory authorities, including without limitation, remediating any inspectional observations to the satisfaction of these regulatory authorities, could result in warning letters, product recalls or seizures, monetary sanctions, injunctions to halt manufacture and distribution, restrictions on our operations, civil or criminal sanctions, or withdrawal of existing or denial of pending approvals, including those relating to products or facilities. In addition, such a failure could expose us to contractual or product liability claims, contractual claims from our customers, including claims for reimbursement for lost or damaged active pharmaceutical ingredients or personal injury, as well as ongoing remediation and increased compliance costs, any or all of which could be significant. We are the sole manufacturer of a number of pharmaceuticals for many of our customers and a negative regulatory event could impact our customers' ability to provide products to their customers.

We are also subject to a variety of federal, state, local and international laws and regulations that govern, among other things, the handling, transportation and manufacture of substances that could be classified as hazardous, and we are required to comply with various import laws and export control and economic sanctions laws, which may affect our transactions with certain customers. In certain circumstances, export control and economic sanctions regulations may prohibit the export of certain products, services and technologies. In other circumstances, we may be required to obtain an export license before exporting the controlled item. Compliance with the various import laws that apply to our businesses can restrict our access to, and increase the cost of obtaining, certain products and at times can interrupt our supply of imported inventory. Any noncompliance by us with applicable laws and regulations or the failure to maintain, renew or obtain necessary permits and licenses could result in criminal, civil and administrative penalties and could have an adverse effect on our results of operations.

Our reputation, ability to do business and financial statements may be impaired by improper conduct by any of our employees, agents or business partners. We have internal controls and compliance systems to protect the company against acts committed by employees, agents or businesses that we acquire that would violate U.S. and/or non-U.S. laws, including the laws governing payments to government officials, bribery, fraud, kickbacks and false claims, pricing, sales and marketing practices, conflicts of interest, competition, employment practices and workplace behavior, export and import compliance, money laundering and data privacy, but these controls and systems may not be sufficient to prevent every such wrongful act. In particular, the U.S. Foreign Corrupt Practices Act, the U.K. Bribery Act 2010 and similar anti-bribery laws in other jurisdictions generally prohibit companies and their intermediaries from making improper payments to government officials for the purpose of obtaining or retaining business, and we operate in many parts of the world that have experienced governmental corruption to some degree. Any such improper actions or allegations of such acts could damage our reputation and subject us to civil or criminal investigations in the U.S. and in other jurisdictions and related shareholder lawsuits, could lead to substantial civil and criminal, monetary and nonmonetary penalties and could cause us to incur significant legal and investigatory fees. In addition, the government may seek to hold us liable for violations committed by companies which we acquire. We also rely on our suppliers to adhere to our supplier standards of conduct, and material violations of such standards of conduct could occur that could have a material effect on our business, reputation and financial statements.

Our inability to protect our intellectual property could have a material adverse effect on our business. In addition, third parties may claim that we infringe their intellectual property, and we could suffer significant litigation or licensing expense as a result. We place considerable emphasis on obtaining patent and trade secret protection for significant new technologies, products and processes because of the length of time and expense associated with bringing new products through the development process and into the marketplace. Our success depends in part on our ability to develop patentable products and obtain and enforce patent protection for our products both in the U.S. and in other countries. We own numerous U.S. and foreign patents, and we intend to file additional applications, as appropriate, for patents covering our products. Patents may not

be issued for any pending or future patent applications owned by or licensed to us, and the claims allowed under any issued patents may not be sufficiently broad to protect our technology. Any issued patents owned by or licensed to us may be challenged, invalidated or circumvented, and the rights under these patents may not provide us with competitive advantages. In addition, competitors may design around our technology or develop competing technologies. Intellectual property rights may also be unavailable or limited in some foreign countries, which could make it easier for competitors to capture increased market position. We could incur substantial costs to defend ourselves in suits brought against us or in suits in which we may assert our patent rights against others. An unfavorable outcome of any such litigation could materially adversely affect our business and results of operations.

We also rely on trade secrets and proprietary know-how with which we seek to protect our products, in part, by confidentiality agreements with our collaborators, employees and consultants. These agreements may not adequately protect our trade secrets and other proprietary rights. These agreements may be breached and we may not have adequate remedies for any breach. In addition, our trade secrets may otherwise become known or be independently developed by our competitors.

Third parties may assert claims against us to the effect that we are infringing on their intellectual property rights. In the event that a claim relating to intellectual property is asserted against us, or third parties not affiliated with us hold pending or issued patents that relate to our products or technology, we may seek licenses to such intellectual property or challenge those patents. However, we may be unable to obtain these licenses on commercially reasonable terms, if at all, and our challenge of the patents may be unsuccessful. Our failure to obtain the necessary licenses or other rights could prevent the sale, manufacture, or distribution of our products and, therefore, could have a material adverse effect on our business, financial condition and results of operations.

Risks Relating to Financial Profile

Fluctuations in our effective tax rate may adversely affect our results of operations and cash flows. As a global company, we are subject to taxation in numerous countries, states and other jurisdictions. In preparing our financial statements, we record the amount of tax that is payable in each of the countries, states and other jurisdictions in which we operate. Our future effective tax rate, however, may be lower or higher than experienced in the past due to numerous factors, including a change in the mix of our profitability from country to country, changes in accounting for income taxes, the results of examinations and audits of our tax filings and recently enacted and future changes in tax laws in jurisdictions in which we operate. Any of these factors could cause us to experience an effective tax rate significantly different from previous periods or our current expectations, which could have an adverse effect on our business, results of operations and cash flows.

Our existing and future indebtedness may restrict our investment opportunities or limit our activities and negatively impact our credit ratings. As of December 31, 2021, we had approximately $34.87 billion in outstanding indebtedness. In addition, we have availability to borrow under a revolving credit facility that provides for up to $5.00 billion (as of January 7. 2022) of unsecured multi-currency revolving credit (the Facility). We may also obtain additional long-term debt and lines of credit to meet future financing needs, which would have the effect of increasing our total leverage.

Our leverage could have negative consequences, including increasing our vulnerability to adverse economic and industry conditions, limiting our ability to obtain additional financing and limiting our ability to acquire new products and technologies through strategic acquisitions.

Our ability to make scheduled payments, refinance our obligations or obtain additional financing will depend on our future operating performance and on economic, financial, competitive and other factors beyond our control. Our business may not generate sufficient cash flow to meet our obligations. If we are unable to service our debt, refinance our existing debt or obtain additional financing, we may be forced to delay strategic acquisitions, capital expenditures or research and development expenditures.

Additionally, the agreements governing our debt require that we maintain a financial ratio, and contain affirmative and negative covenants that restrict our activities by, among other limitations, limiting our ability to incur additional indebtedness, merge or consolidate with other entities and create liens. The covenants in the Facility include a Consolidated Net Interest Coverage Ratio (Consolidated EBITDA to Consolidated Net Interest Expense), as such terms are defined in the Facility. Specifically, the company has agreed that, so long as any lender has any commitment under the Facility, any letter of credit is outstanding under the Facility, or any loan or other obligation is

outstanding under the Facility, it will maintain a minimum Consolidated Interest Coverage Ratio of 3.5:1.0 as of the last day of any fiscal quarter.

Our ability to comply with these financial restrictions and covenants is dependent on our future performance, which is subject to prevailing economic conditions and other factors, including factors that are beyond our control such as the impact of foreign exchange rates and interest rates. Our failure to comply with any of these restrictions or covenants may result in an event of default under the applicable debt instrument, which could permit acceleration of the debt under that instrument and

require us to prepay that debt before its scheduled due date. Also, an acceleration of the debt under certain of our debt instruments would trigger an event of default under other of our debt instruments.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

The company owns and leases office, engineering, laboratory, production and warehouse space throughout the world.

Item 3. Legal Proceedings

There are various lawsuits and claims against the company involving product liability, intellectual property, employment and commercial issues. See "Note 12 to our Consolidated Financial Statements – Commitments and Contingencies."

Item 4. Mine Safety Disclosures

Not applicable.

PART II

Item 5. Market for the Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities

Market Price of Common Stock

Our common stock is traded on the New York Stock Exchange under the symbol TMO.

Holders of Common Stock

As of February 5, 2022, the company had 2,619 holders of record of its common stock. This does not include holdings in street or nominee names.

Issuer Purchases of Equity Securities

There was no share repurchase activity for the company's fourth quarter of 2021. On September 23, 2021, the Board of Directors authorized the repurchase of up to $3.00 billion of the company's common stock. Early in the first quarter of 2022, the company repurchased $2.00 billion of the company's common stock. At February 24, 2022, $1.00 billion was available for future repurchases of the company's common stock under this authorization.

Item 6. Reserved

Not applicable.

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

Reference is made throughout this Management's Discussion and Analysis of Financial Condition and Results of Operations to Notes to the Consolidated Financial Statements, which begin on page F-1 of this report. Management's discussion and analysis of financial condition and results of operations for 2019 is included in Item 7 of the company's 2020 Annual Report on Form 10-K filed with the Securities and Exchange Commission.

The company refers to various amounts or measures not prepared in accordance with generally accepted accounting principles (non-GAAP measures). These non-GAAP measures are further described and reconciled to their most directly comparable amount or measure under the section "Non-GAAP Measures" later in this "Management's Discussion and Analysis of Financial Condition and Results of Operations"

Overview

Thermo Fisher Scientific Inc. enables customers to make the world healthier, cleaner and safer by helping them accelerate life sciences research, solve complex analytical challenges, improve patient diagnostics and therapies, and increase laboratory productivity. Markets served include pharmaceutical and biotech, academic and government, industrial and applied, as well as healthcare and diagnostics. The company's operations fall into four segments (Note 4): Life Sciences Solutions, Analytical Instruments, Specialty Diagnostics and Laboratory Products and Biopharma Services.

Financial Highlights - 2021 Compared With 2020

(Dollars in millions except per share amounts)	2021	2020	Change
Revenues	$ 39,211	$ 32,218	22 %
GAAP operating income	$ 10,028	$ 7,794	29 %
GAAP operating income margin	25.6 %	24.2 %	1.4 pt
Adjusted operating income *(non-GAAP measure)*	$ 12,138	$ 9,556	27 %
Adjusted operating income margin *(non-GAAP measure)*	31.0 %	29.7 %	1.3 pt
GAAP diluted earnings per share attributable to Thermo Fisher Scientific Inc.	$ 19.46	$ 15.96	22 %
Adjusted earnings per share *(non-GAAP measure)*	$ 25.13	$ 19.56	28 %

Organic Revenue Growth

Revenue growth	22 %
Impact of acquisitions	3 %
Impact of currency translation	2 %
Organic revenue growth* *(non-GAAP measure)*	17 %

* Results may not sum due to rounding.

The company mobilized in early 2020 to support the COVID-19 pandemic response with products and services that help analyze, diagnose and protect from the virus. However, as a result of the pandemic's impact on various markets, the company saw a significant reduction in customer activity in several businesses by late March 2020 that materially adversely affected primarily the 2020 results of the Analytical Instruments segment and, to a lesser extent, some businesses within the company's other three segments. The negative impact significantly lessened in 2021, but could worsen in 2022 dependent on the success of global efforts to control and unwind from the pandemic and economic activity ramping up. During 2021, the Life Sciences Solutions and Specialty Diagnostics segments as well as the laboratory products business continued to support COVID-19 diagnostic testing, scaling and evolving their molecular diagnostics solutions and plastic consumables businesses to respond to the on-going COVID-19 pandemic. The biosciences and bioproduction businesses also expanded their capacity to meet the needs of pharma and biotech customers as they rapidly expanded their own production volumes to meet global vaccine manufacturing requirements. Additionally, through our pharma services business, we provided our pharma and biotech customers

with the services they needed to develop and produce vaccines and therapies globally. While these positive impacts are expected to continue through 2022, the duration and extent of future revenues from such sales are uncertain and dependent primarily on customer testing as well as therapy and vaccine demand. Sales of products related to COVID-19 response were $9.23 billion and $6.63 billion in 2021 and 2020, respectively.

Conditions were strong in each of the company's end markets during 2021. Revenues were particularly strong in pharma and biotech driven by strong market dynamics and the company's role in supporting customers across a wide range of therapeutic areas, including our role in supporting COVID-19 vaccines and therapies. Customers in the academic and

Overview (continued)

government market increased demand as a result of positive funding trends around the globe and a return to pre-pandemic levels of activity. Customer activity in the industrial and applied market returned to pre-pandemic levels in 2021. Revenues from customers in the diagnostics and healthcare market were driven by growth in COVID-19 testing-related products as the company continued to support the societal response to the pandemic. Sales growth was strong across all geographic regions during 2021. The company continues to execute its proven growth strategy which consists of three pillars:

- Developing high-impact, innovative new products,
- Leveraging our scale in high-growth and emerging markets, and
- Delivering a unique value proposition to our customers.

GAAP operating income margin and adjusted operating income margin increased in 2021 due primarily to profit on higher sales and sales mix, offset in part by strategic growth investments to support the company's near and long-term growth.

The company's references to strategic growth investments generally refer to targeted spending for enhancing commercial capabilities, including expansion of geographic sales reach and e-commerce platforms, marketing initiatives, expanded service and operational infrastructure, research and development projects and other expenditures to enhance the customer experience, as well as incentive compensation and recognition for employees. The company's references throughout this discussion to productivity improvements generally refer to improved cost efficiencies from its Practical Process Improvement (PPI) business system including reduced costs resulting from implementing continuous improvement methodologies, global sourcing initiatives, a lower cost structure following restructuring actions, including headcount reductions and consolidation of facilities, and low cost region manufacturing. Productivity improvements are calculated net of inflationary cost increases.

Notable Recent Acquisitions

On January 15, 2021, the company acquired, within the Laboratory Products and Biopharma Services segment, the Belgium-based European viral vector manufacturing business of Groupe Novasep SAS for $830 million in net cash consideration. The European viral vector manufacturing business provides manufacturing services for vaccines and therapies to biotechnology companies and large biopharma customers. The acquisition expands the segment's capabilities for cell and gene vaccines and therapies.

On February 25, 2021, the company acquired, within the Life Sciences Solutions segment, Mesa Biotech, Inc., a U.S.-based molecular diagnostic company, for $407 million in net cash consideration and contingent consideration with an initial fair value of $65 million due upon the completion of certain milestones. Mesa Biotech has developed and commercialized a PCR based rapid point-of-care testing platform available for detecting infectious diseases including COVID-19. The acquisition enables the company to accelerate the availability of reliable and accurate advanced molecular diagnostics at the point of care.

On September 30, 2021, the company assumed operating responsibility, within the Laboratory Products and Biopharma Services segment, of a new state-of-the-art biologics manufacturing facility in Lengnau, Switzerland from CSL Limited to perform pharma services for CSL with capacity to serve other customers as well. The company expects to make fixed lease payments aggregating to $555 million (excluding renewals) from 2021 to 2041, with additional amounts dependent on the extent of revenues from customers of the facility other than CSL.

On December 8, 2021, the company acquired, within the Laboratory Products and Biopharma Services segment, PPD, Inc., a U.S.-based global provider of clinical research services to the pharma and biotech industry, for $15.99 billion in net cash consideration and $43 million of equity awards exchanged. The addition of PPD's clinical research services enhances our offering to biotech and pharma customers by enabling them to accelerate innovation and increase their productivity within the drug development process. In 2020, PPD generated revenues of $4.68 billion.

On December 30, 2021, the company acquired, within the Life Sciences Solutions segment, PeproTech, Inc., a U.S. based developer and manufacturer of recombinant proteins, for $1.86 billion in net cash consideration. PeproTech provides bioscience reagents known as recombinant proteins, including cytokines and growth factors. The acquisition expands the segment's bioscience offerings.

Results of Operations

The company's management evaluates segment operating performance using operating income before certain charges/credits as defined in Note 4. Accordingly, the following segment data are reported on this basis.

Results of Operations (continued)

(Dollars in millions)	2021	2020
Revenues		
Life Sciences Solutions	$ 15,631	$ 12,168
Analytical Instruments	6,069	5,124
Specialty Diagnostics	5,659	5,343
Laboratory Products and Biopharma Services	14,862	12,245
Eliminations	(3,010)	(2,662)
Consolidated revenues	$ 39,211	$ 32,218

Life Sciences Solutions

(Dollars in millions)	2021	2020	Total Change	Currency Translation	Acquisitions/ Divestitures	Organic* *(non-GAAP measure)*
Revenues	$ 15,631	$ 12,168	28 %	2 %	3 %	23 %
Segment income	$ 7,817	$ 6,109	28 %			
Segment income margin	50.0 %	50.2 %	-0.2 pt			

* Results may not sum due to rounding

The increase in segment revenues at existing businesses in 2021 was driven by a combination of increased demand for testing to diagnose COVID-19 with higher sales of biosciences products and strong demand in each of the segment's businesses. The decrease in segment income margin resulted primarily from strategic growth investments, offset in part by profit on higher sales.

Analytical Instruments

(Dollars in millions)	2021	2020	Total Change	Currency Translation	Acquisitions/ Divestitures	Organic* *(non-GAAP measure)*
Revenues	$ 6,069	$ 5,124	18 %	2 %	— %	17 %
Segment income	1,197	808	48 %			
Segment income margin	19.7 %	15.8 %	3.9 pt			

* Results may not sum due to rounding

The increase in segment revenues at existing businesses in 2021 was due to increased demand for products sold by each of the segment's primary businesses with particular strength in electron microscopy instruments as well as chromatography and mass spectrometry instruments. The increase in segment income margin was primarily due to profit on higher sales and, to a lesser extent, a $108 million charge in 2020 related to a long-term supply contract (discussed in Note 12), offset in part by strategic growth investments.

Specialty Diagnostics

(Dollars in millions)	2021	2020	Total Change	Currency Translation	Acquisitions/ Divestitures	Organic* *(non-GAAP measure)*
Revenues	$ 5,659	$ 5,343	6 %	1 %	— %	5 %
Segment income	1,280	1,368	(6)%			
Segment income margin	22.6 %	25.6 %	-3.0 pt			

* Results may not sum due to rounding

The increase in segment revenues at existing businesses in 2021 was due to higher demand primarily driven by products addressing treatment of COVID-19, with particular strength in sales of products sold through the segment's healthcare market channel, immunodiagnostics and clinical diagnostics products. The decrease in segment income margin was primarily due to sales mix and strategic investments, offset in part by profit on higher sales and, to a lesser extent, a $13 million credit to cost of product revenue as a result of changing the method of accounting for inventories (discussed in Note 1).

Results of Operations (continued)

Laboratory Products and Biopharma Services

(Dollars in millions)	2021	2020	Total Change	Currency Translation	Acquisitions/ Divestitures	Organic* *(non-GAAP measure)*
Revenues	$ 14,862	$ 12,245	21 %	2 %	5 %	15 %
Segment income	1,844	1,271	45 %			
Segment income margin	12.4 %	10.4 %	2.0 pt			

* Results may not sum due to rounding

The increase in segment revenues at existing businesses in 2021 was primarily due to increased demand in each of the segment's principal businesses with particular strength in products sold through its pharma services business and research and safety market channel and, to a lesser extent, laboratory products businesses. The increase in segment income margin was primarily due to profit on higher sales and sales mix, and, to a lesser extent, acquisitions and a $20 million credit to cost of product revenue as a result of changing the method of accounting for inventories (discussed in Note 1), offset in part by strategic growth investments.

Non-operating Items

(Dollars in millions)	2021	2020
Net interest expense	$ 493	$ 488
GAAP other income/(expense)	(694)	(76)
Adjusted other income/(expense) *(non-GAAP measure)*	38	45
GAAP tax rate	12.5 %	11.8 %
Adjusted tax rate *(non-GAAP measure)*	14.6 %	14.3 %

Net interest expense (interest expense less interest income) increased due primarily to the increase in debt to finance the acquisition of PPD and for general corporate purposes, offset in part by lower average interest rates. See additional discussion under the caption "Liquidity and Capital Resources" below.

GAAP other income/(expense) and adjusted other income/(expense) includes currency transaction gains and losses on non-operating monetary assets and liabilities and net periodic pension benefit cost/income, excluding the service cost component. GAAP other income/(expense) in 2021 also includes $767 million of losses on the early extinguishment of debt (Note 10) and $36 million of financing costs associated with obtaining bridge financing commitments in connection with the agreement to acquire PPD (Note 2), offset in part by $66 million of net gains on investments. GAAP other income/(expense) in 2020 includes $81 million of financing costs for a terminated acquisition, primarily for loan commitment fees and entering into hedging contracts and $42 million of expense reclassified from accumulated other comprehensive items related to a hedge arrangement (Note 14), offset in part by $10 million of net gains on investments.

The company's GAAP and adjusted tax rates increased in 2021 compared to 2020, primarily due to higher profits at different marginal rates, offset in part by the benefits of our tax planning initiatives. The company's 2021 GAAP and adjusted tax rates were also impacted by income tax benefits on intra-entity transactions totaling $284 million. In 2020, the company's GAAP and adjusted tax rates were impacted by foreign tax credit planning in Sweden which resulted in $96 million of foreign tax credits, with no related incremental U.S. income tax expense; a net income tax benefit of $51 million from a domestication transaction involving the transfer of non-U.S. subsidiaries to the U.S.; and a $47 million income tax benefit related to a foreign exchange loss for tax purposes on certain intercompany financing arrangements. Additionally, the 2020 GAAP tax rate included a $27 million tax benefit from tax audit settlements.

The effective tax rate in both 2021 and 2020 was also affected by relatively significant earnings in lower tax jurisdictions. Due primarily to the non-deductibility of intangible asset amortization for tax purposes, the company's cash payments for income taxes were higher than its income tax expense for financial reporting purposes and totaled $2.18 billion and $1.32 billion in 2021 and 2020, respectively.

The company expects its GAAP effective tax rate in 2022 will be between 9% and 11% based on currently forecasted rates of profitability in the countries in which the company conducts business and expected generation of foreign tax credits. The effective tax rate can vary significantly from period to period as a result of discrete income tax factors and events. The company expects its adjusted tax rate will be approximately 13% in 2022.

Results of Operations (continued)

The company has operations and a taxable presence in approximately 50 countries outside the U.S. Some of these countries have lower tax rates than the U.S. The company's ability to obtain a benefit from lower tax rates outside the U.S. is dependent on its relative levels of income in countries outside the U.S. and on the statutory tax rates in those countries. Based on the dispersion of the company's non-U.S. income tax provision among many countries, the company believes that a change in the statutory tax rate in any individual country is not likely to materially affect the company's income tax provision or net income, aside from any resulting one-time adjustment to the company's deferred tax balances to reflect a new rate.

Liquidity and Capital Resources

The company's proven growth strategy has enabled it to generate free cash flow as well as access the capital markets. The company deploys its capital primarily via mergers and acquisitions and secondarily via share buybacks and dividends.

(In millions)	December 31, 2021	December 31, 2020
Cash and cash equivalents	$ 4,477	$ 10,325
Total debt	34,870	21,735

Approximately half of the company's cash balances and cash flows from operations are from outside the U.S. The company uses its non-U.S. cash for needs outside of the U.S. including acquisitions, capacity expansion, and repayment of third-party foreign debt by foreign subsidiaries. In addition, the company also transfers cash to the U.S. using non-taxable returns of capital as well as dividends where the related U.S. dividend received deduction or foreign tax credit equals any tax cost arising from the dividends. As a result of using such means of transferring cash to the U.S., the company does not expect any material adverse liquidity effects from its significant non-U.S. cash balances for the foreseeable future.

The company believes that its existing cash and cash equivalents and its future cash flow from operations together with available borrowing capacity under its revolving credit agreement will be sufficient to meet the cash requirements of its existing businesses for the foreseeable future, including at least the next 24 months.

As of December 31, 2021, the company's short-term debt totaled $2.54 billion. On January 7, 2022, the company replaced its prior credit facility with a new revolving credit facility with a bank group that provides up to $5.00 billion of unsecured multi-currency revolving credit (Note 10). If the company borrows under this facility, it intends to leave undrawn an amount equivalent to outstanding commercial paper to provide a source of funds in the event that commercial paper markets are not available. As of December 31, 2021, no borrowings were outstanding under the company's revolving credit facility, although available capacity was reduced by approximately $4 million as a result of outstanding letters of credit.

(In millions)	2021	2020
Net cash provided by operating activities	$ 9,312	$ 8,289
Net cash used in investing activities	(21,932)	(1,510)
Net cash provided by financing activities	6,581	959
Free cash flow *(non-GAAP measure)*	6,809	6,823

During 2021, cash provided by income was offset in part by investments in working capital. Increases in accounts receivable and inventories used cash of $204 million and $1.07 billion, respectively, primarily to support growth in sales. An increase in accounts payable provided cash of $479 million. Changes in other assets and other liabilities used cash of $724 million primarily due to the timing of tax and incentive compensation payments. Cash payments for income taxes were $2.18 billion during 2021.

During 2020, cash provided by income was offset in part by investments in working capital. Increases in accounts receivable and inventories used cash of $1.30 billion and $508 million, respectively, primarily to support

growth in sales. Changes in other assets and other liabilities provided cash of $1.45 billion primarily due to the timing of incentive compensation payments and, to a lesser extent, customer billings. Cash payments for income taxes were $1.32 billion during 2020.

During 2021, acquisitions used cash of $19.40 billion. The company's investing activities also included the purchase of $2.52 billion of property, plant and equipment for capacity and capability investments. During 2020, the company’s investing activities were principally for the purchase of property, plant and equipment.

Liquidity and Capital Resources (continued)

During 2021, issuance of senior notes provided $18.14 billion of cash. A net increase in commercial paper obligations provided cash of $2.51 billion. Repayment of debt used cash of $11.74 billion, including $4.30 billion to repay the debt assumed in the acquisition of PPD. The company's financing activities also included the repurchase of $2.00 billion of the company's common stock (4.1 million shares) and the payment of $395 million in cash dividends. On September 23, 2021, the Board of Directors authorized the repurchase of up to $3.00 billion of the company's common stock. Early in the first quarter of 2022, the company repurchased $2.00 billion of the company's common stock (3.3 million shares). At February 24, 2022, authorization remained for $1.00 billion of future repurchases of the company's common stock. As discussed in Note 10, in the first quarter of 2022 the company redeemed its 3.650% Senior Notes due 2025 for a total cash outlay of $375 million.

During 2020, issuance of senior notes provided cash of $3.46 billion. Repayment of senior notes used cash of $710 million. The company's financing activities also included the repurchase of $1.50 billion of the company's common stock (4.5 million shares) and the payment of $337 million in cash dividends.

The company expects that for all of 2022, expenditures for property, plant and equipment, net of disposals, will be between $2.5 and $2.7 billion.

In addition to the obligations on the balance sheet at December 31, 2021, which include, but are not limited to, debt (Note 10), unrecognized tax benefits (Note 8), operating leases (Note 11) pension obligations (Note 7) and contingent consideration (Note 14), the company has entered into unconditional purchase obligations, in the ordinary course of business, that include agreements to purchase goods, services or fixed assets and to pay royalties (Note 12).

The company is contingently liable with respect to certain legal proceedings and related matters. An unfavorable outcome that differs materially from current accrual estimates, if any, for one or more of the matters described under the heading "*Product Liability, Workers Compensation and Other Personal Injury Matters,*" in Note 12 could have a material adverse effect on the company's financial position as well as its results of operations and cash flows.

Non-GAAP Measures

In addition to the financial measures prepared in accordance with generally accepted accounting principles (GAAP), we use certain non-GAAP financial measures such as organic revenue growth, which is reported revenue growth, excluding the impacts of revenues from acquired/divested businesses and the effects of currency translation. We report organic revenue growth because Thermo Fisher management believes that in order to understand the company's short-term and long-term financial trends, investors may wish to consider the impact of acquisitions and foreign currency translation on revenues. Thermo Fisher management uses organic revenue growth to forecast and evaluate the operational performance of the company as well as to compare revenues of current periods to prior periods.

We report adjusted operating income, adjusted operating income margin, adjusted other income/(expense), adjusted tax rate, and adjusted EPS. We believe that the use of these non-GAAP financial measures, in addition to GAAP financial measures, helps investors to gain a better understanding of our core operating results and future prospects, consistent with how management measures and forecasts the company's core operating performance, especially when comparing such results to previous periods, forecasts, and to the performance of our competitors. Such measures are also used by management in their financial and operating decision-making and for compensation purposes. To calculate these measures we exclude, as applicable:

- Certain acquisition-related costs, including charges for the sale of inventories revalued at the date of acquisition, significant transaction/acquisition-related costs, including changes in estimates of contingent acquisition-related consideration, and other costs associated with obtaining short-term financing commitments for pending/recent acquisitions. We exclude these costs because we do not believe they are indicative of our normal operating costs.
- Costs/income associated with restructuring activities, such as reducing overhead and consolidating facilities. We exclude these costs because we believe that the costs related to restructuring activities are not indicative of our normal operating costs.

- Equity in earnings of unconsolidated entities; impairments of long-lived assets; and certain other gains and losses that are either isolated or cannot be expected to occur again with any predictability, including gains/losses on investments, the sale of businesses, product lines, and real estate, significant litigation-related matters, curtailments/settlements of pension plans, and the early retirement of debt. We exclude these items because they are outside of our normal operations and/or, in certain cases, are difficult to forecast accurately for future periods.
- The expense associated with the amortization of acquisition-related intangible assets because a significant portion of the purchase price for acquisitions may be allocated to intangible assets that have lives of up to 20 years. Exclusion of

Non-GAAP Measures (continued)

the amortization expense allows comparisons of operating results that are consistent over time for both our newly acquired and long-held businesses and with both acquisitive and non-acquisitive peer companies.

- The tax impacts of the above items and the impact of significant tax audits or events (such as changes in deferred taxes from enacted tax rate changes), the latter of which we exclude because they are outside of our normal operations and difficult to forecast accurately for future periods.

We report free cash flow, which is operating cash flow, excluding net capital expenditures to provide a view of the continuing operations' ability to generate cash for use in acquisitions and other investing and financing activities. The company uses this measure as an indication of the strength of the company and its ability to generate cash for use in acquisitions and other investing and financing activities. Free cash flow is not a measure of cash available for discretionary expenditures since we have certain non-discretionary obligations such as debt service that are not deducted from the measure.

The non-GAAP financial measures of Thermo Fisher Scientific's results of operations and cash flows included in this Form 10-K are not meant to be considered superior to or a substitute for Thermo Fisher Scientific's results of operations prepared in accordance with GAAP. Reconciliations of such non-GAAP financial measures to the most directly comparable GAAP financial measures are set forth within the "Overview" and "Results of Operations" sections and below.

(Dollars in millions except per share amounts)	2021		2020	
Reconciliation of adjusted operating income and adjusted operating income margin				
GAAP operating income	$ 10,028	25.6 %	$ 7,794	24.2 %
Cost of revenues charges (a)	8	0.0 %	6	0.0 %
Selling, general and administrative charges (credits) (b)	144	0.4 %	(10)	0.0 %
Restructuring and other costs (c)	197	0.5 %	99	0.3 %
Amortization of acquisition-related intangible assets	1,761	4.5 %	1,667	5.2 %
Adjusted operating income *(non-GAAP measure)*	$ 12,138	31.0 %	$ 9,556	29.7 %
Reconciliation of adjusted other income/(expense)				
GAAP other income/(expense)	$ (694)		$ (76)	
Adjustments (d)	732		121	
Adjusted other income/(expense) *(non-GAAP measure)*	$ 38		$ 45	
Reconciliation of adjusted tax rate				
GAAP tax rate	12.5 %		11.8 %	
Adjustments (e)	2.1 %		2.5 %	
Adjusted tax rate *(non-GAAP measure)*	14.6 %		14.3 %	
Reconciliation of adjusted earnings per share				
GAAP diluted earnings per share (EPS) attributable to Thermo Fisher Scientific Inc.	$ 19.46		$ 15.96	
Cost of revenues charges (a)	0.02		0.01	
Selling, general and administrative charges (credits) (b)	0.36		(0.02)	
Restructuring and other costs (c)	0.50		0.25	
Amortization of acquisition-related intangible assets	4.43		4.17	
Other income/expense adjustments (d)	1.84		0.30	
Benefit from income taxes (e)	(1.49)		(1.12)	
Equity in losses of unconsolidated entities	0.01		0.01	
Adjusted EPS *(non-GAAP measure)*	$ 25.13		$ 19.56	

Non-GAAP Measures (continued)

(Dollars in millions except per share amounts)	2021	2020
Reconciliation of free cash flow		
GAAP net cash provided by operating activities	$ 9,312	$ 8,289
Purchases of property, plant and equipment	(2,523)	(1,474)
Proceeds from sale of property, plant and equipment	20	8
Free cash flow *(non-GAAP measure)*	$ 6,809	$ 6,823

(a) Adjusted results in 2021 exclude charges for the sale of inventories revalued at the date of acquisition. Adjusted results in 2020 exclude $4 million of accelerated depreciation on manufacturing assets to be abandoned due to facility consolidations and $2 million of charges to conform the accounting policies of recently acquired businesses with the company's accounting policies.

(b) Adjusted results in 2021 and 2020 exclude certain third-party expenses (credits), principally transaction/integration costs (including reimbursement thereof) related to recent/terminated acquisitions; credits from changes in estimates of contingent acquisition consideration; and charges associated with product liability litigation.

(c) Adjusted results in 2021 and 2020 exclude restructuring and other costs consisting principally of severance, abandoned facility and other expenses of headcount reductions within several businesses and real estate consolidations, and charges for impairment of acquired technology. Adjusted results in 2021 exclude $35 million of charges for compensation due to employees of recently acquired businesses at the date of acquisition.

(d) Adjusted results in 2021 and 2020 exclude net gains on investments and charges for amortization of bridge loan commitment fees and entering hedging contracts for recent/terminated acquisitions. Adjusted results in 2021 exclude $767 million of losses on the early extinguishment of debt. Adjusted results in 2020 exclude $42 million of charges related to terminated interest rate swaps and $8 million of net charges for the settlement/curtailment of pension plans.

(e) Adjusted provision for income taxes in 2021 and 2020 excludes the incremental tax benefit for the pre-tax reconciling items between GAAP and adjusted net income, incremental tax impacts from audit settlements and incremental tax impacts from adjusting the company's non-U.S. deferred tax balances as a result of tax rate changes.

Critical Accounting Policies and Estimates

The company's discussion and analysis of its financial condition and results of operations is based upon its financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States of America. The preparation of these financial statements requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenues and expenses and related disclosure of contingent liabilities. On an on-going basis, management evaluates its estimates, including those related to acquisition-related measurements and income taxes. Management believes the most complex and sensitive judgments, because of their significance to the consolidated financial statements, result primarily from the need to make estimates about the effects of matters that are inherently uncertain. Management bases its estimates on historical experience, current market and economic conditions and other assumptions that management believes are reasonable. The results of these estimates form the basis for judgments about the carrying value of assets and liabilities where the values are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

The company believes the following represent its critical accounting policies and estimates used in the preparation of its financial statements:

Acquisition-related Measurements

Business Combinations

The company uses assumptions and estimates in determining the fair value of assets acquired and liabilities assumed in a business combination. The determination of the fair value of intangible assets, which represent a significant portion of the purchase price in many of the company's acquisitions, requires the use of significant judgment with regard to (i) the fair value and (ii) whether such intangibles are amortizable or non-amortizable and, if the former, the period and the method by which the intangible asset will be amortized. The company estimates the

fair value of acquisition-related intangible assets principally based on projections of cash flows that will arise from identifiable intangible assets of acquired businesses, which include estimates of customer attrition and technology obsolesce rates. The projected cash flows are discounted to determine the present value of the assets at the dates of acquisition. See Note 2 for additional information about our recent business combinations.

Critical Accounting Policies and Estimates (continued)

Goodwill and Indefinite-lived Intangible Assets

The company evaluates goodwill and indefinite-lived intangible assets for impairment annually and when events occur or circumstances change that would more likely than not reduce the fair value of the asset below its carrying amount. Events or circumstances that might require an interim evaluation include unexpected adverse business conditions, economic factors, unanticipated technological changes or competitive activities, loss of key personnel and acts by governments and courts. Goodwill and indefinite-lived intangible assets totaled $41.92 billion and $1.24 billion, respectively, at December 31, 2021 (see Note 1 for additional information). Estimates of discounted future cash flows require assumptions related to revenue and operating income growth rates, discount rates and other factors. For the goodwill impairment tests, the company considers (i) peer revenues and earnings trading multiples from companies that have operational and financial characteristics that are similar to the respective reporting units and (ii) estimated weighted average costs of capital. Different assumptions from those made in the company's analysis could materially affect projected cash flows and the company's evaluation of goodwill and indefinite-lived intangible assets for impairment.

The company performed the quantitative goodwill impairment test for all of its reporting units and indefinite-lived intangible assets. Indications of fair value based on projections of cash flows, which increased over the prior year projections at higher rates than the increases in carrying values, and on peer revenues, earnings trading multiples and discount rates, which were relatively consistent with the prior year, were sufficient to conclude that no impairment of goodwill or indefinite-lived intangible assets existed at the end of the tenth fiscal month of 2021, the date of the company's annual impairment testing. There were no interim impairments of goodwill or indefinite-lived intangible assets in 2021. There can be no assurance, however, that an economic downturn will not materially adversely affect peer trading multiples and the company's businesses such that they do not achieve their forecasted profitability and these assets become impaired. Should the fair value of the company's goodwill or indefinite-lived intangible assets decline because of reduced operating performance, market declines, or other indicators of impairment, or as a result of changes in the discount rate, charges for impairment may be necessary.

Definite-lived Intangible Assets

Definite-lived intangible assets totaled $18.88 billion at December 31, 2021 (see Note 1 for additional information). The company reviews definite-lived intangible assets for impairment when indication of potential impairment exists, such as a significant reduction in cash flows associated with the assets. Actual cash flows arising from a particular intangible asset could vary from projected cash flows which could imply different carrying values from those established at the dates of acquisition and which could result in impairment of such asset. The company recorded impairments of $0.12 billion in 2021 (see Note 16 for additional information).

Contingent Consideration

The fair value of contingent consideration liabilities, which were initially exchanged for control of businesses or assumed from acquired businesses, was $0.32 billion at December 31, 2021. At each reporting period, the fair value of contingent consideration is determined using either discounted cash flow analyses, Monte Carlo simulations, or fair values of an underlying recapitalization investment portfolio. Changes in the fair value of contingent consideration liabilities can result from changes in estimates of revenue or operating results or in the timing or likelihood of achieving milestones, as well as changes in the fair values of the investments underlying the recapitalization investment portfolio. These changes resulted in (benefits)/charges of $(0.05) billion during 2021 (see Note 14 for additional information).

Income Taxes

Unrecognized Tax Benefits

In the ordinary course of business there is inherent uncertainty in quantifying the company's income tax positions. The company assesses income tax positions and records tax benefits for all years subject to examination based upon management's evaluation of the facts, circumstances and information available at the reporting date. For those tax positions where it is more likely than not that a tax benefit will be sustained, the company has recorded the largest amount of tax benefit with a greater than 50 percent likelihood of being realized upon ultimate settlement with

a taxing authority that has full knowledge of all relevant information. For those income tax positions where it is not more likely than not that a tax benefit will be sustained, no tax benefit has been recognized in the financial statements. Should tax return positions that the company expects are sustainable not be sustained upon audit, the company could be required to record an incremental tax provision for such taxes. The company's liability for these unrecognized tax benefits totaled $1.12 billion at December 31, 2021 (see Note 8 for additional information).

Critical Accounting Policies and Estimates (continued)

The company operates in numerous countries under many legal forms and, as a result, is subject to the jurisdiction of numerous domestic and non-U.S. tax authorities, as well as to tax agreements and treaties among these governments. Determination of taxable income in any jurisdiction requires the company to interpret the related tax laws and regulations and the use of estimates and assumptions regarding significant future events, such as the amount, timing and character of deductions, permissible revenue recognition methods under the tax law and the sources and character of income and tax credits. Changes in tax laws, regulations, agreements and treaties, currency exchange restrictions or the company's level of operations or profitability in each taxing jurisdiction could have an impact upon the amount of current and deferred tax balances and hence the company's net income.

Valuation Allowances

The company estimates the degree to which tax assets will result in a benefit, after consideration of all positive and negative evidence, and provides a valuation allowance for tax assets that it believes will more likely than not go unused. In situations in which the company has been able to determine that its deferred tax assets will be realized, that determination generally relies on future reversals of taxable temporary differences and expected future taxable income. If it becomes more likely than not that a tax asset will be used, the company reverses the related valuation allowance. Any such reversals are recorded as a reduction of the company's tax provision. The company's tax valuation allowance totaled $0.97 billion at December 31, 2021 (see Note 8 for additional information). Should the company's actual future taxable income by tax jurisdiction vary from estimates, additional allowances or reversals thereof may be necessary.

Undistributed Earnings

The company has not provided U.S. state income taxes or additional non-U.S. taxes on certain of its non-U.S. subsidiaries' undistributed earnings, as such amounts are intended to be reinvested outside the United States indefinitely in the respective jurisdictions based on specific business plans and tax strategies (see Note 8 for additional information). These business plans and tax strategies consider: short-term and long-term forecasts and budgets of the U.S. parent and non-U.S. subsidiaries; working capital and other needs in locations where earnings are generated; the company's past practices regarding non-U.S. subsidiary dividends; sources of financing by the U.S. parent, such as issuing debt or equity; and uses of cash by the U.S. parent that are more discretionary in nature, such as business combinations and share repurchase programs. However, should the company change its business plans and tax strategies in the future and decide to repatriate a portion of these earnings to one of its U.S. subsidiaries, including cash maintained by these non-U.S. subsidiaries, the company would recognize additional tax liabilities. It is not practicable to estimate the amount of additional U.S. state income tax and non-U.S. tax liabilities that the company would incur. The company's intent is to only make distributions from non-U.S. subsidiaries in the future when they can be made at no net tax costs.

Recent Accounting Pronouncements

A description of recently issued accounting standards is included under the heading "*Recent Accounting Pronouncements*" in Note 1.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

The company is exposed to market risk from changes in interest rates and currency exchange rates, which could affect its future results of operations and financial condition. The company manages its exposure to these risks through its regular operating and financing activities. The company has periodically hedged interest rate risks of fixed-rate instruments with offsetting interest rate swaps. Additionally, the company uses short-term forward and option contracts primarily to hedge certain balance sheet and operational exposures resulting from changes in currency exchange rates. Such exposures result from purchases, sales, cash and intercompany loans that are denominated in currencies other than the functional currencies of the respective operations. The currency-exchange contracts principally hedge transactions denominated in euro, Swiss franc, British pounds sterling, Canadian dollars, Czech koruna, Japanese yen and Hong Kong dollars. Income and losses arising from these derivative contracts are

recognized as offsets to losses and income resulting from the underlying exposure being hedged. The company does not enter into speculative derivative agreements.

Interest Rates

The company is exposed to changes in interest rates while conducting normal business operations as a result of ongoing investing and financing activities, which affect the company's debt as well as cash and cash equivalents. As of December 31, 2021, the company's debt portfolio was comprised primarily of fixed rate borrowings. The fair market value of the company's

Quantitative and Qualitative Disclosures About Market Risk (continued)

fixed interest rate debt is subject to interest rate risk. Generally, the fair market value of fixed interest rate debt will increase as interest rates fall and decrease as interest rates rise. The total estimated fair value of the company's debt at December 31, 2021 was $36.05 billion (Note 14). Fair values were determined from available market prices using current interest rates and terms to maturity. If interest rates were to decrease by 100 basis points, the fair value of the company's debt at December 31, 2021 would increase by approximately $2.51 billion. If interest rates were to increase by 100 basis points, the fair value of the company's debt at December 31, 2021 would decrease by approximately $2.52 billion.

In addition, interest rate changes would result in a change in the company's interest expense due to variable-rate debt instruments including swap arrangements. In 2021, a 100 basis point increase in interest rates on the swap arrangements and variable-rate debt would have increased the company's annual pre-tax interest expense by approximately $6 million.

Currency Exchange Rates

The company views its investment in international subsidiaries with a functional currency other than the U.S. dollar as permanent. The company's investment in international subsidiaries is sensitive to fluctuations in currency exchange rates. The functional currencies of the company's international subsidiaries are principally denominated in euro, British pounds sterling, Swedish kronor, Canadian dollars, Norwegian kroner and Danish kroner. The effect of a change in the period ending currency exchange rates on the company's net investment in international subsidiaries is reflected in the "accumulated other comprehensive items" component of shareholders' equity. The company also uses foreign currency-denominated debt to partially hedge its net investments in foreign operations against adverse movements in exchange rates. A 10% depreciation in year-end 2021 functional currencies, relative to the U.S. dollar, would result in a reduction of shareholders' equity of approximately $1.23 billion.

The fair value of forward currency-exchange contracts is sensitive to changes in currency exchange rates. The fair value of forward currency-exchange contracts is the estimated amount that the company would pay or receive upon termination of the contract, taking into account the change in currency exchange rates. A 10% depreciation in year-end 2021 non-functional currency exchange rates related to the company's contracts would result in an additional unrealized loss on forward currency-exchange contracts of $71 million. A 10% appreciation in year-end 2021 non-functional currency exchange rates related to the company's contracts would result in an unrealized gain on forward currency-exchange contracts of $71 million. The unrealized gains or losses on forward currency-exchange contracts resulting from changes in currency exchange rates are expected to approximately offset losses or gains on the exposures being hedged.

Certain of the company's cash and cash equivalents are denominated in currencies other than the functional currency of the depositor and are sensitive to changes in currency exchange rates. A 10% depreciation in the related year-end 2021 non-functional currency exchange rates applied to such cash balances would result in a negative impact of $27 million on the company's net income.

Item 8. Financial Statements and Supplementary Data

This data is submitted as a separate section to this report. See Item 15 "Exhibits and Financial Statement Schedules."

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

Not applicable.

Item 9A. Controls and Procedures

Management's Evaluation of Disclosure Controls and Procedures

The company's management, with the participation of the company's chief executive officer and chief financial officer, has evaluated the effectiveness of the company's disclosure controls and procedures (as such term is defined

in Rules 13a-15(e) and 15d-15(e) under the Exchange Act) as of the end of the period covered by this report. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives, and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on such evaluation, the company's chief executive officer and chief financial officer concluded that, as of the end of such period, the company's disclosure controls and procedures were effective at the reasonable assurance level.

Changes in Internal Control over Financial Reporting

There have been no changes in the company's internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) during the fiscal quarter ended December 31, 2021, that have materially affected or are reasonably likely to materially affect the company's internal control over financial reporting.

Management's Annual Report on Internal Control Over Financial Reporting

The company's management, including the company's chief executive officer and chief financial officer, is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the company. Internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. The company's management conducted an assessment of the effectiveness of the company's internal control over financial reporting as of December 31, 2021 based on criteria established in "Internal Control - Integrated Framework" (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on this assessment, the company's management concluded that, as of December 31, 2021, the company's internal control over financial reporting was effective. Management's assessment of the effectiveness of the company's internal control over financial reporting as of December 31, 2021, excluded PPD, Inc., Mesa Biotech, Inc. and PeproTech, Inc., which were acquired by the company in 2021 in separate purchase business combinations. These entities, whose total assets and total revenues were excluded from the company's assessment, represented approximately 5% and 2%, respectively, of the related consolidated amounts as of and for the year ended December 31, 2021. Based upon Securities and Exchange Commission staff guidance, companies are allowed to exclude certain acquisitions from their assessments of internal control over financial reporting during the first year of an acquisition while integrating the acquired companies.

The company's independent registered public accounting firm, PricewaterhouseCoopers LLP, has audited the effectiveness of the company's internal control over financial reporting as of December 31, 2021, as stated in their report that appears on page F-2 of this Annual Report on Form 10-K.

Item 9B. Other Information

On February 24, 2022, the company and Mark P. Stevenson entered into a consulting agreement relating to ongoing services that Mr. Stevenson will provide to the company following his last day as an employee on March 18, 2022. Under the consulting agreement, which has a term ending March 1, 2023, Mr. Stevenson will serve on the company's Scientific Advisory Board and will also provide ongoing advice and services relating to COVID-19 research and products. During the term of the consulting agreement, Mr. Stevenson's outstanding and unvested equity awards granted in fiscal year 2021 will continue to vest in accordance with their original terms based on his continued service to the company and, if he provides consulting services through March 1, 2023, his outstanding and unvested equity awards granted in fiscal year 2021 will vest to the same extent as if he had retired as an employee on March 1, 2023 and the post-termination exercise period of all of Mr. Stevenson's stock options, to the extent vested and exercisable on March 1, 2023, will be extended until the original maximum term of such stock options. The agreement also contains provisions that restrict Mr. Stevenson's ability during the term of the consulting agreement, and (i) for a period of twelve months thereafter, to work for or provide consulting services to, any competitor of the company, and (ii) for a period of eighteen months thereafter, to solicit for hire employees or consultants of the company or to solicit customers or clients of the company.

The foregoing summary of the consulting agreement is subject to, and qualified in its entirety by, the full text of such agreement, which is filed as an exhibit to this Annual Report on Form 10-K.

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections

Not applicable.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

The information with respect to directors required by this Item will be contained in our definitive proxy statement to be filed with the SEC not later than 120 days after the close of business of the fiscal year (2022 Definitive Proxy Statement) including under "Corporate governance—Board of directors—selection, skills and experience—Director nominee skills, experience, and background," and "Corporate governance—Board of directors—selection, skills and experience—Nominees and incumbent directors," and is incorporated in this report by reference.

The information with respect to executive officers required by this Item is included in Item 1 of Part I of this report.

The other information required by this Item will be contained in our 2022 Definitive Proxy Statement including under "Corporate governance—Board practices, policies and processes —Corporate Governance Guidelines" and "Corporate Governance—Board leadership structure—Board committees," and is incorporated in this report by reference.

Item 11. Executive Compensation

The information required by this Item will be contained in our 2022 Definitive Proxy Statement including under "Corporate governance—Compensation of directors," and "Executive compensation," and is incorporated in this report by reference.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

The information required by this Item will be contained in our 2022 Definitive Proxy Statement including under "Information about stock ownership—Equity compensation plan information" and "Information about stock ownership—Security ownership of certain beneficial owners and management," and is incorporated in this report by reference.

Item 13. Certain Relationships and Related Transactions, and Director Independence

The information required by this Item will be contained in our 2022 Definitive Proxy Statement including under "Corporate governance—Board practices, policies and processes—Related person transactions," and "Corporate governance—Board leadership structure—How we assess director independence," and is incorporated in this report by reference.

Item 14. Principal Accountant Fees and Services

The information required by this Item will be contained in our 2022 Definitive Proxy Statement including under "Audit matters—Independent auditor fees" and "Audit matters—Audit Committee's pre-approval policies and procedures," and is incorporated in this report by reference.

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a) The following documents are filed as part of this report:

(1) Consolidated Financial Statements (see Index on page F-1 of this report)

(2) All schedules are omitted because they are not applicable or not required, or because the required information is included either in the consolidated financial statements or in the notes thereto.

(b) Exhibits

See the Exhibit Index on page 41.

Item 16. Form 10-K Summary

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has

Date: Februar

duly caused this Report to be signed on its behalf by the undersigned, thereunto duly authorized.

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the Registrant and in the capacities indicated, as of February 24, 2022.

By: /s/ Marc N. Casper
Marc N. Casper
Chairman, President and Chief Executive Officer
(Principal Executive Officer)

By: /s/ Thomas J. Lynch
Thomas J. Lynch
Lead Director

By: /s/ Stephen Williamson
Stephen Williamson
Senior Vice President and Chief Financial Officer
(Principal Financial Officer)

By: /s/ Jim P. Manzi
Jim P. Manzi
Director

By: /s/ Joseph R. Holmes
Joseph R. Holmes
Vice President and Chief Accounting Officer
(Principal Accounting Officer)

By: /s/ James C. Mullen
James C. Mullen
Director

By: /s/ Nelson J. Chai
Nelson J. Chai
Director

By: /s/ Lars R. Sørensen
Lars R. Sørensen
Director

By: /s/ C. Martin Harris
C. Martin Harris
Director

By: /s/ Debora L. Spar
Debora L. Spar
Director

By: /s/ Tyler E. Jacks
Tyler E. Jacks
Director

By: /s/ Scott M. Sperling
Scott M. Sperling
Director

By: /s/ R. Alexandra Keith
R. Alexandra Keith
Director

By: /s/ Dion J. Weisler
Dion J. Weisler
Director

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EXHIBIT INDEX

Exhibit Number	Description of Exhibit
2.1	Agreement and Plan of Merger, dated as of April 15, 2021, by and among Thermo Fisher Scientific Inc., Powder Acquisition Corp. and PPD, Inc. (filed as Exhibit 2.1 to the Registrant's Current Report on Form 8-K filed April 16, 2021 [File No. 1-8002] and incorporated in this document by reference).
3.1	Amended and Restated Certificate of Incorporation of the Registrant (filed as Exhibit 3.1 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2005 [File No. 1-8002] and incorporated in this document by reference).
3.2	Amendment to Thermo Fisher Scientific Inc.'s Third Amended and Restated Certificate of Incorporation (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed November 14, 2006 [File No. 1-8002] and incorporated in this document by reference).
3.3	Certificate of Elimination of the Series B Junior Participating Preferred Stock of the Company, dated November 13, 2015 (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed November 16, 2015 [File No. 1-8002] and incorporated in this document by reference).
3.4	Amended and Restated By-Laws of the Registrant, as amended and effective as of July 8, 2021 (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed July 9, 2021 [File No. 1-8002] and incorporated in this document by reference).
	The Registrant agrees, pursuant to Item 601(b)(4)(iii)(A) of Regulation S-K, to furnish to the Commission, upon request, a copy of each instrument with respect to long-term debt of the Registrant or its consolidated subsidiaries.
4.1	Indenture dated as of November 20, 2009 between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 99.1 to the Registrant's Current Report on Form 8-K filed November 20, 2009 [File No. 1-8002] and incorporated in this document by reference).
4.2	Sixth Supplemental Indenture, dated as of December 11, 2013, between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 99.2 to the Registrant's Current Report on Form 8-K filed December 11, 2013 [File No. 1-8002] and incorporated in this document by reference).
4.3	Eighth Supplemental Indenture, dated as of November 24, 2014, among the Company, The Bank of New York Mellon Trust Company, N.A., as trustee, and The Bank of New York Mellon, London Branch, as paying agent (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed November 24, 2014 [File No. 1-8002] and incorporated in this document by reference).
4.4	Eleventh Supplemental Indenture, dated as of December 9, 2015, between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed December 9, 2015 [File No. 1-8002] and incorporated in this document by reference).
4.5	Thirteenth Supplemental Indenture, dated as of September 12, 2016, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed September 12, 2016 [File No. 1-8002] and incorporated in this document by reference).
4.6	Fifteenth Supplemental Indenture, dated as of March 16, 2017, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed March 16, 2017 [File No. 1-8002] and incorporated in this document by reference).
4.7	Sixteenth Supplemental Indenture, dated as of July 24, 2017, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed July 24, 2017 [File No. 1-8002] and incorporated in this document by reference).
4.8	Seventeenth Supplemental Indenture, dated as of August 14, 2017, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed August 14, 2017 [File No. 1-8002] and incorporated in this document by reference).
4.9	Eighteenth Supplemental Indenture, dated as of September 30, 2019, between the Company, and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed September 30, 2019 [File No. 1-8002] and incorporated in this document by reference).
4.10	Nineteenth Supplemental Indenture, dated as of October 8, 2019, between the Company, and the Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed October 8, 2019 [File No. 1-8002] and incorporated in this document by reference).
4.11	Twenty-First Supplemental Indenture, dated as of April 2, 2020, between the Company, and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed April 2, 2020 [File No. 1-8002] and incorporated in this document by reference).
4.12	Twenty-Second Supplemental Indenture, dated as of August 23, 2021, between the Company, and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed August 23, 2021 [File No. 1-8002] and incorporated in this document by reference).
4.13	Third Supplemental Indenture, dated as of October 18, 2021, among Thermo Fisher Scientific (Finance I) B.V. (Thermo Fisher International), as issuer, the Company, as guarantor, and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed October 18, 2021 [File No. 1-8002] and incorporated in this document by reference).
4.14	Twenty-Third Supplemental Indenture, dated as of October 22, 2021, between the Company, and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed October 22, 2021 [File No. 1-8002] and incorporated in this document by reference).
4.15	Indenture, dated as of August 9, 2016, among Thermo Fisher International, as issuer, the Company, as guarantor, and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.1 to the Registrant's Current

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Exhibit Number	Description of Exhibit
4.16	Fourth Supplemental Indenture, dated as of November 18, 2021, among Thermo Fisher Scientific (Finance I) B.V. (Thermo Fisher International), as issuer, the Company, as guarantor, and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed August 9, 2016 [File No. 1-8002] and incorporated in this document by reference).
4.17	Description of the Registrant's Securities
10.1	Thermo Fisher Scientific Inc. Deferred Compensation Plan for Directors of the Registrant, as amended and restated effective November 10, 2006 (filed as Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 29, 2007 [File No. 1-8002] and incorporated in this document by reference).*
10.2	Thermo Electron Corporation Deferred Compensation Plan, effective November 1, 2001 (filed as Exhibit 10.13 to the Registrant's Annual Report on Form 10-K for the fiscal year ended December 29, 2001 [File No. 1-8002] and incorporated in this document by reference).*
10.3	Form of Amended and Restated Indemnification Agreement between the Registrant and its directors and officers (filed as Exhibit 10.2 to the Registrant's Registration Statement on Form S-4 [Reg. No. 333-90661] and incorporated in this document by reference).*
10.4	Summary of Thermo Fisher Scientific Inc. Annual Non-Management Director Compensation (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed February 24, 2022 [File No. 1-8002] and incorporated in this document by reference).*
10.5	Summary of 2021 Annual Cash Incentive Plan*
10.6	Form of Noncompetition Agreement between the Registrant and certain key employees and executive officers, effective as of January 1, 2009 (filed as Exhibit 10.25 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.7	Retirement Plan for Non-Employee Directors of Fisher Scientific International Inc. (filed as Exhibit 10.12 to Fisher Scientific International Inc.'s Annual Report on Form 10-K for the year ended December 31, 1992 [File No. 1-10920] and incorporated in this document by reference).*
10.8	First Amendment to the Fisher Scientific International Inc. Retirement Plan for Non-Employee Directors (filed as Exhibit 10.04 to Fisher Scientific International Inc.'s Quarterly Report on Form 10-Q for the quarter ended March 31, 2005 [File No. 1-10920] and incorporated in this document by reference).*
10.9	Amendment to Retirement Plan for Non-Employee Directors of Fisher Scientific International Inc. (filed as Exhibit 10.02 to Fisher Scientific International Inc.'s Current Report on Form 8-K filed March 7, 2006 [File No. 1-10920] and incorporated in this document by reference).*
10.10	Thermo Fisher Scientific Inc. Amended and Restated 2005 Deferred Compensation Plan, effective January 1, 2020 (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 27, 2020 [File No. 1-8002] and incorporated in this document by reference).*
10.11	2009 Restatement of Executive Severance Agreement, between Marc N. Casper and the Registrant, dated November 21, 2009 (filed as Exhibit 10.5 to the Registrant's Current Report on Form 8-K filed November 25, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.12	Executive Change In Control Retention Agreement, between Marc N. Casper and the Registrant, dated November 21, 2009 (filed as Exhibit 10.6 to the Registrant's Current Report on Form 8-K filed November 25, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.13	Noncompetition Agreement, between Marc N. Casper and the Registrant, dated November 21, 2009 (filed as Exhibit 10.7 to the Registrant's Current Report on Form 8-K filed November 25, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.14	Amendment No. 1 to 2009 Restatement of Executive Severance Agreement, dated February 25, 2010, between the Registrant and Marc N. Casper (filed as Exhibit 10.2 to the Registrant's Current Report on Form 8-K filed February 25, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.15	Amendment No. 2 to 2009 Restatement of Executive Severance Agreement, dated November 30, 2010, between the Registrant and Marc N. Casper (filed as Exhibit 10.55 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.16	Amendment No. 1 to Executive Change In Control Retention Agreement, dated November 30, 2010, between Marc N. Casper and the Registrant (filed as Exhibit 10.56 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.17	Amendment No. 2 to Executive Change in Control Retention Agreement, dated March 16, 2018, between Marc N. Casper and the Registrant (filed as Exhibit 10.3 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 31, 2018 [File No. 1-8002] and incorporated in this document by reference).*
10.18	Form of Executive Change in Control Retention Agreement for Officers (other than Marc N. Casper) (filed as Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 31, 2018 [File No. 1-8002] and incorporated in this document by reference).*
10.19	Form of Thermo Fisher Scientific Inc.'s Restricted Stock Unit Agreement for Directors (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended April 2, 2011 [File No. 1-8002] and incorporated in this document by reference).*

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Exhibit Number	Description of Exhibit
10.20	Form of Thermo Fisher Scientific Inc.'s Performance Restricted Stock Unit Agreement effective February 26, 2013 (filed as Exhibit 10.4 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.21	Form of Performance Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc N. Casper effective February 26, 2013 (filed as Exhibit 10.3 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.22	Form of Nonstatutory Stock Option Agreement between Thermo Fisher Scientific Inc. and Marc N. Casper effective February 26, 2013 (filed as Exhibit 10.5 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.23	Thermo Fisher Scientific Inc. 2013 Stock Incentive Plan (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed May 23, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.24	Supplemental Executive Retirement Plan effective as of December 31, 2005, as amended and restated as of August 28, 2006 (filed as Exhibit 10.3 to Applera Corporation's Quarterly Report on Form 10-Q for the quarter ended September 30, 2006 [File No. 1-04389] and incorporated in this document by reference).*
10.25	Amendment to Supplemental Executive Retirement Plan, effective as of January 1, 2010 (filed as Exhibit 10.1 to Life Technologies Corporation's Current Report on Form 8-K filed December 18, 2009 [File No. 000-25317] and incorporated in this document by reference).*
10.26	Noncompetition Agreement between the Registrant and Mark P. Stevenson, dated September 10, 2015 (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 26, 2015 [File No. 1-8002] and incorporated in this document by reference).*
10.27	Form of Thermo Fisher Scientific Inc.'s Nonstatutory Stock Option Agreement for Officers (filed as Exhibit 10.44 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2016 [File No. 1-8002] and incorporated in this document by reference).*
10.28	Patheon N.V. 2016 Omnibus Incentive Plan (filed as Exhibit 10.2 to the Current Report on Form 8-K filed by Patheon N.V. on July 26, 2016 [File No. 001-37837] and incorporated in this document by reference).*
10.29	Amendment to Patheon N.V. 2016 Omnibus Incentive Plan, dated March 7, 2017 (filed as Exhibit 4.5 to the Registrant's Registration Statement on Form S-8 filed August 29, 2017 [File No. 1-8002] and incorporated in this document by reference).*
10.30	Amendment to Patheon N.V. 2016 Omnibus Incentive Plan, dated August 23, 2017 (filed as Exhibit 4.6 to the Registrant's Registration Statement on Form S-8 filed August 29, 2017 [File No. 1-8002] and incorporated in this document by reference).*
10.31	Credit Agreement, dated January 7, 2022, among Thermo Fisher Scientific Inc., certain Subsidiaries of Thermo Fisher Scientific Inc. from time to time party thereto, Bank of America, N.A., as Administrative Agent and each lender from time to time party thereto (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed January 7, 2022 [File No. 1-8002] and incorporated in this document by reference).
10.32	Form of Performance Restricted Stock Unit Agreement effective February 26, 2019 (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 30, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.33	Form of Performance Restricted Stock Unit Agreement for Marc N. Casper effective February 26, 2019 (filed as Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 30, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.34	Letter Agreement between the Registrant and Michel Lagarde dated August 28, 2017 (filed as Exhibit 10.39 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.35	Option Agreement Under the Patheon N.V. 2016 Omnibus Incentive Plan between Patheon N.V. and Michel Lagarde dated July 20, 2016 (filed as Exhibit 10.40 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.36	Option Agreement Under the Patheon N.V. 2016 Omnibus Incentive Plan between Patheon N.V. and Michel Lagarde dated March 23, 2017 (filed as Exhibit 10.42 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.37	Thermo Fisher Scientific Inc. Executive Severance Policy (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 29, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.38	Form of Noncompetition Agreement between the Registrant and certain key employees and executive officers (filed as Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 29, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.39	Form of Thermo Fisher Scientific Inc.'s Performance Restricted Stock Unit Agreement effective as of February 25, 2020 (filed as Exhibit 10.45 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.40	Form of Thermo Fisher Scientific Inc.'s Restricted Stock Unit Agreement effective as of February 25, 2020 (filed as Exhibit 10.46 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*

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Exhibit Number	Description of Exhibit
10.41	Form of Thermo Fisher Scientific Inc.'s Nonstatutory Stock Option Agreement for Officers effective as of February 25, 2020 (filed as Exhibit 10.47 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.42	Form of Performance Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc N. Casper effective as of February 25, 2020 (filed as Exhibit 10.48 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.43	Form of Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc N. Casper effective as of February 25, 2020 (filed as Exhibit 10.49 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.44	Form of Nonstatutory Stock Option Agreement between Thermo Fisher Scientific Inc. and Marc N. Casper effective as of February 25, 2020 (filed as Exhibit 10.50 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.45	Form of Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc N. Casper (filed as Exhibit 10.47 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2020 [File No. 1-8002] and incorporated in this document by reference).*
10.46	Form of Performance Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc N. Casper (filed as Exhibit 10.48 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2020 [File No. 1-8002] and incorporated in this document by reference).*
10.47	Form of Thermo Fisher Scientific Inc.'s Performance Restricted Stock Unit Agreement (filed as Exhibit 10.49 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2020 [File No. 1-8002] and incorporated in this document by reference).*
10.48	PPD, Inc. 2020 Omnibus Incentive Plan (filed as Exhibit 10.38 to PPD Inc.'s Form S-1/A filed January 27, 2020 [File No. 333-235860] and incorporated in this document by reference).*
10.49	Consulting Agreement between the Registrant and Mark P. Stevenson, dated February 24, 2022*
21	Subsidiaries of the Registrant.
22	Subsidiary Issuer of Guaranteed Securities.
23.1	Consent of PricewaterhouseCoopers LLP, an Independent Registered Public Accounting Firm.
31.1	Certification of Chief Executive Officer required by Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification of Chief Financial Officer required by Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1	Certification of Chief Executive Officer required by Exchange Act Rules 13a-14(b) and 15d-14(b), as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.**
32.2	Certification of Chief Financial Officer required by Exchange Act Rules 13a-14(b) and 15d-14(b), as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.**
101.INS	XBRL Instance Document - the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.
101.SCH	XBRL Taxonomy Extension Schema Document.
101.CAL	XBRL Taxonomy Calculation Linkbase Document.
101.DEF	XBRL Taxonomy Definition Linkbase Document.
101.LAB	XBRL Taxonomy Label Linkbase Document.
101.PRE	XBRL Taxonomy Presentation Linkbase Document.
104	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101).

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*Indicates management contract or compensatory plan, contract or arrangement.

** Certification is not deemed “filed” for purposes of Section 18 of the Exchange Act or otherwise subject to the liability of that section. Such certification is not deemed to be incorporated by reference into any filing under the Securities Act or the Exchange Act except to the extent that the registrant specifically incorporates it by reference.

THERMO FISHER SCIENTIFIC INC.

INDEX OF CONSOLIDATED FINANCIAL STATEMENTS

The following Consolidated Financial Statements of the Registrant and its subsidiaries are required to be included in Item 15:

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Shareholders of Thermo Fisher Scientific Inc.

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheet of Thermo Fisher Scientific Inc. and its subsidiaries (the "Company") as of December 31, 2021 and 2020, and the related consolidated statements of income, of comprehensive income, of redeemable noncontrolling interest and equity and of cash flows for each of the three years in the period ended December 31, 2021, including the related notes (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 2021, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2021 and 2020, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2021 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2021, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the COSO.

Change in Accounting Principle

As discussed in Note 1 to the consolidated financial statements, the Company changed the manner in which it accounts for leases in 2019.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in Management's Annual Report on Internal Control Over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and

significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

As described in Management's Annual Report on Internal Control Over Financial Reporting, management has excluded PPD, Inc., Mesa Biotech, Inc. and PeproTech, Inc. from its assessment of internal control over financial reporting as of December 31, 2021 because they were acquired by the Company in purchase business combinations during 2021. We have also excluded PPD, Inc., Mesa Biotech, Inc. and PeproTech, Inc. from our audit of internal control over financial reporting. PPD, Inc., Mesa Biotech, Inc. and PeproTech, Inc. are wholly-owned subsidiaries whose total assets and total revenues excluded from management's assessment and our audit of internal control over financial reporting collectively represent approximately 5% and 2%, respectively, of the related consolidated financial statement amounts as of and for the year ended December 31, 2021.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current period audit of the consolidated financial statements that were communicated or required to be communicated to the audit committee and that (i) relate to accounts or disclosures that are material to the consolidated financial statements and (ii) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Income taxes

As described in Note 8 to the consolidated financial statements, the Company's provision for income taxes for the year ended December 31, 2021 was $1,109 million. The Company has

deferred tax liabilities, net, of $2,829 million (including a valuation allowance of $968 million) and unrecognized tax benefits of $1,124 million as of December 31, 2021. As disclosed by management, the Company operates in numerous countries under many legal forms and, as a result, is subject to the jurisdiction of numerous domestic and non-U.S. tax authorities, as well as to tax agreements and treaties among these governments. Determination of taxable income in any jurisdiction requires management to interpret the related tax laws and regulations and to use estimates and assumptions regarding significant future events, such as the amount, timing and character of deductions, permissible revenue recognition methods under the tax law and the sources and character of income and tax credits. Management assesses income tax positions and records tax benefits for all years subject to examination based upon management's evaluation of the facts, circumstances and information available at the reporting date. For those tax positions where it is more likely than not that a tax benefit will be sustained, management has recorded the largest amount of tax benefit with a greater than 50 percent likelihood of being realized upon ultimate settlement with a taxing authority that has full knowledge of all relevant information. For those income tax positions where it is not more likely than not that a tax benefit will be sustained, no tax benefit has been recognized in the financial statements. Management estimates the degree to which tax assets will result in a benefit, after consideration of all positive and negative evidence, and provides a valuation allowance for tax assets that it believes will more likely than not go unused. In situations in which management has been able to determine that the Company's deferred tax assets will be realized, that determination generally relies on future reversals of taxable temporary differences and expected future taxable income. If it becomes more likely than not that a tax asset will be used, management reverses the related valuation allowance.

The principal considerations for our determination that performing procedures relating to income taxes is a critical audit matter are (i) the significant judgment by management when interpreting the numerous and complex tax laws and regulations as it relates to determining the provision for income taxes, deferred tax assets and liabilities, including the valuation allowance, and liabilities for unrecognized tax benefits, (ii) a high degree of auditor judgment, subjectivity, and effort in performing procedures and evaluating audit evidence related to the provision for income taxes, deferred tax assets and liabilities, including the valuation allowance, and liabilities for unrecognized tax benefits, and (iii) the audit effort involved the use of professionals with specialized skill and knowledge.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to the provision for income taxes, deferred tax assets and liabilities, including the valuation allowance, and liabilities for unrecognized tax benefits. These procedures also included, among others (i) testing the accuracy of the provision for income taxes, including the rate reconciliation and permanent and temporary differences, (ii) evaluating whether the data utilized in the calculations of the provision for income taxes, deferred tax assets and liabilities, and liabilities for unrecognized tax benefits were appropriate and consistent with evidence obtained in other areas of the audit, (iii) evaluating management's assessment of the realizability of deferred tax assets on a jurisdictional basis, (iv) evaluating the identification of liabilities for unrecognized tax benefits and the reasonableness of the more likely than not determination in consideration of court decisions, legislative actions, statutes of limitations, and developments in tax examinations by jurisdiction, (v) testing the calculation of the liability for unrecognized tax benefits by jurisdiction, including estimates of the amount of income tax benefit expected to be sustained, and (vi) evaluating the adequacy of the Company's disclosures. Professionals with specialized skill and knowledge were used to assist in evaluating the reasonableness of management's judgments and estimates related to the application of foreign and domestic tax laws and regulations.

Acquisition of PPD, Inc. - Valuation of Customer Relationships Intangible Assets

As described in Note 2 to the consolidated financial statements, on December 8, 2021, the Company acquired PPD, Inc. for $15.99 billion in net cash consideration and $43 million of equity awards exchanged, which resulted in $6,264 million of customer relationships intangible assets being recorded. As disclosed by management, assumptions and estimates are used in determining the fair value of the customer relationships intangible assets acquired in a business combination. Management estimates the fair value of acquisition-related customer relationships intangible assets principally based on projections of cash flows that will arise from the customer relationships of PPD, Inc., which include estimates of customer attrition rates. The projected cash flows are discounted to determine the present value of the assets at the date of the acquisition.

The principal considerations for our determination that performing procedures relating to the valuation of the acquired customer relationships intangible assets from the acquisition of PPD, Inc. is a critical audit matter are (i) the significant judgment by management when determining the fair value of the acquired customer relationships intangible assets, (ii) a high degree of auditor judgment, subjectivity, and effort in performing procedures and evaluating management's significant assumptions related to projections of cash flows and discount rates, and (iii) the audit effort involved the use of professionals with specialized skill and knowledge.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to the acquisition accounting, including controls over management's valuation of the customer relationships intangible assets. These procedures also included, among others (i) reading the purchase agreement, (ii) testing management's process for determining the fair values of the acquired customer relationships intangible assets, (iii) evaluating the appropriateness of the valuation methodology utilizing discounted projected cash flows, (iv) testing the completeness and accuracy of the underlying data used in the discounted projected cash flows, and (v) evaluating the reasonableness of the significant assumptions used by management related to projections of cash flows and discount rates. Evaluating management's significant assumption related to projections of cash flows involved evaluating whether the significant assumption used by management was reasonable considering (i) the current and past performance of PPD, Inc., (ii) the consistency with external market and industry data, and (iii) whether the significant assumption was consistent with evidence obtained in other areas of the audit. Professionals with specialized skill and knowledge were used to assist in evaluating (i) the appropriateness of the valuation methodology utilizing discounted projected cash flows and (ii) the reasonableness of the discount rate significant assumption.

/s/PricewaterhouseCoopers LLP
Boston, Massachusetts
February 24, 2022

We have served as the Company's auditor since 2002.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED BALANCE SHEET

(In millions except share and per share amounts)	December 31, 2021	December 31, 2020
Assets		
Current assets:		
Cash and cash equivalents	$ 4,477	$ 10,325
Accounts receivable, less allowances of $150 and $135	7,977	5,741
Inventories	5,051	4,029
Contract assets, net	968	731
Other current assets	1,640	1,131
Total current assets	20,113	21,957
Property, plant and equipment, net	8,333	5,912
Acquisition-related intangible assets, net	20,113	12,685
Other assets	4,640	2,457
Goodwill	41,924	26,041
Total assets	$ 95,123	$ 69,052
Liabilities, redeemable noncontrolling interest and equity		
Current liabilities:		
Short-term obligations and current maturities of long-term obligations	$ 2,537	$ 2,628
Accounts payable	2,867	2,175
Accrued payroll and employee benefits	2,427	1,916
Contract liabilities	2,655	1,271
Other accrued expenses	2,950	2,314
Total current liabilities	13,436	10,304
Deferred income taxes	3,837	1,794
Other long-term liabilities	4,540	3,330
Long-term obligations	32,333	19,107
Commitments and contingencies (Note 12)		
Redeemable noncontrolling interest	122	—
Equity:		
Thermo Fisher Scientific Inc. shareholders' equity:		
Preferred stock, $100 par value, 50,000 shares authorized; none issued		
Common stock, $1 par value, 1,200,000,000 shares authorized; 439,154,741 and 437,088,297 shares issued	439	437
Capital in excess of par value	16,174	15,579
Retained earnings	35,431	28,116
Treasury stock at cost, 44,720,112 and 40,417,789 shares	(8,922)	(6,818)
Accumulated other comprehensive items	(2,329)	(2,807)
Total Thermo Fisher Scientific Inc. shareholders' equity	40,793	34,507
Noncontrolling interests	62	10
Total equity	40,855	34,517
Total liabilities, redeemable noncontrolling interest and equity	$ 95,123	$ 69,052

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF INCOME

(In millions except per share amounts)	Year Ended December 31, 2021	December 31, 2020	December 31, 2019
Revenues			
Product revenues	$ 30,361	$ 25,306	$ 19,496
Service revenues	8,850	6,912	6,046
Total revenues	39,211	32,218	25,542
Costs and operating expenses:			
Cost of product revenues	13,594	11,407	10,037
Cost of service revenues	5,979	4,807	4,177
Selling, general and administrative expenses	8,007	6,930	6,144
Research and development expenses	1,406	1,181	1,003
Restructuring and other costs (income)	197	99	(413)
Total costs and operating expenses	29,183	24,424	20,948
Operating income	10,028	7,794	4,594
Interest income	43	65	224
Interest expense	(536)	(553)	(676)
Other income/(expense)	(694)	(76)	(70)
Income before income taxes	8,841	7,230	4,072
Provision for income taxes	(1,109)	(850)	(374)
Equity in (losses) earnings of unconsolidated entities	(4)	(3)	—
Net income	7,728	6,377	3,698
Less: net income attributable to noncontrolling interests and redeemable noncontrolling interest	3	2	2
Net income attributable to Thermo Fisher Scientific Inc.	$ 7,725	$ 6,375	$ 3,696
Earnings per share attributable to Thermo Fisher Scientific Inc.			
Basic	$ 19.62	$ 16.09	$ 9.24
Diluted	$ 19.46	$ 15.96	$ 9.17
Weighted average shares			
Basic	394	396	400
Diluted	397	399	403

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF COMPREHENSIVE INCOME

(In millions)	Year Ended December 31, 2021	December 31, 2020	December 31, 2019
Comprehensive income			
Net income	$ 7,728	$ 6,377	$ 3,698
Other comprehensive items:			
Currency translation adjustment:			
Currency translation adjustment (net of tax provision (benefit) of $231, $(221) and $25)	373	(118)	(106)
Reclassification adjustment for losses included in net income	—	—	30
Unrealized gains and losses on hedging instruments:			
Unrealized losses on hedging instruments (net of tax benefit of $0, $20 and $12)	—	(65)	(38)
Reclassification adjustment for losses included in net income (net of tax benefit of $17, $14 and $6)	56	45	19
Pension and other postretirement benefit liability adjustments:			
Pension and other postretirement benefit liability adjustments arising during the period (net of tax provision (benefit) of $11, $(1) and $(31))	36	(8)	(93)
Amortization of net loss and prior service benefit included in net periodic pension cost (net of tax benefit of $6, $4 and $2)	13	18	8
Total other comprehensive items	478	(128)	(180)
Comprehensive income	8,206	6,249	3,518
Less: comprehensive income attributable to noncontrolling interests and redeemable noncontrolling interest	2	2	3
Comprehensive income attributable to Thermo Fisher Scientific Inc.	$ 8,204	$ 6,247	$ 3,515

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF CASH FLOWS

(In millions)	Year Ended December 31, 2021	December 31, 2020	December 31, 2019
Operating activities			
Net income	$ 7,728	$ 6,377	$ 3,698
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation of property, plant and equipment	831	658	564
Amortization of acquisition-related intangible assets	1,761	1,667	1,713
Change in deferred income taxes	(647)	(552)	(302)
Gain on sales of businesses	—	—	(482)
Stock-based compensation	230	196	181
Loss on early extinguishment of debt	767	—	184
Other non-cash expenses	190	338	82
Changes in assets and liabilities, excluding the effects of acquisitions and disposition:			
Accounts receivable	(204)	(1,302)	(225)
Inventories	(1,065)	(508)	(458)
Accounts payable	479	59	266
Contributions to retirement plans	(34)	(96)	(50)
Other	(724)	1,452	(198)
Net cash provided by operating activities	9,312	8,289	4,973
Investing activities			
Acquisitions, net of cash acquired	(19,395)	(38)	(1,843)
Proceeds from sale of business, net of cash divested	—	—	1,128
Purchase of property, plant and equipment	(2,523)	(1,474)	(926)
Proceeds from sale of property, plant and equipment	20	8	36
Other investing activities, net	(34)	(6)	118
Net cash used in investing activities	(21,932)	(1,510)	(1,487)
Financing activities			
Net proceeds from issuance of debt	18,137	3,464	5,638
Repayment of debt	(11,738)	(710)	(6,355)
Proceeds from issuance of commercial paper	2,512	383	2,781
Repayments of commercial paper	—	(387)	(3,464)
Purchases of company common stock	(2,000)	(1,500)	(1,500)
Dividends paid	(395)	(337)	(297)
Net proceeds from issuance of company common stock under employee stock plans	156	196	153
Other financing activities, net	(91)	(150)	(74)
Net cash provided by (used in) financing activities	6,581	959	(3,118)
Exchange rate effect on cash	194	176	(63)
(Decrease) increase in cash, cash equivalents and restricted cash	(5,845)	7,914	305
Cash, cash equivalents and restricted cash at beginning of year	10,336	2,422	2,117
Cash, cash equivalents and restricted cash at end of year	$ 4,491	$ 10,336	$ 2,422

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF REDEEMABLE NONCONTROLLING INTEREST AND EQUITY

(In millions)	Redeemable Noncontrolling Interest	Common Stock Shares	Common Stock Amount	Capital in Excess of Par Value	Retained Earnings	Treasury Stock Shares	Treasury Stock Amount	Accumulated Other Comprehensive Items	Total Thermo Fisher Scientific Inc. Shareholders' Equity	Noncontrolling Interests	Total Equity
Balance at December 31, 2018	$ —	432	$ 432	$ 14,621	$ 18,696	29	$(3,665)	$ (2,498)	$ 27,586	$ 8	$ 27,594
Cumulative effect of accounting changes	—	—	—	—	4	—	—	—	4	—	4
Issuance of shares under employees' and directors' stock plans	—	2	2	262	—	1	(71)	—	193	—	193
Stock-based compensation	—	—	—	181	—	—	—	—	181	—	181
Purchases of company common stock	—	—	—	—	—	6	(1,500)	—	(1,500)	—	(1,500)
Dividends declared ($0.76 per share)	—	—	—	—	(304)	—	—	—	(304)	—	(304)
Net income	—	—	—	—	3,696	—	—	—	3,696	2	3,698
Other comprehensive items	—	—	—	—	—	—	—	(181)	(181)	1	(180)
Contributions from (distributions to) noncontrolling interests	—	—	—	—	—	—	—	—	—	(2)	(2)
Balance at December 31, 2019	—	434	434	15,064	22,092	36	(5,236)	(2,679)	29,675	9	29,684
Cumulative effect of accounting changes	—	—	—	—	(1)	—	—	—	(1)	—	(1)
Issuance of shares under employees' and directors' stock plans	—	3	3	319	—	—	(82)	—	240	—	240
Stock-based compensation	—	—	—	196	—	—	—	—	196	—	196
Purchases of company common stock	—	—	—	—	—	4	(1,500)	—	(1,500)	—	(1,500)
Dividends declared ($0.88 per share)	—	—	—	—	(350)	—	—	—	(350)	—	(350)
Net income	—	—	—	—	6,375	—	—	—	6,375	2	6,377
Other comprehensive items	—	—	—	—	—	—	—	(128)	(128)	—	(128)
Contributions from (distributions to) noncontrolling interests	—	—	—	—	—	—	—	—	—	(1)	(1)
Balance at December 31, 2020	—	437	437	15,579	28,116	40	(6,818)	(2,807)	34,507	10	34,517
Issuance of shares under employees' and directors' stock plans	—	2	2	324	—	1	(104)	—	222	—	222
Stock-based compensation	—	—	—	230	—	—	—	—	230	—	230
Purchases of company common stock	—	—	—	—	—	4	(2,000)	—	(2,000)	—	(2,000)
Dividends declared ($1.04 per share)	—	—	—	—	(410)	—	—	—	(410)	—	(410)

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Note 1. Nature of Operations and Summary of Significant Accounting Policies

Nature of Operations

Thermo Fisher Scientific Inc. (the company or Thermo Fisher) enables customers to make the world healthier, cleaner and safer by helping them accelerate life sciences research, solve complex analytical challenges, improve patient diagnostics and therapies, and increase laboratory productivity. Markets served include pharmaceutical and biotech, academic and government, industrial and applied, as well as healthcare and diagnostics.

Principles of Consolidation

The accompanying financial statements include the accounts of the company and its wholly and majority-owned subsidiaries. All material intercompany accounts and transactions have been eliminated. The company accounts for investments in businesses using the equity method when it has the ability to exercise significant influence but not control (generally between 20% and 50% ownership), is not the primary beneficiary and has not elected the fair value option. At December 31, 2021 and 2020, the company had such investments with carrying amounts of $576 million and $32 million, respectively. The company has elected the fair value option of accounting for certain of its investments with readily determinable fair values that would otherwise be accounted for under the equity method. At December 31, 2021, the fair value of such investments was $217 million.

Redeemable Noncontrolling Interest

The company owns 60% of its consolidated subsidiary PPD-SNBL K.K. The 40% ownership interest held by a third party is classified as a redeemable noncontrolling interest on the consolidated balance sheet due to certain put options under which the third party may require the company to purchase the remaining ownership interest at its pre-acquisition fair value.

Presentation

Certain reclassifications of prior year amounts have been made to conform to the current year presentation.

Revenue Recognition

Consumables revenues consist of single-use products and are recognized at a point in time following the transfer of control of such products to the customer, which generally occurs upon shipment. Instruments revenues typically consist of longer-lived assets that, for the substantial majority of sales, are recognized at a point in time in a manner similar to consumables. Service revenues (primarily clinical research, pharmaceutical, and instrument and enterprise services) are recognized over time as customers receive and consume the benefits of such services. For revenues recognized over time, the company generally uses costs accumulated relative to total estimated costs to measure progress as this method approximates satisfaction of the performance obligation. For contracts that contain multiple performance obligations, the company allocates the consideration to which it expects to be entitled (i.e., the transaction price) to each performance obligation based on relative standalone selling prices and recognizes the related revenues when or as control of each individual performance obligation is transferred to customers. The company exercises judgment in determining the timing of revenue by analyzing the point in time or the period over which the customer has the ability to direct the use of and obtain substantially all of the remaining benefits of the asset. The company immediately expenses contract costs that would otherwise be capitalized and amortized over a period of less than one year.

Changes to the scope of services contracts generally also include changes in the transaction price. Typically, these contract modifications are not distinct from existing services provided under the contract, and result in cumulative adjustments to revenue on the modification date.

Payments from customers for most instruments and consumables are typically due in a fixed number of days after shipment or delivery of the product. Service arrangements commonly call for payments in advance of performing the work (e.g., extended service contracts), upon completion of the service (e.g., pharmaceutical services) or a mix of both. Some arrangements include variable amounts of consideration that arise from discounts, rebates, and other programs and practices. In such arrangements, the company estimates the amount by which to reduce the stated contract amount to reflect the transaction price. The company records reimbursement for third-party pass-through and out-of-pocket costs as revenues and the related expenses as costs of revenues.

Contract-related Balances

Accounts receivable include unconditional rights to consideration from customers, which generally represent billings that do not bear interest. The company maintains allowances for doubtful accounts for estimates of expected losses resulting from

the inability of its customers to pay amounts due. The allowance for doubtful accounts is the company's best estimate of the amount of probable credit losses in existing accounts receivable. The company determines the allowance based on history of similarly aged receivables, the creditworthiness of the customer, reasons for delinquency, current economic conditions, expectations associated with future events and circumstances where reasonable and supportable forecasts are available and any other information that is relevant to the judgment. Receivables from academic and government customers as well as large, well-capitalized commercial customers have historically experienced less collectability risk. Account balances are charged off against the allowance when the company believes it is probable the receivable will not be recovered. The company does not have any off-balance-sheet credit exposure related to customers.

Contract assets include revenues recognized in advance of billings where the company's right to bill includes something other than the passage of time. Such amounts are recorded net of estimated losses resulting from the inability to invoice customers, which is primarily due to risk associated with the company's performance. Contract assets are classified as current or noncurrent based on the amount of time expected to lapse until the company's right to consideration becomes unconditional.

Contract liabilities include billings in excess of revenues recognized, such as those resulting from customer advances and deposits and unearned revenues on service contracts. Contract liabilities are classified as current or noncurrent based on the periods over which remaining performance obligations are expected to be transferred to customers. Contract assets and liabilities are presented on a net basis in the consolidated balance sheet if they arise from different performance obligations in the same contract.

Warranty Obligations

The company provides for the estimated cost of standard product warranties, primarily from historical information, in cost of product revenues at the time product revenues are recognized. The liability for warranties is included in other accrued expenses in the accompanying balance sheet. Extended warranty agreements are considered service contracts, which are discussed above. Costs of service contracts are recognized as incurred.

Leases

Operating leases that have commenced are included in other assets, other accrued expenses and other long-term liabilities in the consolidated balance sheet. Finance leases that have commenced are included in property, plant and equipment, net, current maturities of long-term obligations and long-term obligations in the consolidated balance sheet. Classification of lease liabilities as either current or noncurrent is based on the expected timing of payments due under the company's obligations.

Right-of-use (ROU) assets represent the company's right to use an underlying asset for the lease term and lease liabilities represent the company's obligation to make lease payments arising from the lease. Lease ROU assets and liabilities are recognized at the lease commencement date based on the present value of lease payments over the lease term. Leases with an initial term of 12 months or less are not recorded on the consolidated balance sheet. The company recognizes operating lease expense on a straight-line basis over the lease term. Finance lease expense includes depreciation, which is recognized on a straight-line basis over the expected life of the leased asset, and an immaterial amount of interest expense.

Because most of the company's leases do not provide an implicit interest rate, the company estimates incremental borrowing rates based on the information available at the commencement date in determining the present value of lease payments. The company uses the implicit rate when readily determinable. Lease terms include the effect of options to extend or terminate the lease when it is reasonably certain that the company will exercise that option. Operating lease expense is recognized on a straight-line basis over the lease term.

As a lessee, the company accounts for the lease and non-lease components as a single lease component.

Research and Development

The company conducts research and development activities to increase its depth of capabilities in technologies, software and services. Research and development costs include employee compensation and benefits, consultants, facilities related costs, material costs, depreciation and travel. Research and development costs are expensed as incurred.

Restructuring Costs

Accounting for the timing and amount of termination benefits provided by the company to employees is determined based on whether: (a) the company has a substantive plan to provide such benefits, (b) the company has a written employment contract with the affected employees that includes a provision for such benefits, (c) the termination benefits are due to the occurrence of an event specified in an existing plan or agreement, or (d) the termination benefits are a one-time benefit. In certain circumstances, employee termination benefits may meet more than one of the characteristics listed above and therefore, may have individual elements that are subject to different accounting models.

From time to time when executing a restructuring or exit plan, the company also incurs costs other than termination benefits, such as lease termination costs, that are not associated with or will not be incurred to generate revenues. These include costs that represent amounts under contractual obligations that exist prior to the restructuring plan communication date and will either continue after the restructuring plan is completed with no economic benefit or result in a penalty to cancel a contractual obligation. Such costs are recognized when incurred, which generally occurs at the contract termination or over the period from when a plan to abandon a leased facility is approved through the cease-use date but charges may continue over the remainder of the original contractual period.

Income Taxes

The company recognizes deferred income taxes based on the expected future tax consequences of differences between the financial statement basis and the tax basis of assets and liabilities, calculated using enacted tax rates in effect for the year in which the differences are expected to be reflected in the tax return. A valuation allowance is provided for tax assets that will more likely than not go unused.

The financial statements reflect expected future tax consequences of uncertain tax positions that the company has taken or expects to take on a tax return presuming the taxing authorities' full knowledge of the positions and all relevant facts, but without discounting for the time value of money.

Earnings per Share

Basic earnings per share has been computed by dividing net income attributable to Thermo Fisher Scientific Inc. by the weighted average number of shares outstanding during the year. Except where the result would be antidilutive to net income attributable to Thermo Fisher Scientific Inc., diluted earnings per share has been computed using the treasury stock method for outstanding stock options and restricted units.

Cash and Cash Equivalents

Cash equivalents consists principally of money market funds, commercial paper and other marketable securities purchased with an original maturity of three months or less. These investments are carried at cost, which approximates market value.

Inventories

Inventories are valued at the lower of cost or net realizable value, cost being determined by the first-in, first-out (FIFO) method. As discussed below, prior to the third quarter of 2021 certain of the company's businesses utilized the last-in, first-out (LIFO) method. The company periodically reviews quantities of inventories on hand and compares these amounts to the expected use of each product or product line. In addition, the company has certain inventory that is subject to fluctuating market pricing. The company records a charge to cost of sales for the amount required to reduce the carrying value of inventory to net realizable value. Costs associated with the procurement of inventories, such as inbound freight charges, purchasing and receiving costs, and internal transfer costs, are included in cost of revenues in the accompanying statement of income. The components of inventories are as follows:

(In millions)	December 31, 2021	December 31, 2020
Raw materials	$ 1,922	$ 1,305
Work in process	676	540
Finished goods	2,453	2,184
Inventories	$ 5,051	$ 4,029

Prior to the third quarter of 2021, certain of the company's businesses utilized the LIFO method of accounting for inventories. During the third quarter of 2021, these businesses, which comprised approximately 5% of

consolidated inventories, changed from the LIFO method to the FIFO method. The company believes this change is preferable as it will provide a consistent, uniform costing method for all inventories across the company, better reflect the current value of inventories, and improve comparability with peers. Prior financial statements have not been retrospectively adjusted due to immateriality. The cumulative pre-tax effect of this change in accounting principle of $33 million was recorded as an increase to inventories and a decrease to cost of product revenues in the third quarter of 2021. This change was recorded in the Laboratory Products and Biopharma Services ($20 million) and Specialty Diagnostics ($13 million) segments.

The value of inventories maintained using the LIFO method was $274 million at December 31, 2020, which was below estimated replacement cost by $49 million. Reductions to cost of revenues as a result of the liquidation of LIFO inventories were nominal during 2019, 2020 and the first half of 2021.

Property, Plant and Equipment

Property, plant and equipment are recorded at cost. The costs of additions and improvements are capitalized, while maintenance and repairs are charged to expense as incurred. The company generally provides for depreciation and amortization using the straight-line method over the estimated useful lives of the property as follows: buildings and improvements, 25 to 40 years; machinery and equipment (including software), 3 to 10 years; and leasehold improvements, the shorter of the term of the lease or the life of the asset. When assets are retired or otherwise disposed of, the assets and related accumulated depreciation are eliminated from the accounts and the resulting gain or loss is reflected in the accompanying statement of income. Property, plant and equipment consists of the following:

(In millions)	December 31, 2021	December 31, 2020
Land	$ 431	$ 410
Buildings and improvements	2,575	2,192
Machinery, equipment and leasehold improvements	9,587	6,975
Property, plant and equipment, at cost	12,593	9,577
Less: Accumulated depreciation and amortization	4,260	3,665
Property, plant and equipment, net	$ 8,333	$ 5,912

Acquisition-related Intangible Assets

Acquisition-related intangible assets include the costs of acquired customer relationships, product technology, tradenames, backlog and other specifically identifiable intangible assets, and are being amortized using the straight-line method over their estimated useful lives, which range up to 20 years. The company reviews these intangible assets for impairment when indication of potential impairment exists, such as a significant reduction in cash flows associated with the assets. When impairment indicators exist, the company determines whether the carrying value of its intangible assets exceeds the related undiscounted cash flows. In these situations, the carrying value is written down to fair value.

In addition, the company has tradenames and in-process research and development that have indefinite lives and which are not amortized. Intangible assets with indefinite lives are reviewed for impairment annually or whenever events or changes in circumstances indicate they may be impaired. The company may perform an optional qualitative assessment. If the company determines that the fair value of the indefinite-lived intangible asset is more likely than not greater than its carrying amount, no additional testing is necessary. If not, or if the company bypasses the optional qualitative assessment, it writes the carrying value down to the fair value, if applicable.

Acquisition-related intangible assets are as follows:

(In millions)	Balance at December 31, 2021			Balance at December 31, 2020		
	Gross	Accumulated Amortization	Net	Gross	Accumulated Amortization	Net
Definite lived:						
Customer relationships	$ 22,802	$ (7,792)	$ 15,010	$ 16,593	$ (7,450)	$ 9,143
Product technology	6,041	(3,977)	2,064	5,523	(3,532)	1,991
Tradenames	1,722	(919)	803	1,213	(897)	316
Backlog	1,060	(59)	1,001	—	—	—
	31,625	(12,747)	18,878	23,329	(11,879)	11,450
Indefinite lived:						
Tradenames	1,235	N/A	1,235	1,235	N/A	1,235
Acquisition-related intangible assets	$ 32,860	$ (12,747)	$ 20,113	$ 24,564	$ (11,879)	$ 12,685

The estimated future amortization expense of acquisition-related intangible assets with definite lives is as follows:

(In millions)	
2022	$ 2,489
2023	2,358
2024	1,992
2025	1,669
2026	1,392
2027 and thereafter	8,978
Estimated future amortization expense of definite-lived intangible assets	$ 18,878

Other Assets

Other assets in the accompanying balance sheet include operating lease right-of-use assets, investments, deferred tax assets, pension assets, cash surrender value of life insurance, insurance recovery receivables related to product liability matters, certain intangible assets and other assets.

At December 31, 2021 and 2020, the company had $33 million and $43 million, respectively, of intangible assets not derived from acquisitions, net of accumulated amortization, which are being amortized using the straight-line method over their estimated useful lives, which range up to 20 years.

Equity investments that do not have readily determinable fair values and are not eligible for the net asset value (NAV) practical expedient are measured at cost minus impairment, if any, plus or minus changes resulting from observable price changes in orderly transactions for the identical or similar investments of the same issuer. The company performs qualitative assessments to identify impairments of these investments. At December 31, 2021 and 2020, the company had such investments with carrying amounts of $22 million and $28 million, respectively, and investments measured at NAV of $16 million and $0 million, respectively, which are included in other assets.

Goodwill

The company assesses goodwill for impairment at the reporting unit level annually and whenever events occur or circumstances change that would more likely than not reduce the fair value of a reporting unit below its carrying amount. Such events or circumstances generally include the occurrence of operating losses or a significant decline in earnings associated with one or more of the company's reporting units. The company is permitted to first assess qualitative factors to determine whether the quantitative goodwill impairment test is necessary. If the qualitative assessment results in a determination that the fair value of a reporting unit is more likely than not less than its carrying amount, the company performs a quantitative goodwill impairment test. The company may bypass the qualitative assessment for the reporting unit in any period and proceed directly to the goodwill impairment test. The company estimates the fair value of its reporting units by using forecasts of discounted future cash flows and peer market multiples. The company would record an impairment charge based on the excess of a reporting unit's carrying amount over its fair value (limited to the amount of goodwill). The company determined that no impairments existed in 2021, 2020 or 2019.

The changes in the carrying amount of goodwill by segment are as follows:

(In millions)	Life Sciences Solutions	Analytical Instruments	Specialty Diagnostics	Laboratory Products and Biopharma Services	Total
Balance at December 31, 2019	$ 8,544	$ 4,928	$ 3,184	$ 9,058	$ 25,714
Acquisition	35	—	—	—	35
Currency translation	11	151	186	(56)	292
Balance at December 31, 2020	8,590	5,079	3,370	9,002	26,041
Acquisitions	1,560	56	8	14,400	16,024
Currency translation	(7)	(92)	(101)	59	(141)
Balance at December 31, 2021	$ 10,143	$ 5,043	$ 3,277	$ 23,461	$ 41,924

Loss Contingencies

Accruals are recorded for various contingencies, including legal proceedings, environmental, workers' compensation, product, general and auto liabilities, self-insurance and other claims that arise in the normal course of business. The accruals are based on management's judgment, historical claims experience, the probability of losses and, where applicable, the consideration of opinions of internal and/or external legal counsel and actuarial estimates. Additionally, the company records receivables from third-party insurers up to the amount of the loss when recovery has been determined to be probable. Certain liabilities acquired in acquisitions have been recorded at readily determinable fair values and, as such, were discounted to present value at the dates of acquisition.

Currency Translation

All assets and liabilities of the company's subsidiaries operating in non-U.S. dollar currencies are translated at period-end exchange rates. Resulting translation adjustments are reflected in the "accumulated other comprehensive items" component of shareholders' equity. Revenues and expenses are translated at average exchange rates for the period. Currency transaction gains are included in the accompanying statement of income and in aggregate were $25 million, $24 million and $52 million in 2021, 2020 and 2019, respectively.

Derivative Contracts

The company is exposed to certain risks relating to its ongoing business operations including changes to interest rates and currency exchange rates. The company uses derivative instruments primarily to manage currency exchange and interest rate risks. The company recognizes derivative instruments as either assets or liabilities and measures those instruments at fair value. If a derivative is a hedge, depending on the nature of the hedge, changes in the fair value of the derivative are either offset against the change in fair value of the hedged item through earnings or recognized in other comprehensive items until the hedged item is recognized in earnings. Derivatives that are not designated as hedges are recorded at fair value through earnings.

The company uses short-term forward and option currency exchange contracts primarily to hedge certain balance sheet and operational exposures resulting from changes in currency exchange rates, predominantly intercompany loans and cash balances that are denominated in currencies other than the functional currencies of the respective operations. The currency-exchange contracts principally hedge transactions denominated in euro, Swiss franc, British pounds sterling, Canadian dollars, Czech koruna, Japanese yen and Hong Kong dollars. The company does not hold or engage in transactions involving derivative instruments for purposes other than risk management.

Cash flow hedges. For derivative instruments that are designated and qualify as a cash flow hedge, the gain or loss on the derivative is reported as a component of other comprehensive items and reclassified into earnings in the same period or periods during which the hedged transaction affects earnings and is presented in the same income statement line item as the earnings effect of the hedged item.

Fair value hedges. For derivative instruments that are designated and qualify as a fair value hedge, the gain or loss on the derivative, as well as the offsetting loss or gain on the hedged item attributable to the hedged risk, are recognized in earnings.

Net investment hedges. The company uses foreign currency-denominated debt and cross-currency interest rate swaps to partially hedge its net investments in foreign operations against adverse movements in exchange rates. A portion of the company's euro-denominated senior notes and its cross-currency interest rate swaps have been designated as, and are effective as, economic hedges of part of the net investment in a foreign operation. Accordingly, foreign currency transaction gains or losses due to spot rate fluctuations on the euro-denominated debt instruments and contract fair value changes on the cross-currency interest rate swaps, excluding interest accruals, are included in currency translation adjustment within other comprehensive items and shareholders' equity.

Use of Estimates

The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period.

The company's estimates include, among others, asset reserve requirements as well as the amounts of future cash flows associated with certain assets and businesses that are used in assessing the risk of impairment. Risks and uncertainties associated with the ongoing COVID-19 global pandemic materially adversely affected certain of the company's businesses in 2020, particularly in the Analytical Instruments segment and, to a lesser extent, some businesses within the other three segments. The negative impacts significantly lessened in 2021. The extent and duration of negative impacts in the future, which

may include inflationary pressures and supply chain disruptions, are uncertain and may require changes to estimates. Actual results could differ from those estimates.

Recent Accounting Pronouncements

In November 2021, the FASB issued new guidance to require entities to disclose information about certain types of government assistance they receive, including cash grants and tax credits. Among other things, the new guidance requires expanded disclosure regarding the qualitative and quantitative characteristics of the nature, amount, timing, and significant terms and conditions of transactions with a government arising from a grant or other forms of assistance accounted for under a contribution model. The company will adopt this guidance in 2022 using a prospective method. The adoption of this guidance is not expected to have a material impact on the company's disclosures; however, the impact will be dependent on the extent of transactions of this nature entered into by the company in periods subsequent to the date of adoption.

In October 2021, the FASB amended guidance to recognize and measure contract assets and contract liabilities acquired in a business combination. Generally, this new guidance will result in the company recognizing contract assets and contract liabilities at the same amounts recorded by the acquiree. The company adopted this guidance in the fourth quarter of 2021 retrospectively to all business combinations completed in the first three quarters of 2021 and prospectively to all future business combinations. The adoption of this guidance did not have a material impact on the company's consolidated financial statements for acquisitions that closed in 2021; however, the impact in future periods will be dependent on the contract assets and contract liabilities acquired in future business combinations.

In July 2021, the FASB amended guidance to require lessors to classify leases as operating leases if they have certain variable lease payment structures and would have selling losses if they were classified as sales-type or direct financing leases. The company adopted the guidance in the third quarter of 2021 using a prospective method. The adoption of this guidance did not have a material impact on the company's consolidated financial statements.

In January 2020, the FASB issued new guidance to clarify the interaction of the accounting for certain equity securities, equity method investments, and certain forward contracts and purchased options. Among other things, the new guidance clarifies that an entity should consider observable transactions that require it to either apply or discontinue the equity method of accounting for the purposes of applying measurement principles for certain equity securities immediately before applying or discontinuing the equity method. The company adopted this guidance in 2020 using a prospective method. The adoption of this guidance did not have a material impact on the company's consolidated financial statements.

In December 2019, the FASB issued new guidance to simplify the accounting for income taxes. Among other things, the new guidance requires the effects of enacted changes in tax laws or rates to be reflected in the annual effective tax rate computation in the interim period that includes the enactment date. The company adopted this guidance in 2021 using a prospective method. The adoption of this guidance did not have a material impact on the company's consolidated financial statements; however, the impact in future periods will be dependent on the extent of future events or conditions that would be affected such as enacted changes in tax laws or rates.

In August 2018, the FASB issued new guidance to modify the disclosure requirements for employers that sponsor defined benefit pension or other postretirement plans. The company adopted the guidance in 2020 using a retrospective method. The adoption of this guidance did not have a material impact on the company's disclosures.

In August 2018, the FASB issued new guidance to modify the disclosure requirements on fair value measurements. The company adopted the guidance in 2020 with some items requiring a prospective method and others requiring a retrospective method. The adoption of this guidance did not have a material impact on the company's disclosures.

In June 2016, the FASB issued new guidance to require a financial asset measured at amortized cost basis, such as accounts receivable, to be presented at the net amount expected to be collected based on relevant information about past events, including historical experience, current conditions, and reasonable and supportable forecasts that affect the collectability of the reported amount. During 2018 and 2019, the FASB issued additional guidance and clarification. The company adopted the guidance in 2020 using a modified retrospective method. The adoption of this guidance reduced accounts receivable and retained earnings by $1 million on January 1, 2020.

In February 2016, the FASB issued new guidance which requires lessees to record most leases on their balance sheets as lease liabilities, initially measured at the present value of the future lease payments, with corresponding right-of-use assets. The new guidance also sets forth new disclosure requirements related to leases. During 2017 - 2019, the FASB issued additional guidance and clarification. The company adopted this guidance in January 2019. The company elected to adopt the guidance using a modified retrospective method, by applying the transition approach as of the beginning of the period of adoption. Comparative periods have not been restated. As permitted upon transition, the company did not reassess whether any expired or

existing contracts were or contained embedded leases, the lease classification for any expired or existing leases, initial direct costs for any leases, or whether land easements met the definition of a lease if they were not accounted for as leases under the prior guidance. The adoption of this guidance increased retained earnings by $4 million on January 1, 2019.

Note 2. Acquisitions and Disposition

The company's acquisitions have historically been made at prices above the determined fair value of the acquired identifiable net assets, resulting in goodwill, primarily due to expectations of the synergies that will be realized by combining the businesses and the benefits that will be gained from the assembled workforce. These synergies include the elimination of redundant facilities, functions and staffing; use of the company's existing commercial infrastructure to expand sales of the acquired businesses' products; and use of the commercial infrastructure of the acquired businesses to cost-effectively expand sales of company products.

Acquisitions have been accounted for using the acquisition method of accounting, and the acquired companies' results have been included in the accompanying financial statements from their respective dates of acquisition. Acquisition transaction costs are recorded in selling, general and administrative expenses as incurred.

2021

On January 15, 2021, the company acquired, within the Laboratory Products and Biopharma Services segment, the Belgium-based European viral vector manufacturing business of Groupe Novasep SAS for $830 million in net cash consideration. The European viral vector manufacturing business provides manufacturing services for vaccines and therapies to biotechnology companies and large biopharma customers. The acquisition expands the segment's capabilities for cell and gene vaccines and therapies. The goodwill recorded as a result of this business combination is not tax deductible.

On February 25, 2021, the company acquired, within the Life Sciences Solutions segment, Mesa Biotech, Inc., a U.S.-based molecular diagnostic company, for $407 million in net cash consideration and contingent consideration with an initial fair value of $65 million due upon the completion of certain milestones. Mesa Biotech has developed and commercialized a polymerase chain reaction (PCR) based rapid point-of-care testing platform available for detecting infectious diseases including COVID-19. The acquisition enables the company to accelerate the availability of reliable and accurate advanced molecular diagnostics at the point of care. The goodwill recorded as a result of this business combination is not tax deductible.

On September 30, 2021, the company assumed operating responsibility, within the Laboratory Products and Biopharma Services segment, of a new state-of-the-art biologics manufacturing facility in Lengnau, Switzerland from CSL Limited to perform pharma services for CSL with capacity to serve other customers as well. The company expects to make fixed lease payments aggregating to $555 million (excluding renewals) from 2021 to 2041, with additional amounts dependent on the extent of revenues from customers of the facility other than CSL. The goodwill recorded as a result of this business combination is not tax deductible.

On December 8, 2021, the company acquired, within the Laboratory Products and Biopharma Services segment, PPD, Inc., a U.S.-based global provider of clinical research services to the pharma and biotech industry, for $15.99 billion in net cash consideration and $43 million of equity awards exchanged. The addition of PPD's clinical research services enhances our offering to biotech and pharma customers by enabling them to accelerate innovation and increase their productivity within the drug development process. The goodwill recorded as a result of this business combination is not tax deductible.

On December 30, 2021, the company acquired, within the Life Sciences Solutions segment, PeproTech, Inc., a U.S. based developer and manufacturer of recombinant proteins, for $1.86 billion in net cash consideration. PeproTech provides bioscience reagents known as recombinant proteins, including cytokines and growth factors. The acquisition expands the segment's bioscience offerings. The goodwill recorded as a result of this business combination is not tax deductible.

In addition, in 2021, the company acquired, within the Life Sciences Solutions segment, cell sorting technology assets, an Ireland-based life sciences distributor and a developer of a digital PCR platform; within the Analytical Instruments segment, a Belgium-based developer of micro-chip based technology for liquid chromatography columns; and within the Specialty Diagnostics segment, a transplant diagnostics information system provider.

The components of the purchase price and net assets acquired for 2021 acquisitions are as follows:

(In millions)	PPD	PeproTech	European Viral Vector Business	Mesa Biotech	Lengnau biologics manufacturing facility	Other
Purchase price						
Cash paid	$ 17,237	$ 1,947	$ 848	$ 421	$ 17	$ 298
Fair value of equity awards exchanged	43	—	—	—	—	—
Fair value of contingent consideration	—	—	—	65	1	117
Cash acquired	(1,244)	(83)	(18)	(14)	—	(13)
	$ 16,036	$ 1,864	$ 830	$ 472	$ 18	$ 402
Net assets acquired						
Current assets	$ 2,510	$ 63	$ 39	$ 54	$ —	$ 12
Property, plant and equipment	562	18	59	2	92	2
Definite-lived intangible assets:						
Customer relationships	6,264	514	302	—	—	2
Product technology	—	282	25	279	—	224
Tradenames	603	—	—	2	—	2
Backlog	1,060	—	—	—	—	—
Goodwill	13,781	1,190	600	237	18	198
Other assets	1,108	11	3	3	376	2
Contract liabilities	(1,570)	—	(59)	—	—	(1)
Deferred tax assets (liabilities)	(1,803)	(193)	(80)	(72)	—	(28)
Finance lease liabilities	(86)	—	(24)	—	(82)	—
Debt assumed	(4,299)	—	—	—	—	—
Other liabilities assumed	(1,972)	(21)	(35)	(33)	(386)	(11)
Redeemable noncontrolling interest	(122)	—	—	—	—	—
	$ 16,036	$ 1,864	$ 830	$ 472	$ 18	$ 402

The weighted-average amortization periods for definite-lived intangible assets acquired in 2021 are 17 years for customer relationships, 11 years for product technology, 7 years for tradenames and 3 years for backlog. The weighted average amortization period for all definite-lived intangible assets acquired in 2021 is 14 years.

The preliminary allocations of the purchase price for the acquisitions of the Lengnau biologics manufacturing facility, PPD and PeproTech were based on estimates of the fair value of the net assets acquired and are subject to adjustment upon finalization, largely with respect to acquired intangible assets, lease assets and liabilities, and the related deferred taxes. Measurements of these items inherently require significant estimates and assumptions.

Unaudited Pro Forma Information

The following unaudited pro forma information provides the effect of the company's 2021 acquisition of PPD as if the acquisition had occurred on January 1, 2020:

	Year Ended	
(In millions)	December 31, 2021	December 31, 2020
Revenues	$ 44,886	$ 36,887
Net income attributable to Thermo Fisher Scientific Inc.	$ 7,369	$ 5,361

The historical consolidated financial information of the company and PPD has been adjusted in the pro forma information to give effect to pro forma events that are directly attributable to the acquisitions and related financing arrangements and are factually supportable.

To reflect the acquisition of PPD as if it had occurred on January 1, 2020, the unaudited pro forma results include adjustments to reflect, among other things, the incremental intangible asset amortization to be incurred based on the preliminary values of each identifiable intangible asset and the interest expense from debt financings obtained to partially fund the cash consideration transferred. Pro forma adjustments were tax effected at the company's historical statutory rates in effect for the respective periods. The unaudited pro forma amounts are not necessarily indicative of the combined results of operations that would have been realized had the acquisitions and related financings occurred on the aforementioned dates, nor are they meant to be indicative of any anticipated combined results of operations that the company will experience after the transaction. In addition, the amounts do not include any adjustments for actions that may be taken following the completion of the transaction, such as expected cost savings, operating synergies, or revenue enhancements that may be realized subsequent to the transaction.

Pro forma net income attributable to Thermo Fisher Scientific Inc. for the year ended December 31, 2021, excludes $312 million of transaction costs, initial restructuring costs, and debt extinguishment costs directly attributable to the PPD acquisition that were included in the determination of net income attributable to Thermo Fisher Scientific Inc. for that period. These items have reduced pro forma net income attributable to Thermo Fisher Scientific Inc. for the year ended December 31, 2020, by $197 million.

The company’s results would not have been materially different from its pro forma results had the company’s other 2021 acquisitions occurred at the beginning of 2020.

PPD’s revenues and losses attributable to Thermo Fisher Scientific Inc. in 2021, subsequent to the acquisition date, were $378 million and $(60) million, respectively. The loss includes non-recurring transaction and compensation costs.

2020

In 2020, the company acquired, within the Life Sciences Solutions segment, a U.S.-based provider of a spectral dye platform for high-resolution biology applications which will extend the company’s existing tools for protein and cell analysis applications, for a total purchase price of $63 million including the fair value of contingent consideration.

2019

On April 30, 2019, the company acquired, within the Laboratory Products and Biopharma Services segment, Brammer Bio for approximately $1.67 billion in cash. Brammer Bio is a leading viral vector contract development

and manufacturing organization for gene and cell therapies. The acquisition expanded the segment's contract manufacturing capabilities. The purchase price exceeded the fair value of the identifiable net assets and, accordingly, $938 million was allocated to goodwill, $405 million of which is tax deductible.

In addition, in 2019 the company acquired, within the Analytical Instruments segment, a Slovakia-based provider of mass spectrometry software used for identification of compounds, and, within the Laboratory Products and Biopharma Services segment, an active pharmaceutical ingredient manufacturing facility in Cork, Ireland, for an aggregate purchase price of $169 million.

The components of the purchase price and net assets acquired for 2019 acquisitions are as follows:

(In millions)	Brammer Bio	Other
Purchase price		
Cash paid	$ 1,710	$ 169
Cash acquired	(36)	—
	$ 1,674	$ 169
Net assets acquired		
Current assets	$ 52	$ 58
Property, plant and equipment	147	102
Definite-lived intangible assets:		
Customer relationships	744	—
Product technology	65	7
Tradenames	7	—
Goodwill	938	9
Other assets	49	—
Contract liabilities	(110)	—
Deferred tax liabilities	(110)	(6)
Other liabilities assumed	(108)	(1)
	$ 1,674	$ 169

The weighted-average amortization periods for definite-lived intangible assets acquired in 2019 are 14 years for customer relationships, 13 years for product technology and 2 years for tradenames. The weighted average amortization period for all definite-lived intangible assets acquired in 2019 is 14 years.

Disposition

On June 28, 2019, the company sold its Anatomical Pathology business to PHC Holdings Corporation for $1.13 billion, net of cash divested. The business was part of the Specialty Diagnostics segment. The sale of this business resulted in a pre-tax gain of approximately $478 million, included in restructuring and other (income) costs, net. Revenues in 2019, through the date of sale, of the business sold were approximately $115 million, net of retained sales through the company's healthcare market and research and safety market channels.

Note 3. Revenues and Contract-related Balances

Disaggregated Revenues

Revenues by type are as follows:

(In millions)	2021	2020	2019
Revenues			
Consumables	$ 22,608	$ 18,527	$ 13,109
Instruments	7,753	6,779	6,387
Services	8,850	6,912	6,046
Consolidated revenues	$ 39,211	$ 32,218	$ 25,542

Revenues by geographic region based on customer location are as follows:

(In millions)	2021	2020	2019
Revenues			
North America	$ 19,659	$ 17,081	$ 12,896
Europe	11,134	8,284	6,358
Asia-Pacific	7,218	5,822	5,524
Other regions	1,200	1,031	764
Consolidated revenues	$ 39,211	$ 32,218	$ 25,542

Each reportable segment earns revenues from consumables, instruments and services in North America, Europe, Asia-Pacific and other regions. See Note 4 for revenues by reportable segment and other geographic data.

Remaining Performance Obligations

The aggregate amount of the transaction price allocated to the remaining performance obligations for all open customer contracts as of December 31, 2021 was $28.30 billion. The company will recognize revenues for these performance obligations as they are satisfied, approximately 59% of which is expected to occur within the next twelve months. Amounts expected to occur thereafter generally relate to contract manufacturing, clinical research and extended warranty service agreements, which typically have durations of three to five years.

Contract-related Balances

Noncurrent contract assets are included within other assets in the accompanying balance sheet. Noncurrent contract liabilities are included within other long-term liabilities in the accompanying balance sheet. Contract asset and liability balances are as follows:

(In millions)	December 31, 2021	December 31, 2020
Current contract assets, net	$ 968	$ 731
Noncurrent contract assets, net	9	11
Current contract liabilities	2,655	1,271
Noncurrent contract liabilities	1,238	763

Substantially all of the current contract liabilities balance at December 31, 2020 and 2019 was recognized in revenues during 2021 and 2020, respectively.

Note 4. Business Segment and Geographical Information

The company's financial performance is reported in four segments. A description of each segment follows.

Life Sciences Solutions: provides an extensive portfolio of reagents, instruments and consumables used in biological and medical research, discovery and production of new drugs and vaccines as well as diagnosis of disease (including COVID-19 through its polymerase chain reaction (PCR) testing and sample preparation capabilities). These products and services are used by customers in pharmaceutical, biotechnology, agricultural, clinical, academic, and government markets.

Analytical Instruments: provides a broad offering of instruments, consumables, software and services that are used for a range of applications in the laboratory, on the production line and in the field. These products and services

are used by customers in pharmaceutical, biotechnology, academic, government, environmental and other research and industrial markets, as well as the clinical laboratory.

Specialty Diagnostics: provides a wide range of diagnostic test kits, reagents, culture media, instruments and associated products used to increase the speed and accuracy of diagnoses. These products are used by customers in healthcare, clinical, pharmaceutical, industrial and food safety laboratories.

Laboratory Products and Biopharma Services (formerly known as Laboratory Products and Services): provides virtually everything needed for the laboratory, including a combination of self-manufactured and sourced products for customers in research, academic, government, industrial and healthcare settings. The segment also includes a comprehensive offering of

outsourced services used by the pharmaceutical and biotech industries for drug development, clinical trials logistics, clinical research services and commercial drug manufacturing.

The company's management evaluates segment operating performance based on operating income before certain charges/credits to cost of revenues and selling, general and administrative expenses, principally associated with acquisition accounting; restructuring and other costs/income including costs arising from facility consolidations such as severance and abandoned lease expense and gains and losses from the sale of real estate and product lines as well as from significant litigation-related matters; and amortization of acquisition-related intangible assets. The company uses this measure because it helps management understand and evaluate the segments' core operating results and facilitates comparison of performance for determining compensation.

Business Segment Information

(In millions)	2021	2020	2019
Revenues			
Life Sciences Solutions	$ 15,631	$ 12,168	$ 6,856
Analytical Instruments	6,069	5,124	5,522
Specialty Diagnostics	5,659	5,343	3,718
Laboratory Products and Biopharma Services	14,862	12,245	10,599
Eliminations	(3,010)	(2,662)	(1,153)
Consolidated revenues	39,211	32,218	25,542
Segment Income			
Life Sciences Solutions	7,817	6,109	2,446
Analytical Instruments	1,197	808	1,273
Specialty Diagnostics	1,280	1,368	930
Laboratory Products and Biopharma Services	1,844	1,271	1,324
Subtotal reportable segments	12,138	9,556	5,973
Cost of revenues charges	(8)	(6)	(17)
Selling, general and administrative (charges) credits	(144)	10	(62)
Restructuring and other (costs) income	(197)	(99)	413
Amortization of acquisition-related intangible assets	(1,761)	(1,667)	(1,713)
Consolidated operating income	10,028	7,794	4,594
Interest income	43	65	224
Interest expense	(536)	(553)	(676)
Other income/(expense)	(694)	(76)	(70)
Income before income taxes	$ 8,841	$ 7,230	$ 4,072
Depreciation			
Life Sciences Solutions	$ 197	$ 140	$ 130
Analytical Instruments	83	76	75
Specialty Diagnostics	128	100	67
Laboratory Products and Biopharma Services	423	342	292
Consolidated depreciation	$ 831	$ 658	$ 564

Cost of revenues charges included in the above table consist of charges for the sale of inventories revalued at the date of acquisition and accelerated depreciation on fixed assets to estimated disposal value in connection with the

consolidation of operations. Selling, general and administrative charges/credits included in the above table consist of third-party transaction/integration costs (including reimbursement thereof) related to recent/terminated acquisitions, charges/credits for changes in estimates of contingent acquisition consideration, and charges/credits related to product liability litigation.

(In millions)	2021	2020	2019
Total assets			
Life Sciences Solutions	$ 22,751	$ 20,209	$ 18,306
Analytical Instruments	9,692	9,773	9,896
Specialty Diagnostics	6,010	6,534	5,867
Laboratory Products and Biopharma Services	52,639	22,711	21,761
Corporate/other (a)	4,031	9,825	2,551
Consolidated total assets	$ 95,123	$ 69,052	$ 58,381
Capital expenditures			
Life Sciences Solutions	$ 810	$ 392	$ 151
Analytical Instruments	79	74	64
Specialty Diagnostics	167	175	83
Laboratory Products and Biopharma Services	1,327	772	554
Corporate/other	140	61	74
Consolidated capital expenditures	$ 2,523	$ 1,474	$ 926

(a) Corporate assets consist primarily of cash and cash equivalents and property and equipment at the company's corporate offices.

Geographical Information

(In millions)	2021	2020	2019
Revenues (b)			
United States	$ 18,907	$ 16,435	$ 12,366
China	3,444	2,797	2,752
Other	16,860	12,986	10,424
Consolidated revenues	$ 39,211	$ 32,218	$ 25,542
Long-lived Assets (c)			
United States	$ 5,578	$ 3,686	$ 3,099
Other	4,286	3,001	2,349
Consolidated long-lived assets	$ 9,864	$ 6,687	$ 5,448

(b) Revenues are attributed to countries based on customer location.
(c) Includes property, plant and equipment, net, and operating lease ROU assets.

Note 5. Other Income/(Expense)

In all periods, other income/(expense) includes currency transaction gains and losses on non-operating monetary assets and liabilities and net periodic pension benefit cost/income, excluding the service cost component which is included in operating expenses on the accompanying statement of income. In 2021, other income/(expense) includes $767 million of losses on the early extinguishment of debt (Note 10), $36 million of financing costs associated with obtaining bridge financing commitments in connection with the agreement to acquire PPD (Note 2), offset in part by $66 million of net gains on investments. The company had a cash outlay of $36 million in 2021 associated with obtaining the bridge financing commitments, included in other financing activities, net, in the accompanying statement of cash flows.

In 2020, other income/(expense) includes $81 million of financing costs for a terminated acquisition, primarily for loan commitment fees and entering into hedging contracts and $42 million reclassified from accumulated other

comprehensive items related to a hedge arrangement (Note 14), offset in part by $10 million of net gains on investments. The company had a cash outlay of $51 million in 2020 associated with obtaining the loan commitments included in other financing activities, net, in the accompanying statement of cash flows.

In 2019, other income/(expense) includes $184 million of losses on the early extinguishment of debt (Note 10), offset in part by $44 million of net gains on investments. The investment gains include a $28 million gain on the sale of a joint venture for net proceeds of $42 million.

Note 6. Stock-based Compensation Expense

The company has stock-based compensation plans for its key employees, directors and others. These plans permit the grant of a variety of stock and stock-based awards, including restricted stock units, stock options or performance-based shares, as determined by the compensation committee of the company's Board of Directors or, for certain non-officer grants, by the company's employee equity committee, which consists of its chief executive officer. The company generally issues new shares of its common stock to satisfy option exercises and restricted unit vesting. Grants of stock options and restricted units generally provide that in the event of both a change in control of the company and a qualifying termination of an option or unit holder's employment, all options and service-based restricted unit awards held by the recipient become immediately vested (unless an employment or other agreement with the employee provides for different treatment).

Compensation cost is based on the grant-date fair value and is recognized ratably over the requisite vesting period or to the date based on qualifying retirement eligibility, if earlier, and is primarily included in selling, general and administrative expenses.

Stock Options

The company's practice is to grant stock options at fair market value. Options vest over 3-5 years with terms of 7-10 years, assuming continued employment with certain exceptions. Vesting of the option awards is contingent upon meeting certain service conditions. The fair value of most option grants is estimated using the Black-Scholes option pricing model. For option grants that require the achievement of both service and market conditions, a lattice model is used to estimate fair value. The fair value is then amortized on a straight-line basis over the requisite service periods of the awards, which is generally the vesting period. Use of a valuation model requires management to make certain assumptions with respect to selected model inputs. Expected volatility was calculated based on the historical volatility of the company's stock. Historical data on exercise patterns is the basis for estimating the expected life of an option. The risk-free interest rate is based on U.S. Treasury zero-coupon issues with a remaining term which approximates the expected life assumed at the date of grant. The expected annual dividend rate was calculated by dividing the company's annual dividend, based on the most recent quarterly dividend rate, by the closing stock price on the grant date. The compensation expense recognized for all stock-based awards is net of estimated forfeitures. Forfeitures are estimated based on an analysis of actual option forfeitures.

The weighted average assumptions used in the Black-Scholes option pricing model are as follows:

	2021	2020	2019
Expected stock price volatility	26 %	22 %	21 %
Risk free interest rate	0.8 %	1.1 %	2.4 %
Expected life of options (years)	4.3	4.3	4.3
Expected annual dividend	0.2 %	0.3 %	0.3 %

The weighted average per share grant-date fair values of options granted during 2021, 2020 and 2019 were $123.97, $61.19 and $53.37, respectively. The total intrinsic value of options exercised during the same periods was $501 million, $457 million and $320 million, respectively. The intrinsic value is the difference between the market value of the shares on the exercise date and the exercise price of the option.

A summary of the company's option activity for the year ended December 31, 2021 is presented below:

	Shares (in millions)	Weighted average exercise price	Weighted average remaining contractual term (in years)	Aggregate intrinsic value (in millions)
Outstanding at December 31, 2020	5.9	$ 221.22		
Granted	1.5	552.26		
Issued in connection with an acquisition	0.2	492.35		
Exercised	(1.4)	183.63		
Canceled/expired	(0.2)	341.83		
Outstanding at December 31, 2021	6.0	$ 319.95	4.5	$ 2,094
Vested and unvested expected to vest at December 31, 2021	5.7	$ 306.64	4.3	$ 2,035
Exercisable at December 31, 2021	2.8	$ 193.39	2.9	$ 1,307

As of December 31, 2021, there was $243 million of total unrecognized compensation cost related to unvested stock options granted. The cost is expected to be recognized through 2025 with a weighted average amortization period of 2.9 years.

Restricted Share/Unit Awards

Awards of restricted units convert into an equivalent number of shares of common stock. The awards generally vest over 3-4 years, assuming continued employment, with some exceptions. Vesting of the awards is contingent upon meeting certain service conditions and may also be contingent upon meeting certain performance and/or market conditions. The fair market value of the award at the time of the grant is amortized to expense over the requisite service period of the award, which is generally the vesting period. Recipients of restricted units have no voting rights but are entitled to accrue dividend equivalents. The fair value of service- and performance-based restricted unit awards is determined based on the number of units granted and the market value of the company's shares on the grant date. For awards with market-based vesting conditions, the company uses a lattice model to estimate the grant-date fair value of the award.

A summary of the company's restricted unit activity for the year ended December 31, 2021 is presented below:

	Units (in millions)	Weighted average grant-date fair value
Unvested at December 31, 2020	0.8	$ 276.74
Granted	0.4	444.61
Issued in connection with an acquisition	0.2	628.71
Vested	(0.5)	295.70
Forfeited	(0.1)	326.90
Unvested at December 31, 2021	0.8	$ 425.39

The total fair value of shares vested during 2021, 2020 and 2019 was $151 million, $126 million and $118 million, respectively.

As of December 31, 2021, there was $250 million of total unrecognized compensation cost related to unvested restricted stock unit awards. The cost is expected to be recognized through 2025 with a weighted average amortization period of 2.1 years.

Employee Stock Purchase Plans

Qualifying employees are eligible to participate in an employee stock purchase plan sponsored by the company. Shares may be purchased under the program at 95% of the fair market value at the end of the purchase period and the shares purchased are not subject to a holding period. Shares are purchased through payroll deductions of up to 10% of each participating employee's qualifying gross wages. The company issued 0.1 million, 0.1 million and 0.2 million shares, respectively, of its common stock in 2021, 2020 and 2019 under the employee stock purchase plan.

Note 7. Pension and Other Postretirement Benefit Plans

401(k) Savings Plan and Other Defined Contribution Plans

The company's 401(k) savings and other defined contribution plans cover the majority of the company's eligible U.S. and certain non-U.S. employees. Contributions to the plans are made by both the employee and the company. Company contributions are based on the level of employee contributions. Company contributions to these plans are based on formulas determined by the company. In 2021, 2020 and 2019, the company charged to expense $299 million, $254 million and $232 million, respectively, related to its defined contribution plans.

Defined Benefit Pension Plans

Employees of a number of the company's non-U.S. and certain U.S. subsidiaries participate in defined benefit pension plans covering substantially all full-time employees at those subsidiaries. Some of the plans are unfunded, as permitted under the plans and applicable laws. The company also maintains postretirement healthcare programs at several acquired businesses where certain employees are eligible to participate. The liabilities and costs associated with the company's postretirement healthcare programs are generally funded on a self-insured and insured-premium basis and are not material for any period presented.

The company recognizes the funded status of defined benefit pension and other postretirement benefit plans as an asset or liability. This amount is defined as the difference between the fair value of plan assets and the benefit obligation. The company is required to recognize as a component of other comprehensive items, net of tax, the actuarial gains/losses and prior service costs/credits that arise but were not previously required to be recognized as components of net periodic benefit cost. Other comprehensive items is adjusted as these amounts are later recognized in income as components of net periodic benefit cost.

When a company with a pension plan is acquired, any excess of projected benefit obligation over the plan assets is recognized as a liability and any excess of plan assets over the projected benefit obligation is recognized as an asset. The recognition of a new liability or a new asset results in the elimination of (a) previously existing unrecognized net gain or loss and (b) unrecognized prior service cost or credits.

The company funds annually, at a minimum, the statutorily required minimum amount as actuarially determined. During 2021, 2020 and 2019, the company made cash contributions of approximately $34 million, $96 million and $50 million, respectively. Contributions to the plans included in the following table are estimated at between $40 and $60 million for 2022.

The following table provides a reconciliation of benefit obligations and plan assets of the company's domestic and non-U.S. pension plans:

	Domestic pension benefits		Non-U.S. pension benefits	
(In millions)	2021	2020	2021	2020
Change in projected benefit obligations				
Benefit obligation at beginning of year	$ 1,302	$ 1,302	$ 1,486	$ 1,303
Acquisitions	—	—	170	—
Service costs	—	—	27	24
Interest costs	23	35	11	18
Settlements	—	—	(7)	(38)
Plan participants' contributions	—	—	6	5
Actuarial (gains) losses	20	44	(57)	119
Benefits paid	(85)	(79)	(30)	(26)
Currency translation and other	—	—	(54)	81
Benefit obligation at end of year	$ 1,260	$ 1,302	$ 1,552	$ 1,486
Change in fair value of plan assets				
Fair value of plan assets at beginning of year	$ 1,267	$ 1,201	$ 1,160	$ 986
Acquisitions	—	—	158	—
Actual return on plan assets	37	138	14	92
Employer contribution	7	7	27	87
Settlements	—	—	(7)	(38)
Plan participants' contributions	—	—	6	5
Benefits paid	(85)	(79)	(30)	(26)
Currency translation and other	—	—	(26)	54
Fair value of plan assets at end of year	$ 1,226	$ 1,267	$ 1,302	$ 1,160
Funded status	$ (34)	$ (35)	$ (250)	$ (326)
Accumulated benefit obligation	$ 1,260	$ 1,302	$ 1,475	$ 1,417
Amounts recognized in balance sheet				
Noncurrent assets	$ 32	$ 38	$ 205	$ 157
Current liability	(7)	(8)	(10)	(9)
Noncurrent liabilities	(59)	(65)	(445)	(474)
Net amount recognized	$ (34)	$ (35)	$ (250)	$ (326)
Amounts recognized in accumulated other comprehensive items				
Net actuarial loss	$ 157	$ 142	$ 167	$ 242
Prior service credits	—	—	(3)	(2)
Net amount recognized	$ 157	$ 142	$ 164	$ 240

For domestic pension plans, actuarial losses experienced in 2021 were driven by differences between actual and expected returns on plan assets for certain portions of plan benefits indexed to asset returns, which were partially offset by actuarial gains due to increases in the weighted average discount rates used to determine the projected benefit obligation differences. For non-U.S. pension plans, actuarial gains experienced in 2021 were principally driven by increases in the weighted average discount rates used to determine the projected benefit obligation.

For both domestic and non-U.S. pension plans, actuarial losses experienced in 2020 were principally driven by decreases in the weighted average discount rates used to determine the projected benefit obligation. For domestic pension plans, the 2020 actuarial losses were partially offset by gains recognized due to the adoption of an updated mortality assumption.

The actuarial assumptions used to compute the funded status for the plans are based upon information available as of December 31, 2021 and 2020 and are as follows:

	Domestic pension benefits		Non-U.S. pension benefits	
	2021	2020	2021	2020
Weighted average assumptions used to determine projected benefit obligations				
Discount rate for determining benefit obligation	2.70 %	2.33 %	1.45 %	0.95 %
Interest crediting rate for cash balance plans	2.58 %	2.16 %	1.25 %	1.25 %
Average rate of increase in employee compensation	N/A	N/A	2.73 %	2.30 %

The actuarial assumptions used to compute the net periodic pension benefit cost (income) are based upon information available as of the beginning of the year, as presented in the following table:

	Domestic pension benefits			Non-U.S. pension benefits		
	2021	2020	2019	2021	2020	2019
Weighted average assumptions used to determine net benefit cost (income)						
Discount rate - service cost	N/A	N/A	N/A	0.65 %	1.21 %	1.97 %
Discount rate - interest cost	2.33 %	3.13 %	4.22 %	0.80 %	1.44 %	2.06 %
Average rate of increase in employee compensation	N/A	N/A	N/A	2.30 %	2.27 %	2.47 %
Expected long-term rate of return on assets	4.25 %	5.00 %	5.76 %	2.02 %	2.33 %	3.25 %

The discount rate reflects the rate the company would have to pay to purchase high-quality investments that would provide cash sufficient to settle its current pension obligations. The discount rate is determined based on a range of factors, including the rates of return on high-quality, fixed-income corporate bonds and the related expected duration of the obligations or, in certain instances, the company has used a hypothetical portfolio of high quality instruments with maturities that mirror the benefit obligation in order to accurately estimate the discount rate relevant to a particular plan.

The company utilizes a full yield curve approach in the estimation of these components by applying the specific spot-rates along the yield curve used in the determination of the benefit obligation to the relevant projected cash flows.

The expected long-term rate of return on plan assets reflects the average rate of earnings expected on the funds invested, or to be invested, to provide for the benefits included in the projected benefit obligations. In determining the expected long-term rate of return on plan assets, the company considers the relative weighting of plan assets, the historical performance of total plan assets and individual asset classes and economic and other indicators of future performance. In addition, the company may consult with and consider the opinions of financial and other professionals in developing appropriate return benchmarks.

Asset management objectives include maintaining an adequate level of diversification to reduce interest rate and market risk and providing adequate liquidity to meet immediate and future benefit payment requirements.

The expected rate of compensation increase reflects the long-term average rate of salary increases and is based on historic salary increase experience and management's expectations of future salary increases.

The projected benefit obligation and fair value of plan assets for the company's qualified and non-qualified pension plans with projected benefit obligations in excess of plan assets are as follows:

	Pension plans	
(In millions)	2021	2020
Pension plans with projected benefit obligations in excess of plan assets		
Projected benefit obligation	$ 2,010	$ 2,047
Fair value of plan assets	1,521	1,529

The accumulated benefit obligation and fair value of plan assets for the company's qualified and non-qualified pension plans with accumulated benefit obligations in excess of plan assets are as follows:

	Pension plans	
(In millions)	2021	2020
Pension plans with accumulated benefit obligations in excess of plan assets		
Accumulated benefit obligation	$ 1,937	$ 1,976
Fair value of plan assets	1,521	1,526

The measurement date used to determine benefit information is December 31 for all plan assets and benefit obligations.

The net periodic pension benefit cost (income) includes the following components:

	Domestic pension benefits			Non-U.S. pension benefits		
(In millions)	2021	2020	2019	2021	2020	2019
Components of net benefit cost (income)						
Service cost	$ —	$ —	$ —	$ 27	$ 24	$ 23
Interest cost on benefit obligation	23	35	45	11	18	24
Expected return on plan assets	(40)	(47)	(55)	(19)	(19)	(30)
Amortization of actuarial net loss	7	6	2	12	10	6
Amortization of prior service benefit	—	—	—	—	(1)	(1)
Settlement/curtailment loss	—	—	—	—	8	4
Net periodic benefit cost (income)	$ (10)	$ (6)	$ (8)	$ 31	$ 40	$ 26

Expected benefit payments are estimated using the same assumptions used in determining the company’s benefit obligation at December 31, 2021. Benefit payments will depend on future employment and compensation levels, average years employed and average life spans, among other factors, and changes in any of these factors could significantly affect these estimated future benefit payments. Estimated future benefit payments during the next five years and in the aggregate for the five fiscal years thereafter, are as follows:

(In millions)	Domestic pension benefits	Non-U.S. pension benefits
Expected benefit payments		
2022	$ 93	$ 45
2023	89	45
2024	88	49
2025	86	52
2026	84	56
2027-2031	368	307

Domestic Pension Plan Assets

The company’s overall objective is to manage the assets in a liability framework where investments are selected that are expected to have similar changes in fair value as the related liabilities will have upon changes in interest rates. The company invests in a portfolio of both return-seeking and liability-hedging assets, primarily through the use of institutional collective funds, to achieve long-term growth and to insulate the funded position from interest rate volatility. The strategic asset allocation uses a combination of risk controlled and index strategies in fixed income and global equities. The target allocations for the investments are approximately 10% to funds investing in

U.S. equities, approximately 10% to funds investing in international equities and approximately 80% to funds investing in fixed income securities. The portfolio maintains enough liquidity at all times to meet the near-term benefit payments.

Non-U.S. Pension Plan Assets

The company maintains specific plan assets for many of the individual pension plans outside the U.S. The investment strategy of each plan has been uniquely established based on the country specific standards and characteristics of the plans. Several of the plans have contracts with insurance companies whereby the market risks of the benefit obligations are borne by the insurance companies. When assets are held directly in investments, generally the objective is to invest in a portfolio of

diversified assets with a variety of fund managers. The investments may include equity funds, fixed income funds, hedge funds, multi-asset funds, alternative investments and derivative funds with the target asset allocations ranging from approximately 0% - 25% for equity funds, 40% - 90% for fixed income funds, 0% - 35% for multi-asset funds, and 0% - 30% for funds holding derivatives. The derivatives held by the funds are primarily interest rate swaps intended to match the movements in the plan liabilities. Each plan maintains enough liquidity at all times to meet the near-term benefit payments.

The fair values of the company's plan assets at December 31, 2021 and 2020, by asset category are as follows:

(In millions)	December 31, 2021	Quoted prices in active markets (Level 1)	Significant other observable inputs (Level 2)	Significant unobservable inputs (Level 3)	Not subject to leveling (a)
Domestic pension plan assets					
U.S. equity funds	$ 124	$ —	$ —	$ —	$ 124
International equity funds	117	—	—	—	117
Fixed income funds	966	—	—	—	966
Money market funds	19	—	—	—	19
Total domestic pension plans	$ 1,226	$ —	$ —	$ —	$ 1,226
Non-U.S. pension plan assets					
Equity funds	$ 17	$ —	$ —	$ —	$ 17
Fixed income funds	651	—	—	—	651
Hedge funds	3	—	—	—	3
Multi-asset funds	73	—	—	—	73
Derivative funds	253	—	—	—	253
Alternative investments	1	—	—	—	1
Insurance contracts	295	—	295	—	—
Cash / money market funds	9	5	—	—	4
Total non-U.S. pension plans	$ 1,302	$ 5	$ 295	$ —	$ 1,002

(a) Investments measured at the net asset value per share (or its equivalent) practical expedient have not been classified in the fair value hierarchy.

(In millions)	December 31, 2020	Quoted prices in active markets (Level 1)	Significant other observable inputs (Level 2)	Significant unobservable inputs (Level 3)	Not subject to leveling (a)
Domestic pension plan assets					
U.S. equity funds	$ 125	$ —	$ —	$ —	$ 125
International equity funds	126	—	—	—	126
Fixed income funds	1,001	—	—	—	1,001
Money market funds	15	—	—	—	15
Total domestic pension plans	$ 1,267	$ —	$ —	$ —	$ 1,267
Non-U.S. pension plan assets					
Equity funds	$ 74	$ —	$ —	$ —	$ 74
Fixed income funds	510	—	—	—	510
Hedge funds	59	—	—	—	59
Multi-asset funds	45	—	—	—	45
Derivative funds	149	—	—	—	149
Alternative investments	6	—	—	—	6
Insurance contracts	262	—	262	—	—
Cash / money market funds	55	7	—	—	48
Total non-U.S. pension plans	$ 1,160	$ 7	$ 262	$ —	$ 891

(a) Investments measured at the net asset value per share (or its equivalent) practical expedient have not been classified in the fair value hierarchy.

The tables above present the fair value of the company's plan assets in accordance with the fair value hierarchy (Note 14). Certain investments that are measured at fair value using the net asset value per share practical expedient have not been classified in the fair value hierarchy. The fair value amounts of these investments presented in the above tables are intended to permit reconciliation of the fair value hierarchy to the amounts presented for the total pension plan assets. These investments were also redeemable at the balance sheet date or within limited time restrictions.

Note 8. Income Taxes

The components of income before provision for income taxes are as follows:

(In millions)	2021	2020	2019
U.S.	$ 3,340	$ 4,762	$ 2,280
Non-U.S.	5,501	2,468	1,792
Income before income taxes	$ 8,841	$ 7,230	$ 4,072

The components of the provision for income taxes are as follows:

(In millions)	2021	2020	2019
Current income tax provision			
Federal	$ 446	$ 521	$ 267
Non-U.S.	1,148	423	544
State	160	175	62
	1,754	1,119	873
Deferred income tax provision (benefit)			
Federal	$ (227)	$ (237)	$ (222)
Non-U.S.	(399)	(18)	(252)
State	(19)	(14)	(25)
	(645)	(269)	(499)
Provision for income taxes	$ 1,109	$ 850	$ 374

The provision for income taxes in the accompanying statement of income differs from the provision calculated by applying the statutory federal income tax rate to income before income taxes due to the following:

(In millions)	2021	2020	2019
Statutory federal income tax rate	21 %	21 %	21 %
Provision for income taxes at statutory rate	$ 1,857	$ 1,518	$ 855
Increases (decreases) resulting from:			
Foreign rate differential	(255)	(223)	(204)
Income tax credits	(315)	(335)	(213)
Global intangible low-taxed income	76	86	92
Foreign-derived intangible income	(119)	(156)	(111)
Excess tax benefits from stock options and restricted stock units	(124)	(114)	(80)
Provision for (reversal of) tax reserves, net	(17)	(26)	62
Intra-entity transfers	(284)	—	(79)
Foreign exchange loss on inter-company debt refinancing	—	(47)	(62)
Domestication transaction	—	(263)	—
Valuation allowance	36	379	(4)
Withholding taxes	164	115	38
Basis difference on disposal of business	—	—	73
Tax return reassessments and settlements	1	(196)	(6)
State income taxes, net of federal tax	82	147	22
Other, net	7	(35)	(9)
Provision for income taxes	$ 1,109	$ 850	$ 374

The company has operations and a taxable presence in approximately 50 countries outside the U.S. The company's effective income tax rate differs from the U.S. federal statutory rate each year due to certain operations that are subject to tax incentives, state and local taxes, and foreign taxes that are different than the U.S. federal statutory rate.

During 2021, the company recorded a $188 million income tax benefit related to the deferred tax implications of an intra-entity transfer of assets. Also in 2021, the company recorded a $96 million income tax benefit related to a capital loss resulting from certain intra-entity transactions.

During 2020, the company settled an IRS audit relating to the 2014, 2015, and 2016 tax years. The company recorded a $25 million net tax benefit primarily from this settlement and related impacts, which resulted in a decrease in the company's unrecognized tax benefits of $378 million, of which $144 million was reclassified to income taxes payable. The company recorded $53 million of charges for expired tax credits and other related components of the settlement. The company recorded a charge of $156 million to establish a valuation allowance against certain U.S. foreign tax credits which the company believes will more likely than not expire unutilized.

In 2020, the company recorded a $263 million income tax benefit related to a domestication transaction involving the transfer of certain non-U.S. subsidiaries to the U.S., including interest expense of those subsidiaries. The company also recorded a valuation allowance of $212 million against the amount of interest expense that the company believes will more likely than not go unused. Also in 2020, the company recorded a $47 million income tax benefit, including both U.S. federal and state taxes, related to a foreign exchange loss for tax purposes on certain intercompany financing arrangements.

In 2019, the company recorded a $62 million income tax benefit, including both U.S. federal and state taxes, related to a foreign exchange loss for tax purposes on certain intercompany financing arrangements as well as a tax provision of $191 million related to the gain on the sale of the Anatomical Pathology business. Also in 2019, the company recorded a $79 million benefit related to the deferred tax implications of intra-entity transactions which included a tax benefit to release a valuation allowance against net operating losses previously determined to be unrealizable.

The foreign tax credits discussed below are the result of foreign earnings and profits remitted or deemed remitted to the U.S. during the reporting year and the U.S. treatment of taxes paid in the foreign jurisdictions in the years those profits were originally earned.

In 2020, the company implemented foreign tax credit planning in Sweden which resulted in $96 million of foreign tax credits, with no related incremental U.S. income tax expense.

In 2019, the company implemented foreign tax credit planning in Sweden which resulted in $75 million of foreign tax credits, with no related incremental U.S. income tax expense.

The company generally receives a tax deduction upon the exercise of non-qualified stock options by employees, or the vesting of restricted stock units held by employees, for the difference between the exercise price and the market price of the underlying common stock on the date of exercise. The company uses the incremental tax benefit approach for utilization of tax attributes. These excess tax benefits reduce the tax provision. In 2021, 2020 and 2019, the company's tax provision was reduced by $124 million, $114 million and $80 million, respectively, of such benefits.

Net deferred tax asset (liability) in the accompanying balance sheet consists of the following:

(In millions)	2021	2020
Deferred tax asset (liability)		
Depreciation and amortization	$ (4,687)	$ (2,962)
Net operating loss and credit carryforwards	1,652	1,668
Reserves and accruals	162	164
Accrued compensation	318	253
Inventory basis difference	181	112
Deferred interest	295	227
Unrealized (gains) losses on hedging instruments	(33)	242
Other, net	251	124
Deferred tax liabilities, net before valuation allowance	(1,861)	(172)
Less: Valuation allowance	968	933
Deferred tax liabilities, net	$ (2,829)	$ (1,105)

The company estimates the degree to which tax assets and loss and credit carryforwards will result in a benefit based on expected profitability by tax jurisdiction and provides a valuation allowance for tax assets and loss and credit carryforwards that it believes will more likely than not expire unutilized. At December 31, 2021, all of the

company’s valuation allowance relates to deferred tax assets, primarily net operating losses and disallowed interest expense carryforward, for which any subsequently recognized tax benefits will reduce income tax expense.

The changes in the valuation allowance are as follows:

	Year Ended December 31,		
(In millions)	2021	2020	2019
Beginning balance	$ 933	$ 408	$ 471
Additions (reductions) charged to income tax provision, net	24	514	(27)
Additions due to acquisitions	30	—	—
Reduction due to a divestiture	—	—	(33)
Currency translation and other	(19)	11	(3)
Ending balance	$ 968	$ 933	$ 408

At December 31, 2021, the company had net federal, state and non-U.S. net operating loss carryforwards of $72 million, $88 million and $1.18 billion, respectively. Use of the carryforwards is limited based on the future income of certain subsidiaries. The federal and state net operating loss carryforwards expire in the years 2022 through 2041. Of the net non-U.S. net operating loss carryforwards, $419 million expire in the years 2025 through 2041, and the remainder do not expire.

At December 31, 2021, the company had foreign tax credit carryforwards of $610 million and deferred interest carryforwards of $295 million. The foreign tax credit carryforwards will expire in the years 2022 through 2030 while deferred interest carryforwards do not expire.

U.S. federal taxes have been recorded on $24 billion of undistributed foreign earnings as of December 31, 2021. A provision has not been made for certain U.S. state income taxes or additional non-U.S. taxes that would be due when cash is repatriated to the U.S. as the company's undistributed foreign earnings are intended to be reinvested outside of the U.S. indefinitely. The determination of the amount of the unrecognized deferred tax liability related to the undistributed foreign earnings is not practicable due to the uncertainty in the manner in which these earnings will be distributed. The company's intent is to only make distributions from non-U.S. subsidiaries in the future when they can be made at no net tax cost.

Unrecognized Tax Benefits

As of December 31, 2021, the company had $1.12 billion of unrecognized tax benefits substantially all of which, if recognized, would reduce the effective tax rate.

A reconciliation of the beginning and ending amounts of unrecognized tax benefits is as follows:

(In millions)	2021	2020	2019
Beginning balance	$ 1,091	$ 1,552	$ 1,442
Additions due to acquisitions	26	—	—
Additions for tax positions of current year	32	8	53
Additions for tax positions of prior years	60	—	69
Reductions for tax positions of prior years	(5)	(296)	(7)
Closure of tax years	(27)	—	—
Settlements	(53)	(173)	(5)
Ending balance	$ 1,124	$ 1,091	$ 1,552

Substantially all of the unrecognized tax benefits are classified as long-term liabilities. The company does not expect its unrecognized tax benefits to change significantly over the next twelve months.

During 2021, the company's unrecognized tax benefits increased by $80 million as a result of uncertain tax positions relating to foreign tax positions and decreased $75 million relating to U.S. federal and state tax positions. The company also assumed $26 million of uncertain tax benefits as part of the acquisition of PPD.

During 2020, the company's unrecognized tax benefits decreased $51 million as a result of uncertain tax positions relating to foreign tax positions and $410 million relating to U.S. federal and state tax positions which included $378 million from the settlement of the IRS audit of the 2014, 2015 and 2016 tax years.

During 2019, the company's unrecognized tax benefits increased $70 million as a result of uncertain tax positions relating to foreign tax positions and $45 million relating to U.S. federal and state tax positions.

The company classified interest and penalties related to unrecognized tax benefits as income tax expense. The total amount of interest and penalties related to uncertain tax positions and recognized in the balance sheet as of December 31, 2021 and 2020 was $59 million and $78 million, respectively.

The company conducts business globally and, as a result, Thermo Fisher or one or more of its subsidiaries files income tax returns in the U.S. federal jurisdiction and various state and foreign jurisdictions. In the normal course of business, the company is subject to examination by taxing authorities throughout the world, including such major jurisdictions as Australia, Canada, China, Denmark, Finland, France, Germany, Japan, Singapore, Sweden, the United Kingdom and the United States. With few exceptions, the company is no longer subject to U.S. state and local or non-U.S. income tax examinations for years before 2012 and no longer subject to U.S. federal income tax examinations for years before 2017.

Note 9. Earnings per Share

(In millions except per share amounts)	2021	2020	2019
Net income attributable to Thermo Fisher Scientific Inc.	$ 7,725	$ 6,375	$ 3,696
Basic weighted average shares	394	396	400
Plus effect of: stock options and restricted stock units	3	3	3
Diluted weighted average shares	397	399	403
Basic earnings per share	$ 19.62	$ 16.09	$ 9.24
Diluted earnings per share	$ 19.46	$ 15.96	$ 9.17
Antidilutive stock options excluded from diluted weighted average shares	1	1	1

Note 10. Debt and Other Financing Arrangements

(Dollars in millions)	Effective interest rate at December 31, 2021	December 31, 2021	December 31, 2020
Commercial Paper	0.01 %	$ 2,522	$ —
2.15% 7-Year Senior Notes, Due 7/21/2022 (euro-denominated)		—	611
3.00% 7-Year Senior Notes, Due 4/15/2023		—	1,000
Floating Rate (SOFR + 0.35%) 1.5-Year Senior Notes, Due 4/18/2023		1,000	—
Floating Rate (SOFR + 0.39%) 2-Year Senior Notes, Due 10/18/2023		500	—
0.797% 2-Year Senior Notes, Due 10/18/2023	1.03 %	1,350	—
Floating Rate (EURIBOR + 0.20%) 2-Year Senior Notes Due 11/18/2023 (euro-denominated)	0.00 %	1,933	—
0.000% 2-Year Senior Notes Due 11/18/2023 (euro-denominated)	0.06 %	625	—
4.15% 10-Year Senior Notes, Due 2/1/2024		—	1,000
0.75% 8-Year Senior Notes, Due 9/12/2024 (euro-denominated)	0.94 %	1,137	1,222
1.215% 3-Year Senior Notes, Due 10/18/2024	1.42 %	2,500	—
Floating Rate (SOFR + 0.53%) 3-Year Senior Notes, Due 10/18/2024		500	—
0.125% 5.5-Year Senior Notes, Due 3/1/2025 (euro-denominated)	0.41 %	910	977
4.133% 5-Year Senior Notes, Due 3/25/2025		—	1,100
2.00% 10-Year Senior Notes, Due 4/15/2025 (euro-denominated)	2.10 %	728	782
0.000% 4-Year Senior Notes Due 11/18/2025 (euro-denominated)	0.16 %	625	—
3.65% 10-Year Senior Notes, Due 12/15/2025	3.77 %	350	350
1.40% 8.5-Year Senior Notes, Due 1/23/2026 (euro-denominated)	1.53 %	796	855
2.95% 10-Year Senior Notes, Due 9/19/2026		—	1,200

(Dollars in millions)	Effective interest rate at December 31, 2021	December 31, 2021	December 31, 2020
1.45% 10-Year Senior Notes, Due 3/16/2027 (euro-denominated)	1.66 %	568	611
1.75% 7-Year Senior Notes, Due 4/15/2027 (euro-denominated)	1.97 %	682	733
3.20% 10-Year Senior Notes, Due 8/15/2027		—	750
0.50% 8.5-Year Senior Notes, Due 3/1/2028 (euro-denominated)	0.77 %	910	977
1.375% 12-Year Senior Notes, Due 9/12/2028 (euro-denominated)	1.46 %	682	733
1.750% 7-Year Senior Notes, Due 10/15/2028	1.89 %	700	—
1.95% 12-Year Senior Notes, Due 7/24/2029 (euro-denominated)	2.08 %	796	855
2.60% 10-Year Senior Notes, Due 10/1/2029	2.74 %	900	900
4.497% 10-Year Senior Notes, Due 3/25/2030		—	1,100
0.80% 9-Year Senior Notes, Due 10/18/2030 (euro-denominated)	0.89 %	1,990	—
0.875% 12-Year Senior Notes, Due 10/1/2031 (euro-denominated)	1.13 %	1,023	1,099
2.00% 10-Year Senior Notes, Due 10/15/2031	2.23 %	1,200	—
2.375% 12-Year Senior Notes, Due 4/15/2032 (euro-denominated)	2.55 %	682	733
1.125% 12-Year Senior Notes, Due 10/18/2033 (euro-denominated)	1.21 %	1,706	—
2.875% 20-Year Senior Notes, Due 7/24/2037 (euro-denominated)	2.94 %	796	855
1.50% 20-Year Senior Notes, Due 10/1/2039 (euro-denominated)	1.73 %	1,023	1,099
2.80% 20-Year Senior Notes, Due 10/15/2041	2.90 %	1,200	—
1.625% 20-Year Senior Notes, Due 10/18/2041 (euro-denominated)	1.78 %	1,421	—
5.30% 30-Year Senior Notes, Due 2/1/2044	5.37 %	400	400
4.10% 30-Year Senior Notes, Due 8/15/2047	4.23 %	750	750
1.875% 30-Year Senior Notes, Due 10/1/2049 (euro-denominated)	1.98 %	1,137	1,222
2.00% 30-Year Senior Notes, Due 10/18/2051 (euro-denominated)	2.07 %	853	—
Other		76	5
Total borrowings at par value		34,971	21,919
Fair value hedge accounting adjustments		—	25
Unamortized discount		(117)	(102)
Unamortized debt issuance costs		(184)	(114)
Total borrowings at carrying value		34,670	21,728
Finance lease liabilities		200	7
Less: Short-term obligations and current maturities		2,537	2,628
Long-term obligations		$ 32,333	$ 19,107

SOFR - Secured Overnight Financing Rate
EURIBOR - Euro Interbank Offered Rate

The effective interest rates for the fixed-rate debt include the stated interest on the notes, the accretion of any discount and the amortization of any debt issuance costs.

See Note 14 for fair value information pertaining to the company’s long-term borrowings.

As of December 31, 2021, the annual repayment requirements for debt obligations are as follows:

(In millions)	Borrowings	Finance Lease Liabilities
2022	$ 2,522	$ 15
2023	5,396	12
2024	4,138	12
2025	2,610	12
2026	797	12
2027 and thereafter	19,508	137
	$ 34,971	$ 200

In addition to available borrowings under the company's revolving credit agreements, discussed below, the company had unused lines of credit of $78 million as of December 31, 2021. These unused lines of credit generally provide for short-term unsecured borrowings at various interest rates.

Credit Facilities

On January 7, 2022, the company entered into a new revolving credit facility (the Facility) with a bank group that provides for up to $5.00 billion of unsecured multi-currency revolving credit The Facility replaces the company's $3.00 billion credit facility which was in place at December 31, 2021 (the prior credit facility). The Facility expires on January 7, 2027. The revolving credit agreement calls for interest at either a Term SOFR, a EURIBOR-based rate (for funds drawn in euro) or a rate based on the prime lending rate of the agent bank, at the company's option. The agreement contains affirmative, negative and financial covenants, and events of default customary for facilities of this type. The covenants in the Facility include a Consolidated Net Interest Coverage Ratio (Consolidated EBITDA to Consolidated Net Interest Expense), as such terms are defined in the Facility. Specifically, the company has agreed that, so long as any lender has any commitment under the Facility, any letter of credit is outstanding under the Facility, or any loan or other obligation is outstanding under the Facility, it will maintain a minimum Consolidated Interest Coverage Ratio of 3.5:1.0 as of the last day of any fiscal quarter. As of December 31, 2021, no borrowings were outstanding under the prior credit facility, although available capacity was reduced by approximately $4 million as a result of outstanding letters of credit.

Commercial Paper Programs

The company has commercial paper programs pursuant to which it may issue and sell unsecured, short-term promissory notes (CP Notes). Under the U.S. program, a) maturities may not exceed 397 days from the date of issue and b) the CP Notes are issued on a private placement basis under customary terms in the commercial paper market and are not redeemable prior to maturity nor subject to voluntary prepayment. Under the euro program, maturities may not exceed 183 days and may be denominated in euro, U.S. dollars, Japanese yen, British pounds sterling, Swiss franc, Canadian dollars or other currencies. Under both programs, the CP Notes are issued at a discount from par (or premium to par, in the case of negative interest rates), or, alternatively, are sold at par and bear varying interest rates on a fixed or floating basis. As of December 31, 2021, there were $2.52 billion outstanding borrowings under these programs.

Senior Notes

Interest is payable quarterly on the floating rate senior notes, annually on the euro-denominated fixed rate senior notes and semi-annually on all other senior notes. Each of the fixed rate senior notes may be redeemed at a redemption price of 100% of the principal amount plus a specified make-whole premium and accrued interest. Except for the euro-denominated floating rate senior notes, which may not be redeemed early, the floating rate senior notes may be redeemed in whole or in part on or after their applicable call dates at a redemption price of 100% of the principal amount plus accrued interest. The company is subject to certain affirmative and negative covenants under

the indentures governing the senior notes, the most restrictive of which limits the ability of the company to pledge principal properties as security under borrowing arrangements. The company was in compliance with all covenants at December 31, 2021.

The company intends to allocate an amount equal to the net proceeds from the 0.000% senior notes due 2025 to finance or refinance, in whole or in part, certain green or social eligible projects. Pending allocation to green or social eligible projects, such net proceeds may be temporarily invested in cash, cash equivalents, short-term investments, or used to repay other borrowings.

In 2021, the company redeemed some of its existing senior notes. In connection with these redemptions, the company incurred $767 million of losses on the early extinguishment of debt included in other income/(expense) on the accompanying

statement of income. Upon redemption of the senior notes, the company terminated the related fixed to floating rate interest rate swap arrangements and received $22 million, included in other financing activities, net, in the accompanying statement of cash flows.

In 2019, the company refinanced certain of its debt by issuing new senior notes and using the proceeds to redeem some of its existing senior notes. In connection with these redemptions, the company incurred $184 million of losses on the early extinguishment of debt included in other income/(expense) on the accompanying statement of income. Upon redemption of the senior notes, the company terminated the related fixed to floating rate interest rate swap arrangements and paid $17 million, included in other financing activities, net, in the accompanying statement of cash flows. The company also terminated related cross-currency interest rate swap arrangements and received $44 million, included in other investing activities, net, in the accompanying statement of cash flows.

In February 2022, the company redeemed all of its 3.650% Senior Notes due 2025. In connection with the redemption the company incurred approximately $26 million of losses on the early extinguishment of debt in the first quarter of 2022.

Thermo Fisher Scientific (Finance I) B.V. (Thermo Fisher International), a wholly-owned finance subsidiary of the company, issued each of the Floating Rate Senior Notes due 2023, the 0.00% Senior Notes due 2023, the 0.00% Senior Notes due 2025, the 0.80% Senior Notes due 2030, the 1.125% Senior Notes due 2033, the 1.625% Senior Notes due 2041, and the 2.00% Senior Notes due 2051 included in the table above (collectively, the “Euronotes”) in registered public offerings. The company has fully and unconditionally guaranteed all of Thermo Fisher International’s obligations under the Euronotes and all of Thermo Fisher International’s other debt securities, and no other subsidiary of the company will guarantee these obligations. Thermo Fisher International is a “finance subsidiary” as defined in Rule 13-01(a)(4)(vi) of the Exchange Act, with no assets or operations other than those related to the issuance, administration and repayment of the Euronotes and other debt securities issued by Thermo Fisher International from time to time. The financial condition, results of operations and cash flows of Thermo Fisher International are consolidated in the financial statements of the company.

Note 11. Leases

As a lessee, the company leases certain logistics, office, and manufacturing facilities, as well as vehicles, copiers, and other equipment. These operating leases generally have remaining lease terms between 1 month and 30 years, and some include options to extend (generally for 1 to 10 years) or have options to terminate the arrangement within 1 year.

The company has guaranteed the residual value of three leased operating facilities with lease terms ending in 2023, 2024 and 2025. The company has agreed with the lessor to comply with certain financial covenants consistent with its other debt arrangements (Note 10). The aggregate maximum guarantee under these three lease arrangements is $147 million. Operating lease ROU assets and lease liabilities for these lease arrangements are recorded on the consolidated balance sheet as of December 31, 2021, but exclude any amounts for residual value guarantees.

As a lessee, the consolidated financial statements include the following relating to operating leases:

(In millions)	2021	2020	2019
Balance sheet			
ROU assets	$ 1,531	$ 775	
Operating lease liabilities - current	266	184	
Operating lease liabilities - noncurrent	1,203	626	
Statement of income			
Operating lease costs	$ 254	$ 224	$ 208
Variable lease costs	66	49	41
Statement of cash flows			
Cash used in operating activities for payments of amounts included in the measurement of operating lease liabilities	$ 288	$ 222	$ 208
Operating lease ROU assets obtained in exchange for new operating lease liabilities	293	202	205
Weighted average at end of year			
Remaining operating lease term	9.9 years	6.3 years	6.2 years
Discount rate	2.6 %	3.4 %	4.0 %

ROU assets are classified in other assets in the consolidated balance sheet. Operating lease liabilities are classified in other accrued expenses and other long-term liabilities, respectively, in the consolidated balance sheet.

Lease costs arising from finance leases, short-term leases, and sublease income are not material. See Note 10 for additional information relating to finance leases.

As of December 31, 2021, future payments of operating lease liabilities are as follows:

(In millions)	
2022	$ 303
2023	248
2024	193
2025	144
2026	120
2027 and thereafter	650
Total lease payments	1,658
Less: imputed interest	189
Total operating lease liability	$ 1,469

As a lessor, operating leases, sales-type leases and direct financing leases are not material.

Note 12. Commitments and Contingencies

Purchase Obligations

The company has entered into unconditional purchase obligations, in the ordinary course of business, that include agreements to purchase goods, services or fixed assets and to pay royalties that are enforceable and legally binding and that specify all significant terms including: fixed or minimum quantities to be purchased; fixed, minimum or variable price provisions; and the approximate timing of the transaction. Purchase obligations exclude agreements that are cancelable at any time without penalty. The aggregate amount of the company's unconditional purchase obligations totaled $2.51 billion at December 31, 2021 and the majority of these obligations are expected to be settled during 2022.

The Analytical Instruments segment recorded a charge to cost of product revenues for $108 million in 2020 related to an existing supply contract for components of electron microscopy instruments. The agreement requires the company to make future minimum purchases through 2025. The company developed and launched an alternative product beginning in 2020 and based on the expected demand for the internally developed product vs. the third-party product, the company does not expect to use all of the product it will be required to buy, resulting in a loss on the purchase commitment.

Letters of Credit, Guarantees and Other Commitments

Outstanding letters of credit and bank guarantees totaled $266 million at December 31, 2021. Substantially all of these letters of credit and guarantees expire before 2039.

Outstanding surety bonds and other guarantees totaled $95 million at December 31, 2021. The expiration of these bonds and guarantees ranges through 2023.

The letters of credit, bank guarantees and surety bonds principally secure performance obligations, and allow the holder to draw funds up to the face amount of the letter of credit, bank guarantee or surety bond if the applicable business unit does not perform as contractually required.

The company is a guarantor of pension plan obligations of a divested business. The purchaser of the divested business has agreed to pay for the pension benefits, however the company was required to guarantee payment of these pension benefits should the purchaser fail to do so. The amount of the guarantee at December 31, 2021 was $36 million.

In connection with the sale of businesses of the company, the buyers have assumed certain contractual obligations of such businesses and have agreed to indemnify the company with respect to those assumed liabilities. In the event a third-party to a transferred contract does not recognize the transfer of obligations or a buyer defaults on its obligations under the transferred contract, the company could be liable to the third-party for such obligations. However, in such event, the company would be entitled to seek indemnification from the buyer.

Indemnifications

In conjunction with certain transactions, primarily divestitures, the company has agreed to indemnify the other parties with respect to certain liabilities related to the businesses that were sold or leased properties that were abandoned (e.g., retention of certain environmental, tax, employee and product liabilities). The scope and duration of such indemnity obligations vary from transaction to transaction. Where probable, an obligation for such indemnifications is recorded as a liability. Generally, a maximum obligation cannot be reasonably estimated. Other than obligations recorded as liabilities at the time of divestiture, historically the company has not made significant payments for these indemnifications.

In connection with the company's efforts to reduce the number of facilities that it occupies, the company has vacated some of its leased facilities or sublet them to third parties. When the company sublets a facility to a third-party, it remains the primary obligor under the master lease agreement with the owner of the facility. As a result, if a third-party vacates the sublet facility, the company would be obligated to make lease or other payments under the master lease agreement. The company believes that the financial risk of default by sublessors is individually and in the aggregate not material to the company's financial position or results of operations.

In connection with the sale of products in the ordinary course of business, the company often makes representations affirming, among other things, that its products do not infringe on the intellectual property rights of others and agrees to indemnify customers against third-party claims for such infringement. The company has not been required to make material payments under such provisions.

Environmental Matters

The company is currently involved in various stages of investigation and remediation related to environmental matters. The company cannot predict all potential costs related to environmental remediation matters and the possible impact on future operations given the uncertainties regarding the extent of the required cleanup, the complexity and interpretation of applicable laws and regulations, the varying costs of alternative cleanup methods and the extent of the company's responsibility. Expenses for environmental remediation matters related to the costs of installing, operating and maintaining groundwater-treatment systems and other remedial activities related to historical environmental contamination at the company's domestic and international facilities were not material in any period presented. The company records accruals for environmental remediation liabilities, based on current interpretations of environmental laws and regulations, when it is probable that a liability has been incurred and the amount of such liability can be reasonably estimated. The company calculates estimates based upon several factors, including input from environmental specialists and management's knowledge of and experience with these environmental matters. The company includes in these estimates potential costs for investigation, remediation and operation and

maintenance of cleanup sites. At December 31, 2021, the company's total environmental liability was approximately $65 million. While management believes the accruals for environmental remediation are adequate based on current estimates of remediation costs, the company may be subject to additional remedial or compliance costs due to future events such as changes in existing laws and regulations, changes in agency direction or enforcement policies, developments in remediation technologies or changes in the conduct of the company's operations, which could have a material adverse effect on the company's financial position, results of operations or cash flows.

Litigation and Related Contingencies

The company is involved in various disputes, governmental and/or regulatory inspections, inquiries, investigations and proceedings, and litigation matters that arise from time to time in the ordinary course of business. The disputes and litigation matters include product liability, intellectual property, employment and commercial issues. The company determines the probability and range of possible loss based on the current status of each of these matters. A liability is recorded in the financial statements if it is believed to be probable that a loss has been incurred and the amount of the loss can be reasonably estimated. The company establishes a liability that is an estimate of amounts expected to be paid in the future for events that have already occurred. The company accrues the most likely amount or at least the minimum of the range of probable loss when a range of probable loss can be estimated. The accrued liabilities are based on management's judgment as to the probability of losses for asserted and unasserted claims and, where applicable, actuarially determined estimates. Accrual estimates are adjusted as additional information becomes known or payments are made. The amount of ultimate loss may differ from these estimates. Due to the inherent uncertainties associated with pending litigation or claims, the company cannot predict the outcome, nor, with respect to certain pending litigation or claims where no liability has been accrued, make a meaningful estimate of the reasonably possible loss or range of loss that could result from an unfavorable outcome. The company has no material accruals for pending litigation or claims for which accrual amounts are not disclosed below, nor are material losses deemed probable for such matters. It is reasonably possible, however, that an unfavorable outcome that exceeds the company's current accrual estimate, if any, for one or more of the matters described below could have a material adverse effect on the company's results of operations, financial position and cash flows.

Product Liability, Workers Compensation and Other Personal Injury Matters

The company is involved in various proceedings and litigation that arise from time to time in connection with product liability, workers compensation and other personal injury matters. The range of probable loss for product liability, workers compensation and other personal injury matters of the company's continuing operations at December 31, 2021, was approximately $216 million to $375 million on an undiscounted basis. The portion of these liabilities assumed in the 2006 merger with Fisher was recorded at its fair (present) value at the date of merger. The company's accrual for all such matters in total, including the discounted liabilities, was $216 million at December 31, 2021 (or $223 million undiscounted). The accrual includes estimated defense costs and is gross of estimated amounts due from insurers of $100 million at December 31, 2021 (or $106 million undiscounted) that are included in other assets in the accompanying balance sheet. The portion of these insurance assets assumed in the merger with Fisher was also recorded at its fair value at the date of merger. In addition to the above accrual, as of December 31, 2021, the company had a product liability accrual of $11 million (undiscounted) relating to divested businesses.

Although the company believes that the amounts accrued and estimated recoveries are probable and appropriate based on available information, including actuarial studies of loss estimates, the process of estimating losses and insurance recoveries involves a considerable degree of judgment by management and the ultimate amounts could vary, which could have a material adverse effect on the company's results of operations, financial position, and cash flows. Insurance contracts do not relieve the company of its primary obligation with respect to any losses incurred. The collectability of amounts due from its insurers is subject to the solvency and willingness of the insurer to pay, as well as the legal sufficiency of the insurance claims. Management monitors the payment history as well as the financial condition and ratings of its insurers on an ongoing basis.

Note 13. Comprehensive Income and Shareholders' Equity

Comprehensive Income (Loss)

Comprehensive income combines net income and other comprehensive items. Other comprehensive items represent certain amounts that are reported as components of shareholders' equity in the accompanying balance sheet.

Changes in each component of accumulated other comprehensive items, net of tax are as follows:

(In millions)	Currency translation adjustment	Unrealized losses on hedging instruments	Pension and other postretirement benefit liability adjustment	Total
Balance at December 31, 2020	$ (2,438)	$ (91)	$ (278)	$ (2,807)
Other comprehensive items before reclassifications	373	—	36	409
Amounts reclassified from accumulated other comprehensive items	—	56	13	69
Net other comprehensive items	373	56	49	478
Balance at December 31, 2021	$ (2,065)	$ (35)	$ (229)	$ (2,329)

Shareholders' Equity

At December 31, 2021, the company had reserved 23 million unissued shares of its common stock for possible issuance under stock-based compensation plans.

Early in the first quarter of 2022, the company repurchased $2.00 billion of the company's common stock (3.3 million shares).

Note 14. Fair Value Measurements and Fair Value of Financial Instruments

Fair Value Measurements

The company uses the market approach technique to value its financial instruments and there were no changes in valuation techniques during 2021. The company's financial assets and liabilities carried at fair value are primarily comprised of investments in publicly traded securities, insurance contracts, investments in derivative contracts, mutual funds holding publicly traded securities and other investments in unit trusts held as assets to satisfy outstanding deferred compensation and retirement liabilities; and acquisition-related contingent consideration.

Assets and liabilities carried at fair value are classified and disclosed in one of the following three categories:

Level 1: Quoted market prices in active markets for identical assets or liabilities that the company has the ability to access.

Level 2: Observable market based inputs or unobservable inputs that are corroborated by market data such as quoted prices, interest rates and yield curves.

Level 3: Inputs are unobservable data points that are not corroborated by market data.

The following tables present information about the company's financial assets and liabilities measured at fair value on a recurring basis as of December 31, 2021 and December 31, 2020:

(In millions)	December 31, 2021	Quoted prices in active markets (Level 1)	Significant other observable inputs (Level 2)	Significant unobservable inputs (Level 3)
Assets				
Cash equivalents	$ 2,210	$ 2,210	$ —	$ —
Investments	298	298	—	—
Warrants	15	—	15	—
Insurance contracts	181	—	181	—
Derivative contracts	36	—	36	—
Total assets	$ 2,740	$ 2,508	$ 232	$ —
Liabilities				
Derivative contracts	$ 1	$ —	$ 1	$ —
Contingent consideration	317	—	—	317
Total liabilities	$ 318	$ —	$ 1	$ 317

(In millions)	December 31, 2020	Quoted prices in active markets (Level 1)	Significant other observable inputs (Level 2)	Significant unobservable inputs (Level 3)
Assets				
Cash equivalents	$ 8,971	$ 8,971	$ —	$ —
Investments	21	21	—	—
Warrants	7	—	7	—
Insurance contracts	157	—	157	—
Derivative contracts	28	—	28	—
Total assets	$ 9,184	$ 8,992	$ 192	$ —
Liabilities				
Derivative contracts	$ 132	$ —	$ 132	$ —
Contingent consideration	70	—	—	70
Total liabilities	$ 202	$ —	$ 132	$ 70

The company uses the Black-Scholes model to value its warrants. The company determines the fair value of its insurance contracts by obtaining the cash surrender value of the contracts from the issuer. The fair value of derivative contracts is the estimated amount that the company would receive/pay upon liquidation of the contracts, taking into account the change in interest rates and currency exchange rates. The company initially measures the fair value of acquisition-related contingent consideration based on amounts expected to be transferred (probability-weighted) discounted to present value. Changes to the fair value of contingent consideration are recorded in selling, general and administrative expense.

The following table provides a rollforward of the fair value, as determined by level 3 inputs (such as likelihood of achieving production or revenue milestones, as well as changes in the fair values of the investments underlying a

recapitalization investment portfolio), of the contingent consideration.

(In millions)	2021	2020
Contingent consideration		
Beginning balance	$ 70	$ 55
Acquisitions (including assumed balances)	403	28
Payments	(109)	(4)
Changes in fair value included in earnings	(47)	(9)
Ending balance	$ 317	$ 70

Derivative Contracts

The following table provides the aggregate notional value of outstanding derivative contracts.

(In millions)	December 31, 2021	December 31, 2020
Notional amount		
Interest rate swaps - fair value hedges	$ —	$ 1,000
Cross-currency interest rate swaps - designated as net investment hedges	900	900
Currency exchange contracts	2,149	5,206

While certain derivatives are subject to netting arrangements with counterparties, the company does not offset derivative assets and liabilities within the balance sheet. The following tables present the fair value of derivative instruments in the accompanying balance sheet and statement of income.

	Fair value – assets		Fair value – liabilities	
(In millions)	December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2020
Derivatives designated as hedging instruments				
Interest rate swaps (a)	$ —	$ 25	$ —	$ —
Cross-currency interest rate swaps (a)	25	—	—	46
Derivatives not designated as hedging instruments				
Currency exchange contracts (b)	11	3	1	86
Total derivatives	$ 36	$ 28	$ 1	$ 132

(a) The fair values of the interest rate swaps and cross-currency interest rate swaps are included in the accompanying balance sheet under the caption other assets or other long-term liabilities.
(b) The fair value of the currency exchange contracts is included in the accompanying balance sheet under the captions other current assets or other accrued expenses.

The following amounts related to cumulative basis adjustments for fair value hedges were included in the accompanying balance sheet under the caption long-term obligations:

	Carrying amount of the hedged liability		Cumulative amount of fair value hedging adjustment - increase (decrease) included in carrying amount of liability	
(In millions)	December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2020
Long-term obligations	$ —	$ 1,020	$ —	$ 25

(In millions)	Gain (loss) recognized 2021	2020
Fair value hedging relationships		
Interest rate swaps		
Hedged long-term obligations - included in other income/(expense)	$ 25	$ (38)
Derivatives designated as hedging instruments - included in other income/(expense)	(3)	38
Derivatives designated as cash flow hedges		
Interest rate swaps		
Included in unrealized losses on hedging instruments within other comprehensive items	—	(85)
Amount reclassified from accumulated other comprehensive items to other income/(expense)	(73)	(59)
Financial instruments designated as net investment hedges		
Foreign currency-denominated debt		
Included in currency translation adjustment within other comprehensive items	922	(873)
Cross-currency interest rate swaps		
Included in currency translation adjustment within other comprehensive items	71	(79)
Included in other income/(expense)	8	11
Derivatives not designated as hedging instruments		
Currency exchange contracts		
Included in cost of product revenues	12	(17)
Included in other income/(expense)	162	(81)
Cross-currency interest rate swaps		
Included in other income/(expense)	—	(9)

Gains and losses recognized on currency exchange contracts and the interest rate swaps designated as fair value hedges are included in the accompanying statement of income together with the corresponding, offsetting losses and gains on the underlying hedged transactions.

The company uses foreign currency-denominated debt and cross-currency interest rate swaps to partially hedge its net investments in foreign operations against adverse movements in exchange rates. A portion of the company’s euro-denominated senior notes and its cross-currency interest rate swaps have been designated as, and are effective as, economic hedges of part of the net investment in a foreign operation. Accordingly, foreign currency transaction gains or losses due to spot rate fluctuations on the euro-denominated debt instruments and contract fair value changes on the cross-currency interest rate swaps, excluding interest accruals, are included in currency translation adjustment within other comprehensive items and shareholders’ equity.

See Note 1 and Note 10 for additional information on the company's risk management objectives and strategies.

Cash Flow Hedge Arrangements

In 2020 and 2019, the company entered into interest rate swap arrangements to mitigate the risk of interest rates rising prior to completion of debt offerings. Based on the company's conclusion that the debt offerings were probable, the swaps hedged the cash flow risk for each of the interest payments on the planned fixed-rate debt issues. The aggregate fair value of the terminated hedges, net of tax, has been classified as a reduction to accumulated other comprehensive items and will be amortized to interest expense over the term of the related debt issuances. The company had cash outlays aggregating $85 million and $50 million in 2020 and 2019, respectively, associated with termination of the arrangements, included in other financing activities, net, in the accompanying statement of cash flows.

In late 2020, the company determined that the previously anticipated debt offerings were probable of not occurring and reclassified $42 million from accumulated other comprehensive items to other income/(expense). During 2021, in connection with the extinguishment of debt (Note 10), the company reclassified $65 million from accumulated other comprehensive items to other income/(expense).

Fair Value of Other Financial Instruments

The carrying value and fair value of the company's debt instruments are as follows:

	December 31, 2021		December 31, 2020	
(In millions)	Carrying value	Fair value	Carrying value	Fair value
Senior notes	$ 32,072	$ 33,449	$ 21,723	$ 24,653
Commercial paper	2,522	2,522	—	—
Other	76	76	5	5
	$ 34,670	$ 36,047	$ 21,728	$ 24,658

The fair value of debt instruments was determined based on quoted market prices and on borrowing rates available to the company at the respective period ends which represent level 2 measurements.

Note 15. Supplemental Cash Flow Information

(In millions)	2021	2020	2019
Cash paid for:			
Interest	$ 555	$ 471	$ 790
Income taxes	2,182	1,324	896
Non-cash investing and financing activities			
Acquired but unpaid property, plant and equipment	379	347	150
Fair value of equity awards exchanged	43	—	—
Fair value of acquisition contingent consideration	183	—	—
Finance lease ROU assets obtained in exchange for new finance lease liabilities	15	5	1
Declared but unpaid dividends	104	89	77
Issuance of stock upon vesting of restricted stock units	265	217	182

Cash, cash equivalents and restricted cash is included in the consolidated balance sheet as follows:

(In millions)	December 31, 2021	December 31, 2020
Cash and cash equivalents	$ 4,477	$ 10,325
Restricted cash included in other current assets	13	10
Restricted cash included in other assets	1	1
Cash, cash equivalents and restricted cash	$ 4,491	$ 10,336

Amounts included in restricted cash represent funds held as collateral for bank guarantees and incoming cash in China awaiting government administrative clearance.

Note 16. Restructuring and Other Costs (Income)

Restructuring and other costs in 2021 primarily included charges for impairments of an acquired technology asset and a tradename asset, and, to a lesser extent, compensation due to employees at acquired businesses on the date of acquisition. In 2021, severance actions associated with facility consolidations and cost reduction measures affected less than 1% of the company's workforce.

Restructuring and other costs in 2020 primarily included continuing charges for headcount reductions and facility consolidations in an effort to streamline operations, including the closure and consolidation of operations within several facilities in the U.S. and Europe, and charges for the write-off of acquired technology. In 2020, severance actions associated with facility consolidations and cost reduction measures affected approximately 1% of the company's workforce.

Restructuring and other costs (income) in 2019 primarily included the gain on the sale of the company's Anatomical Pathology business, and, to a lesser extent, continuing charges for headcount reductions and facility consolidations in an effort to streamline operations, including the closure and consolidation of operations within several facilities in the U.S. and Europe. In 2019, severance actions associated with facility consolidations and cost reduction measures affected approximately 1% of the company's workforce.

As of February 24, 2022, the company has identified restructuring actions that will result in additional charges of approximately $20 million, primarily in 2022, and expects to identify additional actions in future periods which will be recorded when specified criteria are met, such as communication of benefit arrangements or when the costs have been incurred.

Restructuring and other costs (income) by segment are as follows:

(In millions)	2021	2020	2019
Life Sciences Solutions	$ 129	$ 34	$ 24
Analytical Instruments	6	26	14
Specialty Diagnostics	18	9	(471)
Laboratory Products and Biopharma Services	35	23	17
Corporate	9	7	3
	$ 197	$ 99	$ (413)

The following table summarizes the changes in the company's accrued restructuring balance. Other amounts reported as restructuring and other costs in the accompanying statement of income have been summarized in the notes to the table. Accrued restructuring costs are included in other accrued expenses in the accompanying balance

sheet.

(In millions)	Total (a)
Balance at December 31, 2018	$ 80
Cumulative effect of accounting change (b)	(28)
Net restructuring charges incurred in 2019 (c)	52
Payments	(69)
Currency translation	(1)
Balance at December 31, 2019	34
Net restructuring charges incurred in 2020 (d)	51
Payments	(57)
Currency translation	(7)
Balance at December 31, 2020	21
Net restructuring charges incurred in 2021 (e)	37
Payments	(40)
Currency translation	(1)
Balance at December 31, 2021	$ 17

(a) The movements in the restructuring liability principally consist of severance and other costs such as relocation and moving expenses associated with facility consolidations, as well as employee retention costs which are accrued ratably over the period through which employees must work to qualify for a payment.

(b) Impact of adopting new lease accounting guidance on January 1, 2019.

(c) Excludes $465 million of net charges, principally $482 million of net gain on the sale of businesses recorded in the Specialty Diagnostics segment, partially offset by $17 million of other restructuring charges, net, across the company's segments primarily for the write-off of acquired technology, pre-acquisition litigation-related matters, and compensation due to employees at businesses at the date of acquisition.

(d) Excludes $48 million of charges, principally $32 million for impairment of acquired technology in the Life Sciences Solutions segment resulting from a reduction in expected cash flows and, to a lesser extent, charges across the company's segments for fixed asset writedowns and costs associated with environmental remediation at abandoned/previously owned facilities.

(e) Excludes $160 million of charges, principally $122 million for impairments of an acquired technology asset and a tradename asset in the Life Sciences Solutions and Laboratory Products and Biopharma Services segment, principally resulting from a reduction in expected cash flows, and $35 million of charges for compensation contractually due to employees of acquired businesses at the date of acquisition in the Life Sciences Solutions and Laboratory Products and Biopharma Services segments.

The company expects to pay accrued restructuring costs primarily through 2022.

UNITED STATES SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

☒ Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 for the fiscal year ended December 31, 2020 or

☐ Transition Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934

Commission file number 1-8002

THERMO FISHER SCIENTIFIC INC.

(Exact name of Registrant as specified in its charter)

Delaware

(State of incorporation)

168 Third Avenue
Waltham, Massachusetts 02451
(Address of principal executive offices) (Zip Code)

Registrant's telephone number, including area code: (781) 622-1000

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, $1.00 par value	TMO	New York Stock Exchange
2.150% Notes due 2022	TMO 22A	New York Stock Exchange
0.750% Notes due 2024	TMO 24A	New York Stock Exchange
0.125% Notes due 2025	TMO 25B	New York Stock Exchange
2.000% Notes due 2025	TMO 25	New York Stock Exchange
1.400% Notes due 2026	TMO 26A	New York Stock Exchange
1.450% Notes due 2027	TMO 27	New York Stock Exchange
1.750% Notes due 2027	TMO 27B	New York Stock Exchange
0.500% Notes due 2028	TMO 28A	New York Stock Exchange
1.375% Notes due 2028	TMO 28	New York Stock Exchange
1.950% Notes due 2029	TMO 29	New York Stock Exchange
0.875% Notes due 2031	TMO 31	New York Stock Exchange
2.375% Notes due 2032	TMO 32	New York Stock Exchange
2.875% Notes due 2037	TMO 37	New York Stock Exchange
1.500% Notes due 2039	TMO 39	New York Stock Exchange
1.875% Notes due 2049	TMO 49	New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. Yes ☐ No ☒

Indicate by check mark whether the Registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the Registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T during the preceding 12 months. Yes ☒ No ☐

Indicate by check mark whether the Registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act. Large accelerated filer ☒
Accelerated filer ☐ Non-accelerated filer ☐ Smaller reporting company ☐ Emerging growth company ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒
As of June 26, 2020, the aggregate market value of the voting stock held by nonaffiliates of the Registrant was approximately $138,639,543,000 (based on the last reported sale of common stock on the New York Stock Exchange Composite Tape reporting system on June 26, 2020).

As of February 6, 2021, the Registrant had 393,793,362 shares of Common Stock outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Sections of Thermo Fisher's definitive Proxy Statement for the 2021 Annual Meeting of Shareholders are incorporated by reference into Parts II and III of this report.

THERMO FISHER SCIENTIFIC INC.

ANNUAL REPORT ON FORM 10-K
FOR THE FISCAL YEAR ENDED DECEMBER 31, 2020

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THERMO FISHER SCIENTIFIC INC.

PART I

Item 1. Business

General Development of Business

Thermo Fisher Scientific Inc. (also referred to in this document as "Thermo Fisher," "we," the "company," or the "registrant") is the world leader in serving science. Our Mission is to enable our customers to make the world healthier, cleaner and safer. We serve more than 400,000 customers working in pharmaceutical and biotech companies, hospitals and clinical diagnostic labs, universities, research institutions and government agencies, as well as environmental, industrial quality and process control settings. Our global team of more than 80,000 colleagues delivers an unrivaled combination of innovative technologies, purchasing convenience and pharmaceutical services through our industry-leading brands, including Thermo Scientific, Applied Biosystems, Invitrogen, Fisher Scientific, Unity Lab Services and Patheon.

We continuously increase our depth of capabilities in technologies, software and services, and leverage our extensive global channels to address our customers' emerging needs. We do this through organic investments in research and development and through acquisitions. Our goal is to make our customers more productive in an increasingly competitive business environment, and enable them to solve their challenges, from complex research to improved patient care, environmental and process monitoring, and consumer safety.

Forward-looking Statements

Forward-looking statements, within the meaning of Section 21E of the Securities Exchange Act of 1934 (the Exchange Act), are made throughout this Annual Report on Form 10-K. Any statements contained herein that are not statements of historical fact may be deemed to be forward-looking statements, including without limitation statements regarding: projections of revenues, expenses, earnings, margins, tax rates, tax provisions, cash flows, pension and benefit obligations and funding requirements, our liquidity position; cost reductions, restructuring activities, new product and service developments, competitive strengths or market position, acquisitions or divestitures; growth, declines and other trends in markets we sell into; new or modified laws, regulations and accounting pronouncements; outstanding claims, legal proceedings, tax audits and assessments and other contingent liabilities; foreign currency exchange rates and fluctuations in those rates; general economic and capital markets conditions; the timing of any of the foregoing; assumptions underlying any of the foregoing; the expected impact of the COVID-19 pandemic on the company's business; and any other statements that address events or developments that Thermo Fisher intends or believes will or may occur in the future. Without limiting the foregoing, the words "believes," "anticipates," "plans," "expects," "seeks," "estimates," and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements are accompanied by such words. While the company may elect to update forward-looking statements in the future, it specifically disclaims any obligation to do so, even if the company's estimates change, and readers should not rely on those forward-looking statements as representing the company's views as of any date subsequent to the date of the filing of this report.

A number of important factors could cause the results of the company to differ materially from those indicated by such forward-looking statements, including those detailed under the heading, "Risk Factors" in Part I, Item 1A.

Business Segments and Products

We report our business in four segments – Life Sciences Solutions, Analytical Instruments, Specialty Diagnostics, and Laboratory Products and Services.

In 2020, we worked with our customers to respond to the COVID-19 pandemic. This important work crossed many of the business segments we describe below. Very early in the year, cryo-electron microscopes made by our Analytical Instruments business were used by researchers to create the first 3D image of the virus. Through our Research and Safety Market Channel and Healthcare Market Channel we were a critical supplier of personal protective equipment (PPE), leveraging our strong relationships to secure these products when supplies were scarce. Through our Life Sciences Solutions, Specialty Diagnostics and Laboratory Products businesses, we enabled widespread COVID-19 testing, creating a leading molecular diagnostic business in just a few months to support hundreds of millions of polymerase chain reaction (PCR) tests around the world. And through our Pharma Services business, we provided our pharma and biotech customers with the set of products and services they needed to develop and produce vaccines and therapies.

Life Sciences Solutions Segment

Through our Life Sciences Solutions segment, we provide an extensive portfolio of reagents, instruments and consumables used in biological and medical research, discovery and production of new drugs and vaccines as well as diagnosis of infection and disease. These products and services are used by customers in pharmaceutical, biotechnology, agricultural, clinical,

Business (continued)

healthcare, academic, and government markets. Life Sciences Solutions includes four primary businesses – Biosciences, Genetic Sciences, Clinical Next-Generation Sequencing, and BioProduction.

Biosciences

Our biosciences business includes reagents, instruments and consumables that help our customers conduct biological and medical research, discover new drugs and vaccines, and diagnose infection and disease, such as COVID-19.

Our biosciences offerings include:

- Reagents, instruments, and consumables used for protein biology, molecular biology, sample preparation and cell imaging and analysis. The portfolio includes antibodies and products for protein purification, detection, modification, and analysis; and sequencing, detection and purification products used for high content analysis of nucleic acids. Many of these products are also used in applied markets, including agriculture, forensics, diagnostics product development, toxicology research and diagnostic testing.
- Tools used for genetic engineering, amplification, quantification and analysis as well as RNA isolation, including stem cell reprogramming kits, transfection reagents, RNA interference reagents, along with gene editing tools and gene synthesis products.
- Cell culture media, reagents, and plastics for preserving and growing mammalian cells which are used in many life science research applications.
- Fluorescence-based technologies, which facilitate the labeling of molecules for biological research and drug discovery. These technologies include a wide range of cell analysis instruments, including flow cytometers and imaging platforms that enable fluorescence microscopy.
- Protein analysis products, including pre-cast electrophoresis gels for separating nucleic acids and proteins, and western blotting and staining tools.

Genetic Sciences

Our genetic sciences business combines a wide variety of instruments and related reagents used to provide high-value genomic solutions to assist customer decisions in the research, clinical, healthcare and applied markets.

Our offerings include real-time PCR technology used to identify changes in gene expression, genotyping or proteins on an individual gene-by-gene basis and for diagnostic testing to identify infection and disease such as COVID-19; capillary electrophoresis (CE) sequencing, a core technology used in DNA sequencing and fragment analysis and forensic analysis applications; and microarray technology, used in gene expression, genotyping and reproductive health.

Our genetic analyzers served as the foundational platform used to sequence the first human genome. These systems are used in a variety of basic, commercial and clinical research applications.

Clinical Next-Generation Sequencing

Our clinical next-generation sequencing (NGS) business focuses on delivering simple, fast and cost-effective NGS technology for a range of applications. The business is focused on targeted sequencing solutions for research use, the application of NGS in oncology and companion diagnostics.

BioProduction

Our bioproduction business supports developers and manufacturers of biological-based therapeutics and vaccines with a portfolio of premium solutions and services focused on upstream cell culture, downstream purification, analytics for detection and quantitation of process/product impurities, and a suite of single-use solutions spanning the biologics workflow.

Our bioproduction offerings include:

- Single-use bioproduction solutions that provide our customers with faster turnaround and set-up times, minimal validation requirements, reduced investment and running costs, and increased flexibility of manufacturing capacity.

- Production cell culture media solutions, which are used by leading biotechnology and pharmaceutical companies to grow cells in controlled conditions and enable large scale cGMP (Current Good Manufacturing Practices) manufacturing of drugs and vaccines. We also provide our customers with the associated services to optimize the productivity of these production platforms.

Business (continued)

- Chromatography products, which deliver superior capacity and resolution for process-scale bioseparations, and offer a broad set of scalable options for the purification of antibodies, antibody fragments and proteins.
- Rapid molecular products that deliver accurate results in less than four hours for contaminant detection, identification and quantitation.
- Scalable solutions for the manufacture of cell therapy based drugs.

Our Doe & Ingalls offerings include chemical distribution and supply chain services that provide primarily life science manufacturers with reliable, secure supply chains for their chemical raw materials.

Analytical Instruments Segment

Through our Analytical Instruments segment, we provide a broad offering of instruments, consumables, software and services that are used for a range of applications in the laboratory, on the production line and in the field. These products and services are used by customers in pharmaceutical, biotechnology, academic, government, environmental and other research and industrial markets, as well as the clinical laboratory. This segment includes three primary businesses – Chromatography and Mass Spectrometry, Chemical Analysis, and Materials and Structural Analysis.

Chromatography and Mass Spectrometry

Our chromatography and mass spectrometry (MS) business provides analytical instrumentation for organic and inorganic sample analysis across both applied technologies and life science research. These products are complemented by laboratory information management systems (LIMS); chromatography data systems (CDS); database analytical tools; automation systems; a range of consumables, such as a full line of chromatography columns; and a range of sample preparation and separation products including auto-samplers and multiplexing systems.

Chromatography is a technique for separating, identifying and quantifying individual chemical components of substances based on their specific physical and chemical characteristics. Our chromatography product line includes high performance liquid chromatography, ion chromatography and gas chromatography systems, all of which are supported by our Chromeleon chromatography data system software.

- *Liquid Chromatography (LC) Systems* analyze complex sample matrices in liquids. Our high-pressure liquid chromatography (HPLC) and ultrahigh pressure liquid chromatography (UHPLC) systems offer high throughput and sensitivity and are sold either as stand-alone systems or integrated with our mass spectrometers (LC/MS and LC/MS/MS). These systems are used for a range of applications, from complex proteomic analyses to routine industrial quality assurance and quality control (QA/QC).
- *Ion Chromatography (IC) Systems* separate ionic (charged) or highly polar molecules (e.g., sugars and carbohydrates), usually found in water-based solutions, and typically detect them based on their electrical conductivity. Our IC products are used in a wide range of applications, including scientific research, and environmental testing, as well as quality control in pharmaceutical, food and beverage, and other industrial processes.
- *Gas Chromatography (GC) Systems* analyze complex sample matrices in gases, comprising both separation and detection technology. Separation technology is common to all gas chromatography analyzers, and is paired with either a conventional detector (GC) or with different types of mass spectrometers (GC/MS). Our GC/MS offering includes a triple stage quadrupole, a single stage quadrupole, an Orbitrap, and an ion trap, for a range of applications, including food safety testing, quantitative screening of environmental samples, and complex molecular analyses.
- *Elemental Analysis Spectrometers* use atomic spectroscopy techniques to identify trace concentrations of elements in liquid and solid samples primarily in environmental, petrochemical, food safety, metallurgical, geochemical and clinical/toxicology research applications. These products are widely used in growth markets such as China, India and Latin America to support compliance with increasingly stringent international environmental and consumer safety regulations.

Mass spectrometry is a technique for analyzing chemical compounds, individually or in complex mixtures, by forming charged ions that are then analyzed according to their mass-to-charge ratios. In addition to molecular information, each discrete chemical compound generates a pattern that provides structurally identifiable information. Our comprehensive offering includes life sciences mass spectrometry systems; and inorganic mass spectrometry systems; as well as a range of sample preparation and separation products including auto-samplers and multiplexing systems.

- *Life Sciences Mass Spectrometers* include triple quadrupole and Orbitrap technologies. Our triple quadrupole systems provide high performance quantitative analysis of chemicals in biological fluids, environmental samples and food

Business (continued)

matrices. They are also used by the pharmaceutical industry for targeted quantitation during drug discovery. Our Orbitrap technologies provide high resolution and accurate mass capabilities for both research and applied markets and are well suited for drug metabolism, proteomics, environmental analysis, food safety, toxicology and clinical research applications. We also offer a comprehensive portfolio of instrument control and data analysis software to help customers simplify their workflows and obtain knowledge from often complex data.

- *Inorganic Mass Spectrometers* include four product lines: isotope ratio mass spectrometry (IRMS); multi-collector isotope ratio mass spectrometry (MC/IRMS); inductively coupled plasma mass spectrometry (ICP/MS); and high resolution trace mass spectrometry (HR Trace/MS). These products are primarily used for qualitative and quantitative analysis of inorganic matter in a range of applications, including environmental analysis, materials science and earth sciences.

Chemical Analysis

Our chemical analysis products fall into three main categories: materials and minerals instruments; field safety instruments; and environmental and process instruments. Customers use these products to quickly and accurately analyze the composition of materials to optimize workflows primarily in industrial applications or to help them comply with governmental regulations and industry safety standards. Our product lines range from those used on production lines to improve quality and efficiency, to portable systems for rapid and real-time chemical identification in the field or to analyze, measure or respond to hazardous situations.

- *Materials and Minerals Instruments* include production line process monitoring, and control systems for a range of industrial applications. For example, we offer on-line instruments that analyze bulk materials non-invasively and in real time to improve quality control and ensure safe operation in a mine or cement manufacturing plant, as well as systems that enable high-speed weighing during bulk materials handling. We also offer gauging systems that employ ionizing and non-ionizing technologies to measure the total thickness, basis weight and coating thickness of flat-sheet materials, such as steel, plastics, foil, rubber and glass. We also offer on-line analyzers based on a variety of technologies such as X-ray imaging and ultra-trace chemical detection, to inspect packaged goods for physical contaminants, validate fill quantities, or check for missing or broken parts on-line and at high speeds in the food and beverage, pharmaceutical production and packaging industries to maintain safety and quality standards.
- *Field Safety Instruments* are rugged handheld products that provide rapid, precise, real-time analysis at the point of need. Our main product categories are elemental analyzers, optical analyzers and radiation detection instruments. Our portable elemental analyzers use X-ray fluorescence (XRF) or Laser-induced breakdown spectroscopy technologies in QA/QC applications, to identify metal alloys in scrap metal recycling; in precious metals analysis; in environmental analysis; and for lead screening in a range of consumer products. Our portable optical analyzers utilize Raman, Fourier transform infrared (FTIR) and near-infrared (NIR) technologies for use in the field by first responders, and law enforcement and military personnel who need to quickly and accurately identify chemicals and explosives in critical safety and security situations. Other applications include QA/QC in pharmaceutical production and identification of counterfeit drugs. Our radiation measurement products are used to monitor, detect and identify specific forms of radiation in nuclear power, environmental, industrial, medical, and security applications. Our primary customers include national, regional, and local government agencies responsible for monitoring cargo, vehicles and people traveling across borders. These products are also used by first-responders in safety and security situations, and for worker safety in the nuclear power and other industrial markets.
- *Environmental and Process Instruments* include fixed and portable instrumentation that help our customers protect people and the environment as well as comply with government regulations and industry safety standards. Our products are used by environmental regulatory agencies and power plant operators to measure ambient air, and stack gas emissions for compliance with regulated emissions standards for criteria pollutant gases. Our products are also used in ambient particulate monitoring applications by customers in mining environments to provide continuous measurements and logging of real-time concentrations and median particle sizes of airborne dust, smoke, mist and fumes to improve efficiency and increase worker safety.

In addition to our broad product offerings, we offer a variety of specialized services to our customers, including equipment servicing, instrument calibration services, asset management and training.

Materials and Structural Analysis

Our materials and structural analysis business includes electron microscopy, molecular spectroscopy and laboratory elemental analysis instruments that are used by customers in life sciences, materials sciences and industrial markets to accelerate breakthrough discoveries.

Business (continued)

- *Electron Microscopy Instruments* include transmission electron microscopes which provide imaging and characterization at the atomic scale, with applications in semiconductor development, materials science research and the characterization of protein structure and function. We also offer scanning electron microscopes which resolve features from the optical regime down to the nanometer length scale and are used for a wide variety of applications from materials characterization in science and engineering to applications in natural resources, manufacturing, and biological systems. Our DualBeam focused ion beam-scanning electron microscope systems are used for sample preparation, 3D characterization, nanoprototyping, and industrial failure analysis. Our focused ion beam microscopes are used in a range of process control, failure analysis, and materials research applications. We also offer electrical failure analysis instruments which are used in root cause failure analysis and quality control, microCT instruments which are micro-computed tomography solutions for quantitative analysis of a broad range of materials, providing 3D visualization of large volumes non-destructively and 3D visualization software that turns the data and images generated by a broad range of instruments into 3D visualizations of the microscopic sample, allowing quantitative analysis of material properties.
- *Molecular Spectroscopy Instruments* are divided into four primary techniques: FTIR, Raman, NIR and ultraviolet/visible (UV/Vis) spectroscopy. These technologies are typically used in the laboratory to provide information on the structure of molecules to identify, verify and quantify organic materials in pharmaceutical, biotechnology, polymer, chemical, and forensic sciences. Our material characterization instruments include rheometers and extruders that measure viscosity, elasticity, processability, and temperature-related mechanical changes of various materials. We also provide a range of surface analysis instruments commonly used in the semiconductor, metals, coatings, and polymer industries as a product development and failure analysis tool.
- *Laboratory Elemental Analysis Instruments* and analyzers use X-ray fluorescence (XRF), X-ray diffraction (XRD), and arc spark optical emission (OES) techniques for accurate and precise analysis of bulk materials in the metals, cement, minerals, and petrochemicals industries.

Specialty Diagnostics Segment

Our Specialty Diagnostics segment offers a wide range of diagnostic test kits, reagents, culture media, instruments and associated products in order to serve customers in healthcare, clinical, pharmaceutical, industrial, and food safety laboratories. Our healthcare products are used to increase the speed and accuracy of diagnoses, which improves patient care in a more cost efficient manner. This segment has five primary businesses – Clinical Diagnostics, ImmunoDiagnostics, Microbiology, Transplant Diagnostics and our Healthcare Market Channel.

Clinical Diagnostics

Our clinical diagnostics products include a broad offering of liquid, ready-to-use and lyophilized immunodiagnostic reagent kits, calibrators, controls and calibration verification fluids. In particular, we provide products used for COVID-19 testing, drugs-of-abuse testing; therapeutic drug monitoring, including immunosuppressant drug testing; thyroid hormone testing; serum toxicology; clinical chemistry; immunology; hematology; coagulation; glucose tolerance testing; first trimester screening; tumor markers testing; and biomarkers testing for sepsis, acute myocardial infarction and congestive heart failure. We also private label many of our reagents and controls for major *in vitro* diagnostics companies through OEM arrangements. In many instances, we will work with customers or partners to develop new products and applications for their instrument platforms.

We have developed one of the broadest menus for drugs-of-abuse immunoassays. We also provide a broad offering of immunosuppressant drug immunoassays that can be used on a variety of clinical chemistry analyzers.

Our clinical chemistry systems include analyzers and reagents to analyze and measure routine blood and urine chemistry, such as glucose and cholesterol; and advanced testing for specific proteins, therapeutic drug monitoring and drugs-of-abuse. Our diagnostic test range currently covers approximately 80 different validated methods. We also provide pre- and post-analytical automation for preparation of blood specimens before and after analysis, and specialty diagnostic tests based on patented biomarkers for sepsis, cardiovascular and pulmonary diseases, as well as intensive care treatments and prenatal screening.

ImmunoDiagnostics

Our immunodiagnostics offerings include developing, manufacturing and marketing complete blood-test systems to support the clinical diagnosis and monitoring of allergy, asthma and autoimmune diseases. In addition, we offer antibody tests for approximately 20 indications to help diagnose autoimmune diseases such as rheumatoid arthritis, celiac disease, lupus and scleroderma. Our products include ImmunoCAP for allergy and asthma tests and EliA for autoimmunity tests.

Business (continued)

Microbiology

Our microbiology offerings include dehydrated and prepared culture media, collection and transport systems, instrumentation and consumables to detect pathogens in blood, diagnostic and rapid direct specimen tests, quality-control products and associated products for the microbiology laboratory. Our products help customers worldwide to diagnose infectious disease; determine appropriate antimicrobial therapy; implement effective infection control programs; and detect microbial contamination of their products or manufacturing facilities.

Within the food and pharmaceutical industries, our products are used to assure the safety and quality of consumer products by monitoring production environments; raw materials and end products for bacterial contamination; and animal health in the dairy industry.

Transplant Diagnostics

Our transplant diagnostics products include human leukocyte antigen (HLA) typing and testing for the organ transplant market. Our diagnostic tests are used by transplant centers for tissue typing, primarily to determine the compatibility of donors and recipients pre-transplant, and to detect the presence of antibodies post-transplant that can lead to transplant rejection. These transplant diagnostic tests are widely used across the transplant-testing workflow to improve patient outcomes. Our transplant diagnostic offerings include several lines of HLA typing and antibody detection assays utilizing serological, molecular, enzyme-linked immunosorbent assays (ELISA), flow, and multiplexing technologies.

Healthcare Market Channel

Our healthcare market channel offerings include a broad array of consumables, diagnostic kits and reagents, equipment, instruments, solutions and services for hospitals, clinical laboratories, reference laboratories, physicians' offices and other clinical testing facilities. These products are manufactured by Thermo Fisher and third parties and are primarily used in clinical diagnosis. We go to market through our expert sales force, segment-relevant printed collateral and digital content, and a state-of-the-art website, www.fishersci.com/healthcare, containing full product content for more than 1.5 million products.

Laboratory Products and Services Segment

Our Laboratory Products and Services segment offers virtually everything needed for the laboratory. Our unique combination of self-manufactured and sourced products and extensive service offering, enables our customers to focus on their core activities and helps them to be more efficient, productive and cost effective. The segment also includes a comprehensive offering of outsourced services used by the pharmaceutical and biotech industries for drug development, clinical trials logistics and commercial drug manufacturing. We serve the pharmaceutical, biotechnology, academic, government and other research and industrial markets, as well as the clinical laboratory through four key businesses: Laboratory Products, Laboratory Chemicals, Research and Safety Market Channel, and Pharma Services.

Laboratory Products

Our laboratory products are used primarily by pharmaceutical companies for drug discovery and development and by biotechnology companies and universities for life science research to advance the prevention and cure of diseases and enhance quality of life. This offering consists of equipment, accessories, and services for sample preparation, storage and protection, and analysis:

- *Laboratory Equipment Technologies* includes our leading laboratory refrigerators and freezers, ultralow-temperature freezers and cryopreservation storage tanks for maintaining samples in a cold environment to protect them from degradation. We also offer temperature control products such as heated bath circulators, immersion coolers, recirculating chillers, water baths, and dry baths in a range of sizes, temperatures and configurations for life science, analytical chemistry, manufacturing and quality-control applications. In addition, we offer sample preparation and preservation equipment, which protects our customers' chemical and biological samples and supports the growth of cells and organisms in optimal conditions such as temperature, carbon dioxide and humidity as well as incubators and related products. We also offer centrifugation products, which are used to separate biological matrices and inorganic materials, including microcentrifuges, general use bench-top centrifuges and floor models. Additionally, we offer biological

safety cabinets, which enable technicians to handle samples without risk to themselves or their environment and without risk of cross-contamination of samples.

- *Water and Laboratory Products* include water analysis instruments such as meters, electrodes and solutions for the measurement of pH, ions, conductivity, dissolved oxygen, turbidity and other key parameters in the lab and production line. We also offer other laboratory equipment such as water purification systems, shakers, vacuum concentrators, microbiological incubators, ovens, furnaces, hotplates, stirrers, stirring hotplates, and other related products.

Business (continued)

- *Laboratory Plastics Essentials* include a leading offering of laboratory pipette tips and a complementary range of handheld and automated pipetting systems, supporting low-through high-throughput activity. These products optimize productivity and ergonomics, and ensure accurate results. We also offer sample preparation and storage products such as centrifugation consumables as well as vials and organization systems for ultralow temperature and cryogenic storage, with specific products designed for low protein binding and low DNA binding and containers for packaging life science and diagnostic reagents as well for the storage and transport of bulk intermediates and active pharmaceutical ingredients. Additionally, our offerings include a complete selection of clinical specimen collection products, drug-of-abuse collection kits and environmental and food-safety glass and plastic vials, bottles and containers, plastic transfer pipettes, general purpose clinical laboratory consumables and containers for breast milk collection, storage and feeding primarily used in neo-natal units and by lactation specialists. We also provide OEM and custom kit assembly services for clinical and drugs-of-abuse test kits.

Laboratory Chemicals

Our laboratory chemicals offering comprises a broad range of chemicals, solvents and reagents supporting virtually every laboratory application – from research to drug discovery and development and manufacturing. This portfolio includes organic chemicals used to synthesize new materials; essential laboratory chemicals used by scientists to purify, extract, separate, identify and manufacture products; high-purity analytical reagents, bioreagents used in many different applications, from cell growth to detailed protein analysis; novel chemical building blocks, reactive intermediates and screening libraries used to accelerate drug discovery; and precious metals, salts and solutions used in a broad range of applications where highly specific reactions are desired. We provide bulk volumes of many products for scale-up from research to development and customized services for chemical procurement, processing, production, testing, and packaging.

Research and Safety Market Channel

Our research and safety market channel serves academic, pharmaceutical, biotechnology, government and industrial customers. We go to market through our expert sales force, segment-relevant printed collateral and digital content in four languages, a state-of-the-art website, www.fishersci.com, containing full product content for more than 1.5 million products, and our global network of resellers and distributors.

We have an international network of warehouses in our primary markets through which we maintain inventory and coordinate product delivery. With specialized product vaults and warehouse management systems, we are able to handle the complete range of products we offer to our customers. Our transportation capabilities include our dedicated fleet of delivery vehicles as well as parcel shipping capabilities that are closely integrated with our third-party parcel carriers. Throughout the product delivery process, we provide our customers with convenient access to comprehensive electronic systems that offer automated catalog search, product order and invoicing, and payment capabilities.

Our channel offers a mix of products that are manufactured by Thermo Fisher, by third parties for us on a private-label basis, and by third parties under their brand but offered for sale exclusively through us. We also offer a broad range of third-party products representing leading industry brand names on a non-exclusive basis.

Our research products include a complete offering of laboratory products, ranging from capital equipment and instruments to chemicals to consumable products. Our safety products include clean-room and controlled-environment supplies, personal protective equipment, firefighting, military, and first responder equipment and supplies, and environmental monitoring and sampling equipment. Our education products include science-related and laboratory products for the K-12 and secondary education markets.

In addition to our broad product offerings, we offer a variety of specialized services to our customers through our Unity Lab Services team, including training, equipment servicing and asset management, and dedicated supply management personnel. We also offer scientific support services including desktop delivery, coordination of instrument calibration and service, and on-site customer service.

Pharma Services

We provide the entire spectrum of development, manufacturing and clinical trials services for both small-molecule and large-molecule pharmaceuticals. This includes i) development of a suitable formulation and

manufacturing process for the active pharmaceutical ingredient (API) or biologic; ii) technology transfer to scale up the manufacturing; iii) labeling, packaging, distribution and logistics for clinical trials; and iv) commercial scale manufacturing and packaging.

- *Drug Substance Services* - Our service offerings address small molecules, produced through chemical synthesis, and large molecules such as antibodies and proteins produced through mammalian cell culture. We provide development and manufacturing services for small molecule APIs and the biologically active component of pharmaceutical products

Business (continued)

under current good manufacturing practice (cGMP) conditions from early development through commercial production.

- *Drug Product Services* - We manufacture both small-molecule and large-molecule products for customers in conventional and specialized dosage forms. We differentiate ourselves by our breadth of dosage forms and specialized capabilities in both oral solid and sterile dosage forms. We provide a wide spectrum of advanced formulation, production and technical services and scientific expertise and solutions, from the early stages of a product's development to regulatory approval and commercial scale production.
- *Clinical Trials Services* - We provide global services for pharmaceutical and biotechnology companies engaged in clinical trials, including comparator sourcing; specialized packaging; over-encapsulation; multi-lingual and specialized labeling and distribution for phase I through phase IV clinical trials; biological-specimen management and biobanking services; specialty pharmaceutical logistics; and clinical supply-chain planning and management.
- *Viral Vector Services* - We provide a full-range of viral vector development and manufacturing services for customers developing and commercializing gene and cell therapies, including process development, optimization, scale-up, analytical development and qualification of viral vectors for commercial manufacturing. Our breadth of vector platform includes the five most widely used virus types, providing extensive coverage across the gene and cell therapy landscape.

Sales and Marketing

We market and sell our products and services through a direct sales force, customer-service professionals, electronic commerce, third-party distributors and various catalogs.

We offer our products and services through leading brands including:

- The Thermo Scientific brand offers customers in research, diagnostics, industrial, and applied markets a complete range of high-end analytical instruments as well as laboratory equipment, software, services, consumables and reagents. Our portfolio of products includes innovative technologies for mass spectrometry, chromatography, elemental analysis, electron microscopy, molecular spectroscopy, sample preparation, informatics, chemical research and analysis, cell culture, bioprocess production, cellular, protein and molecular biology research, allergy testing, drugs-of-abuse testing, therapeutic drug monitoring testing, microbiology, as well as environmental monitoring and process control.
- The Applied Biosystems brand offers customers in research, clinical and applied markets integrated instrument systems, reagents, and software for genetic analysis. Our portfolio includes innovative technologies for genetic sequencing and real-time, digital and end point PCR, that are used to determine meaningful genetic information in applications such as COVID-19 testing, cancer diagnostics, human identification testing, and animal health, as well as inherited and infectious disease.
- The Invitrogen brand offers life science customers a broad range of consumables and instruments that accelerate research and ensure consistency of results. Our portfolio of products includes innovative solutions for cellular analysis and biology, flow cytometry, cell culture, protein expression, synthetic biology, molecular biology and protein biology.
- Fisher Scientific is our channels brand, offering customers a complete portfolio of laboratory equipment and consumables, chemicals, supplies and services used in scientific research, healthcare, safety, and education markets. These products are offered through an extensive network of direct sales professionals, segment-relevant printed collateral and digital content, a state-of-the-art website, and supply-chain management services.
- Unity Lab Services is our instrument and equipment services brand, offering a complete portfolio of services from enterprise level engagements to individual instruments and laboratory equipment, regardless of the original manufacturer. Through our network of world-class service and support personnel, we provide services that are designed to help our customers improve productivity, reduce costs, and drive decisions with better data.

- Patheon is our contract development and manufacturing brand, representing the comprehensive offering of services that we provide to customers ranging from small biotech to large pharmaceutical companies. We support our customers' development of innovative medicines, including biologics, gene therapies and vaccines. By leveraging our expanding global network of facilities, we deliver high-quality services at all stages of the drug lifecycle, from discovery to development through clinical trials and commercial manufacturing.

Business (continued)

We have approximately 13,000 sales personnel including highly trained technical specialists who enable us to better meet the needs of our more technical end-users. We also provide customers with product standardization and other supply-chain-management services to reduce procurement costs.

New Products and Research and Development

Our business includes the development and introduction of new products and may include entry into new business segments. We anticipate that we will continue to make significant expenditures for research and development as we seek to provide a continuing flow of innovative products to maintain and improve our competitive position.

Resources

Raw Materials

Our management team believes that we have a readily available supply of raw materials for all of our significant products from various sources. We do not anticipate any difficulties obtaining the raw materials essential to our business.

Raw material and fuel prices are subject to fluctuations due to market conditions. We employ many strategies, including the use of alternative materials, to mitigate the effect of these fluctuations on our results.

Patents, Licenses and Trademarks

Patents are important in many aspects of our business. No particular patent, or related group of patents, is so important, however, that its loss would significantly affect our operations as a whole. Where appropriate, we seek patent protection for inventions and developments made by our personnel that are incorporated into our products or otherwise fall within our fields of interest. Patent rights resulting from work sponsored by outside parties do not always accrue exclusively to the company and may be limited by agreements or contracts.

We protect some of our technology as trade secrets and, where appropriate, we use trademarks or register trademarks used in connection with products. We also enter into license agreements with others to grant and/or receive rights to patents and know-how.

Seasonal Influences

Revenues in the fourth quarter are historically stronger than in other quarters due to the capital spending patterns of industrial, pharmaceutical and government customers. Sales of flu tests and related diagnostic products vary quarter to quarter and year to year based on the severity and duration of each period’s flu season. Sales of allergy tests vary quarter to quarter and year to year based on the severity and duration of each period’s airborne pollen allergens.

Government Contracts

Although the company transacts business with various government agencies, no government contract is of such magnitude that a renegotiation of profits or termination of the contract at the election of the government agency would have a material adverse effect on the company’s financial results.

Competition

The company encounters aggressive and able competition in virtually all of the markets we serve. Because of the diversity of our products and services, we face many different types of competitors and competition. Our competitors include a broad range of manufacturers and third-party distributors. Competitive climates in many of the markets we serve are characterized by changing technology and customer demands that require continuing research and development. Our success primarily depends on the following factors:

- technical performance and advances in technology that result in new products and improved price/performance ratios;
- product differentiation, availability and reliability;
- the depth of our capabilities;

- our reputation among customers as a quality provider of products and services;
- customer service and support;
- active research and application-development programs; and
- relative prices of our products and services.

Business (continued)

Government Regulation

Environmental Regulations

We are subject to various laws and governmental regulations concerning environmental matters and employee safety and health in the United States and other countries. U.S. federal environmental legislation that affects us includes the Toxic Substances Control Act, the Resource Conservation and Recovery Act, the Clean Air Act, the Clean Water Act, the Safe Drinking Water Act, and the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). We are also subject to regulation by the Occupational Safety and Health Administration (OSHA) concerning employee safety and health matters. The United States Environmental Protection Agency (USEPA), OSHA, and other federal agencies have the authority to promulgate regulations that have an effect on our operations.

In addition to these federal activities, various states have been delegated certain authority under the aforementioned federal statutes as well as having authority over these matters under state laws. Many state and local governments have adopted environmental and employee safety and health laws and regulations, some of which are similar to federal requirements.

A number of our operations involve the handling, manufacturing, use or sale of substances that are or could be classified as toxic or hazardous materials within the meaning of applicable laws. Consequently, some risk of environmental harm is inherent in our operations and products, as it is with other companies engaged in similar businesses.

Our expenses for environmental requirements are incurred generally for ongoing compliance and historical remediation matters. Based on current information, we believe that these compliance costs are not material. For historical remediation obligations, our expenditures relate primarily to the cost of permitting, installing, and operating and maintaining groundwater-treatment systems and other remedial measures.

Our Fair Lawn and Somerville, New Jersey facilities entered into administrative consent orders with the New Jersey Department of Environmental Protection in 1984 to maintain groundwater-remediation activities at these sites, and are currently under the State's Licensed Site Remediation Professional Program. As the owner of the Fair Lawn facility, we are listed as a potentially responsible party for remediation within an area called the Fair Lawn Wellfields Superfund Site, and, in 2008, the company and certain other parties entered into a consent order with the USEPA to complete a Remedial Investigation/Feasibility Study. In 2018, the USEPA issued a Record of Decision, setting forth the scope of required remediation work at the site, which includes upgrading a water treatment plant to address constituents such as chlorinated organic compounds, 1,4-dioxane, and perfluorooctanoic acid/perfluorooctane sulfonate (PFOA/PFOS). In 2019, the company and another responsible party signed a proposed consent decree, which the U.S. government entered in 2020, requiring the parties to finance and perform the required remediation work with USEPA oversight. In 2011, our Life Technologies subsidiary entered into a consent decree with the USEPA and other responsible parties to implement a groundwater remedy at the former Davis Landfill Superfund site in Smithfield, Rhode Island.

We record accruals for environmental liabilities based on current interpretations of environmental laws and regulations when it is probable that a liability has been incurred and the amount of such liability can be reasonably estimated. We calculate estimates based upon several factors, including reports prepared by environmental specialists and management's knowledge and experience with these environmental matters. We include in these estimates potential costs for investigation, remediation and operation and maintenance of cleanup sites. Accrued liabilities for environmental matters totaled $71 million at December 31, 2020.

These environmental liabilities do not include third-party recoveries to which we may be entitled. We believe that our accrual is adequate for the environmental liabilities we currently expect to incur. As a result we believe that our ultimate liability with respect to environmental matters will not have a material adverse effect on our financial position, results of operations or cash flows. However, we may be subject to remedial or compliance costs due to future events, such as changes in existing laws and regulations, changes in agency direction or enforcement policies, developments in remediation technologies, changes in the conduct of our operations, and the effect of changes in accounting rules, which could have a material adverse effect on our financial position, results of operations or cash flows.

Other Laws and Regulations

Our operations, and some of the products we offer, are subject to a number of complex and stringent laws and regulations governing the production, handling, transportation and distribution of chemicals, drugs and other similar products, including the operating and security standards of the Food and Drug Administration, the Drug Enforcement Administration, the Bureau of Alcohol, Tobacco, Firearms and Explosives, and various state boards of pharmacy as well as comparable state and foreign agencies. As Thermo Fisher's businesses also include export and import activities, we are subject to pertinent laws enforced by the U.S. Departments of Commerce, State and Treasury. In addition, our logistics activities must comply with the rules and

regulations of the Department of Transportation, the Federal Aviation Administration and similar foreign agencies. While we believe we are in compliance in all material respects with such laws and regulations, any noncompliance could result in substantial fines or otherwise restrict our ability to provide competitive distribution services and thereby have an adverse effect on our financial condition. To date, none has had a material impact on our operations.

We are subject to laws and regulations governing government contracts, and failure to address these laws and regulations or comply with government contracts could harm our business by leading to a reduction in revenues associated with these customers. We have agreements relating to the sale of our products to government entities and, as a result, we are subject to various statutes and regulations that apply to companies doing business with the government. We are also subject to investigation for compliance with the regulations governing government contracts. A failure to comply with these regulations could result in suspension of these contracts, criminal, civil and administrative penalties or debarment.

Human Capital

The success of Thermo Fisher Scientific is fueled by colleagues who are highly engaged and feel empowered to achieve their goals. Everything we do starts with our Mission – to enable our customers to make the world healthier, cleaner and safer. Our colleagues understand the role they play in fulfilling that Mission and that inspires them to bring their best to work each day. Our Mission is not only a differentiator for us externally, but a motivator for us internally.

Our culture is rooted in our 4i Values of Integrity, Intensity, Innovation and Involvement. Within this framework, we strive to create a safe, fair and positive working environment for our colleagues around the world. We want our teams to feel they have a stake in our success, a voice in our direction and to be empowered to make a difference for the key stakeholders we serve.

Every year, we conduct an Employee Involvement Survey to solicit direct feedback from our colleagues on what we're doing well and where we need to improve. We then compile the feedback to measure our progress using three key indices: Leadership, Involvement and Inclusion. In 2020, 84 percent of our workforce completed the survey, and we saw marked improvement in each index and across every survey question, despite the challenges brought on by the pandemic. Our continued focus on enhancing our culture helps position our company to be an even better place to work.

We are committed to building the strongest team in our industry, focusing on developing and retaining our colleagues, while leveraging our leadership to attract new colleagues to our company. Of our more than 80,000 colleagues globally, as of December 31, 2020, approximately 42,000 were based in the Americas region, 12,000 were in the Asia-Pacific region, and 26,000 were in Europe, the Middle East and Africa (EMEA).

Diversity and Inclusion

We recognize that the future aspirations outlined in our Vision for 2030, which serves as our long-term roadmap, will only be achievable if we have a culture that values diversity and inclusion. While diversity of gender and ethnicity are important – and we're focused on continuously improving– for us, diversity of backgrounds, experiences and viewpoints is equally vital to our long-term success. When those differences are welcomed and supported, we create an inclusive workplace that unlocks the true benefits of diversity.

Diversity and Inclusion is not an initiative at Thermo Fisher Scientific. It's woven into the fabric of our culture, and our colleagues are encouraged to openly share the wide range of perspectives they represent. We work together to create an inclusive culture where our colleagues feel they belong and are empowered to contribute, collaborate and innovate. Embracing individual differences is critical to our success. For example, Thermo Fisher was named a Best Place to Work for LGBTQ Equality for the sixth consecutive year in 2020. Establishing this kind of environment is critical in empowering our colleagues so they can contribute their best ideas and bring their true selves to work each day.

Our D&I focus is embedded in every stage of our colleague lifecycle – from recruiting to onboarding, training, development and longer-term career planning. We track our progress on our D&I strategic objectives through a core set of metrics that are reviewed during routine business operating mechanisms, including Quarterly Business Reviews, Human Resource Reviews, Board Reviews and through team dashboards that are shared each month with leaders across the company. This enables frequent, meaningful, data-driven discussions across our businesses and

functions on a range of D&I factors, including gender and ethnic representation. This approach also ensures we consistently prioritize our opportunities to improve. We understand the critical role diversity plays in sustained business success, and our teams are empowered to ensure our workforce represents the customers we serve.

We are committed to ensuring our colleagues have access to resources, awareness training and internal networks that offer support and guidance. Our diversity and inclusion strategy is greatly enabled by our Employee Resource Groups (ERGs), which bring together individuals with similar interests to share experiences, learn from each other and collaborate to identify solutions

to business challenges. Our ERGs reinforce that all colleagues can make a difference for our customers, for each other and for our company. As of December 31, 2020, we had 10 ERGs globally, with 220 local ERG chapters.

Talent Development

Our overarching goal from a talent perspective is to create opportunities for our colleagues to achieve their full potential and career aspirations here at Thermo Fisher Scientific. We are committed to creating an exceptional colleague experience from their first day throughout their career with us. We focus on the entire lifecycle of a colleague's career, from their initial recruitment, to onboarding, through ongoing development and training to enhance their skills so they are in the best position to deliver on their goals and achieve their career aspirations.

In today's environment, we know talent is a key competitive advantage, and that building the strongest team in the industry is critical to our future. From our colleague referral program, summer internships, university relations, to our Graduate Leadership Development Program, we continue to build strong internal and external sourcing channels.

Once on board, talent development at Thermo Fisher is a key organizational capability. We continue to make significant investments to support our colleagues along every step of their career journey to help support their success. Our talent development framework incorporates a multi-faceted approach, including formal and self-paced training, networking opportunities, on-the-job stretch learning, coaching, mentoring and manager training utilizing contemporary technology solutions to support the broad needs of our workforce.

We provide multiple programs at all career levels, from online learning for all colleagues through Thermo Fisher University, to focused trainings for managers at various experience levels, to our Global Leadership Program for executives. We also support our colleagues' career advancement through our tuition reimbursement program.

In a company our size, we can also actively manage our talent through rotational opportunities across our businesses, functions and geographies that help our colleagues gain new experiences, share knowledge and broaden their skills. Our executives and leaders participate in frequent talent discussions as well as formal reviews, leveraging workforce data and predictive analytics to better anticipate the talent requirements of our business based on our growth opportunities and market demand.

Thermo Fisher is dedicated to talent development to meet our evolving business needs and to provide our colleagues with opportunities for long and fulfilling careers. Our colleagues are passionate about our company, and their role in our success, and it's our responsibility to help them reach their full potential.

Total Rewards

We offer a comprehensive total rewards package that we regularly evaluate and measure against established benchmarks to ensure its effectiveness in recruiting and retention, and to position Thermo Fisher as an employer of choice.

Our health and wellness programs provide competitive, flexible programs that our global colleagues and their families can count on. For example, for U.S. colleagues, we offer a choice of comprehensive national medical, dental and vision plans; a wellness program, including valuable health incentive opportunities and tax-advantaged savings and spending accounts; as well as commuter benefits, employee assistance programs, optional group legal coverage, and company-paid disability, accident and life insurance. We also offer a company-paid proprietary program for cancer care called the Impact Program, which gives our colleagues and their families access to personalized support and direct lines of communication to experts in cancer genetics and genomics. Similar benefits are available in all countries around the world where we operate.

We also invest in our colleagues' financial health, helping them to grow and protect their savings, plan for the future and share in the success of the company they are helping to build. We deliver comprehensive rewards, including competitive base pay, and also provide a variety of incentive and equity programs that, by design, directly link the impact of colleague contributions to the company's overall success.

Available Information

The company files annual, quarterly and current reports, proxy statements and other documents with the Securities and Exchange Commission (SEC) under the Exchange Act. The SEC maintains a website that contains reports, proxy and information statements and other information that issuers, including the company, file

electronically with the SEC. The public can obtain any documents that we file with the SEC at www.sec.gov. We also make available free of charge on or through our own website at www.thermofisher.com our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and, if applicable, amendments to those reports filed or furnished pursuant to Section 13(a) of the Exchange Act as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC. In addition, paper copies

of these documents may be obtained free of charge by writing to the company care of its Investor Relations Department at our principal executive office located at 168 Third Avenue, Waltham, Massachusetts 02451.

Information about Our Executive Officers

As of February 24, 2021, our executive officers were:

Name	Age	Present Title (Fiscal Year First Became Executive Officer)	Other Positions Held
Marc N. Casper	52	Chairman, President and Chief Executive Officer (2001)	President and Chief Executive Officer (2009-2020) Chief Operating Officer (2008-2009) Executive Vice President (2006-2009)
Mark P. Stevenson	58	Executive Vice President and Chief Operating Officer (2014)	Executive Vice President and President, Life Sciences Solutions (2014-2017) President and Chief Operating Officer, Life Technologies Corporation (2008-2014)
Michel Lagarde	47	Executive Vice President (2017)	Senior Vice President and President, Pharma Services (2017-2019) President and Chief Operating Officer, Patheon N.V. (2016-2017) Managing Director, JLL Partners* (2008-2016)
Michael A. Boxer	59	Senior Vice President and General Counsel (2018)	Executive Vice President and Group General Counsel, Luxottica Group S.p.A. (2011-2017)
Stephen Williamson	54	Senior Vice President and Chief Financial Officer (2015)	Vice President, Financial Operations (2008-2015)
Peter E. Hornstra	61	Vice President and Chief Accounting Officer (2001)	Corporate Controller (1996-2007)

*JLL Partners is a private equity firm focused on healthcare.

Item 1A. Risk Factors

Set forth below are the risks that we believe are material to our investors. This section contains forward-looking statements. You should refer to the explanation of the qualifications and limitations on forward-looking statements in Item 1. Business under the caption “Forward-looking Statements”.

Industry and Economic Risks

Our growth would suffer if the markets into which we sell our products and services decline, do not grow as anticipated or experience cyclicality. Our growth depends in part on the growth of the markets which we serve. Any decline or lower than expected growth in our served markets would diminish demand for our products and services, which would adversely affect our financial statements. Certain of our businesses operate in industries that may experience periodic, cyclical downturns.

We are subject to risks associated with public health crises and epidemics/pandemics, such as the COVID-19 pandemic. Our global operations expose us to risks associated with public health crises and epidemics/pandemics, such as COVID-19. The global spread of COVID-19 has created significant volatility, uncertainty and worldwide economic disruption, resulting in an economic slowdown of potentially extended duration.

COVID-19 has had an adverse impact on certain of our operations, supply chains and distribution systems, including as a result of impacts associated with preventive and precautionary measures that we, other businesses and governments are taking. Due to these impacts and measures, we have experienced significant and unpredictable reductions as well as increases in demand for certain of our products. Many employers in the United States and Europe are continuing to require their employees to work from home or not go into their offices. If the pandemic continues and conditions worsen, we could experience a decline in sales activities and customer orders in certain of

our businesses, and it remains uncertain what impact these declines would have on future sales and customer orders once conditions begin to improve. In addition to existing travel restrictions, countries may continue to close or decline to reopen borders, impose prolonged quarantines, and further restrict travel, which would significantly impact our ability to support our sites and customers in those locations and the ability of our employees to get to their places of work to produce products, or significantly hamper our products from moving through the supply chain. As a result, COVID-19 may materially adversely affect revenue growth in certain of our businesses, and it is uncertain how materially COVID-19 will affect our global operations generally if these impacts were to persist or worsen over an extended

period of time. The extent and duration of the impacts are uncertain and dependent in part on customers returning to work and economic activity ramping up.

The company has mobilized to support the COVID-19 response with products and services that help diagnose the virus as well as assisting customers to develop potential therapeutics and vaccines used to protect from the virus. Our ability to continue to manufacture products is highly dependent on our ability to maintain the safety and health of our factory employees. The ability of our employees to work may be significantly impacted by individuals contracting or being exposed to COVID-19. While we are following the requirements of governmental authorities and taking preventative and protective measures to prioritize the safety of our employees, these measures may not be successful, and we may be required to temporarily close facilities or take other measures. While we are staying in close communication with our sites, employees, customers and suppliers and acting to mitigate the impact of this dynamic and evolving situation, the duration and extent of the effect of COVID-19 on the company is not determinable.

In addition, several of the company's businesses have had an increase in revenues due to sales of products addressing diagnosis and treatment of COVID-19. While these positive impacts are expected to continue into 2021, the duration and extent of future revenues from such sales are uncertain and dependent primarily on customer testing demand.

Our business is affected by general economic conditions and related uncertainties affecting markets in which we operate. Our business is affected by general economic conditions, both inside and outside the U.S. If the global economy and financial markets, or economic conditions in Europe, the U.S. or other key markets, continue to be unstable (including as a result of the COVID-19 pandemic), it could adversely affect the business, results of operations and financial condition of the company and its customers, distributors, and suppliers, having the effect of

- reducing demand for some of our products;
- increasing the rate of order cancellations or delays;
- increasing the risk of excess and obsolete inventories;
- increasing pressure on the prices for our products and services;
- causing supply interruptions which could disrupt our ability to produce our products; and
- creating longer sales cycles and greater difficulty in collecting sales proceeds.

Economic, political, foreign currency and other risks associated with international sales and operations could adversely affect our results of operations. International markets contribute a substantial portion of our revenues, and we intend to continue expanding our presence in these regions. The exposure to fluctuations in currency exchange rates takes on different forms. International revenues and costs are subject to the risk that fluctuations in exchange rates could adversely affect our reported revenues and profitability when translated into U.S. dollars for financial reporting purposes. These fluctuations could also adversely affect the demand for products and services provided by us. As a multinational corporation, our businesses occasionally invoice third-party customers in currencies other than the one in which they primarily do business (the "functional currency"). Movements in the invoiced currency relative to the functional currency could adversely impact our cash flows and our results of operations. As our international sales grow, exposure to fluctuations in currency exchange rates could have a larger effect on our financial results. In 2020, currency translation had a favorable effect of $133 million on revenues due to the weakening of the U.S. dollar relative to other currencies in which the company sells products and services.

In addition, many of our employees, contract manufacturers, suppliers, job functions, outsourcing activities and manufacturing facilities are located outside the United States. Accordingly, our future results could be harmed by a variety of factors, including:

- interruption to transportation flows for delivery of parts to us and finished goods to our customers;
- changes in a specific country's or region's political, economic or other conditions;
- changes in diplomatic and trade relationships, including new tariffs, trade protection measures, import or export licensing requirements, trade embargoes and sanctions and other trade barriers;

- tariffs imposed by the U.S. on goods from other countries and tariffs imposed by other countries on U.S. goods, including the tariffs recently adopted by the U.S. government on various imports from China and by the Chinese government on certain U.S. goods;
- the impact of public health epidemics/pandemics on the global economy, such as the COVID-19 pandemic;
- negative consequences from changes in tax laws;

- difficulty in staffing and managing widespread operations;
- differing labor regulations;
- differing protection of intellectual property;
- unexpected changes in regulatory requirements; and
- geopolitical uncertainty or turmoil, including terrorism and war.

For example, on January 31, 2020, the United Kingdom formally withdrew from the European Union, or EU (commonly referred to as "Brexit") and on December 24, 2020, the U.K. and EU announced they had entered into a post-Brexit deal on certain aspects of trade and other strategic and political issues. This withdrawal has created political and economic uncertainty, particularly in the United Kingdom and the EU, and this uncertainty may last for years. Our business could be affected during this period of uncertainty, and perhaps longer, by the impact of the United Kingdom's withdrawal from the EU. In addition, our business could be negatively affected by new trade agreements between the United Kingdom and other countries, including the United States, and by the possible imposition of trade or other regulatory barriers in the United Kingdom. These possible negative impacts, and others resulting from the United Kingdom's withdrawal from the EU, may adversely affect our operating results and our customers' businesses.

Demand for some of our products depends on capital spending policies of our customers and on government funding policies. Our customers include pharmaceutical and chemical companies, laboratories, universities, healthcare providers, government agencies and public and private research institutions. Many factors, including public policy spending priorities, available resources and product and economic cycles, have a significant effect on the capital spending policies of these entities.

Spending by some of these customers fluctuates based on budget allocations and the timely passage of the annual federal budget. An impasse in federal government budget decisions could lead to substantial delays or reductions in federal spending.

Business Risks

We must develop new products, adapt to rapid and significant technological change and respond to introductions of new products by competitors to remain competitive. Our growth strategy includes significant investment in and expenditures for product development. We sell our products in several industries that are characterized by rapid and significant technological changes, frequent new product and service introductions and enhancements and evolving industry standards. Competitive factors include technological innovation, price, service and delivery, breadth of product line, customer support, e-business capabilities and the ability to meet the special requirements of customers. Our competitors may adapt more quickly to new technologies and changes in customers' requirements than we can. Without the timely introduction of new products, services and enhancements, our products and services will likely become technologically obsolete over time, in which case our revenues and operating results would suffer.

Many of our existing products and those under development are technologically innovative and require significant planning, design, development and testing at the technological, product and manufacturing-process levels. Our customers use many of our products to develop, test and manufacture their own products. As a result, we must anticipate industry trends and develop products in advance of the commercialization of our customers' products. If we fail to adequately predict our customers' needs and future activities, we may invest heavily in research and development of products and services that do not lead to significant revenues.

It may be difficult for us to implement our strategies for improving internal growth. Our growth depends in part on the growth of the markets which we serve. Any decline or lower than expected growth in our served markets could diminish demand for our products and services, which would adversely affect our results of operations and financial condition. To address this issue, we are pursuing a number of strategies to improve our internal growth, including:

- strengthening our presence in selected geographic markets;

- allocating research and development funding to products with higher growth prospects;
- developing new applications for our technologies;
- expanding our service offerings;
- continuing key customer initiatives;
- combining sales and marketing operations in appropriate markets to compete more effectively;

- finding new markets for our products; and
- continuing the development of commercial tools and infrastructure to increase and support cross-selling opportunities of products and services to take advantage of our depth in product offerings.

We may not be able to successfully implement these strategies, and these strategies may not result in the expected growth of our business.

Because we compete directly with certain of our larger customers and product suppliers, our results of operations could be adversely affected in the short term if these customers or suppliers abruptly discontinue or significantly modify their relationship with us. Our largest customer in the laboratory products business is also a significant competitor. Our business may be harmed in the short term if our competitive relationship in the marketplace with certain of our large customers results in a discontinuation of their purchases from us. In addition, we manufacture products that compete directly with products that we source from third-party suppliers. We also source competitive products from multiple suppliers. Our business could be adversely affected in the short term if any of our large third-party suppliers abruptly discontinues selling products to us.

Our inability to complete any pending acquisitions or to successfully integrate any new or previous acquisitions could have a material adverse effect on our business. Our business strategy includes the acquisition of technologies and businesses that complement or augment our existing products and services. Certain acquisitions may be difficult to complete for a number of reasons, including the need for antitrust and/or other regulatory approvals. Any acquisition we may complete may be made at a substantial premium over the fair value of the net identifiable assets of the acquired company. Further, we may not be able to integrate acquired businesses successfully into our existing businesses, make such businesses profitable, or realize anticipated cost savings or synergies, if any, from these acquisitions, which could adversely affect our business.

Moreover, we have acquired many companies and businesses. As a result of these acquisitions, we recorded significant goodwill and indefinite-lived intangible assets (primarily tradenames) on our balance sheet, which amount to approximately $26.04 billion and $1.24 billion, respectively, as of December 31, 2020. In addition, we have definite-lived intangible assets totaling $11.45 billion as of December 31, 2020. We assess the realizability of goodwill and indefinite-lived intangible assets annually as well as whenever events or changes in circumstances indicate that these assets may be impaired. We assess the realizability of definite-lived intangible assets whenever events or changes in circumstances indicate that these assets may be impaired. These events or circumstances would generally include operating losses or a significant decline in earnings associated with the acquired business or asset. Our ability to realize the value of the goodwill and intangible assets will depend on the future cash flows of these businesses. These cash flows in turn depend in part on how well we have integrated these businesses. If we are not able to realize the value of the goodwill and intangible assets, we may be required to incur material charges relating to the impairment of those assets.

Operational Risks

Our reliance upon sole or limited sources of supply for certain materials or components could cause production interruptions, delays and inefficiencies. Some of our businesses purchase certain materials from sole or limited source suppliers for reasons of quality assurance, regulatory requirements, cost effectiveness, availability or uniqueness of design. If these or other suppliers encounter financial, operating or other difficulties or if our relationship with them changes, we might not be able to quickly establish or qualify replacement sources of supply. The supply chains for our businesses could also be disrupted by supplier capacity constraints, bankruptcy or exiting of the business for other reasons, decreased availability of key raw materials or commodities and external events such as natural disasters, pandemic health issues such as COVID-19, war, terrorist actions, governmental actions and legislative or regulatory changes. Any of these factors could result in production interruptions, delays, extended lead times and inefficiencies.

A significant disruption in, or breach in security of, our information technology systems or violation of data privacy laws could adversely affect our business. As a part of our ongoing effort to upgrade our current information systems, we periodically implement new enterprise resource planning software and other software applications to manage certain of our business operations. As we implement and add functionality, problems could arise that we have not foreseen. Such problems could disrupt our ability to provide quotes, take customer orders and

otherwise run our business in a timely manner. When we upgrade or change systems, we may suffer interruptions in service, loss of data or reduced functionality. In addition, if our new systems fail to provide accurate pricing and cost data our results of operations and cash flows could be adversely affected.

We also rely on our information technology systems to process, transmit and store electronic information (including sensitive data such as confidential business information and personally identifiable data relating to employees, customers and other business partners) and to manage or support a variety of critical business processes and activities (such as interacting with suppliers, selling our products and services, fulfilling orders and billing, collecting and making payments, shipping products,

providing services and support to customers, tracking customer activity, fulfilling contractual obligations and otherwise conducting business). Our systems may be vulnerable to damage or interruption from natural disasters, power loss, telecommunication failures, terrorist attacks, computer hackers, computer viruses, ransomware, phishing, computer denial-of-service attacks, unauthorized access to customer or employee data or company trade secrets, and other attempts to harm our systems. Certain of our systems are not redundant, and our disaster recovery planning is not sufficient for every eventuality. Despite any precautions we may take, such problems could result in, among other consequences, interruptions in our services, which could harm our reputation and financial results. Any of the cyber-attacks, breaches or other disruptions or damage described above, if significant, could materially interrupt our operations, delay production and shipments, result in theft of our and our customers' intellectual property and trade secrets, damage customer, business partner and employee relationships and our reputation or result in defective products or services, legal claims and proceedings, liability and penalties under privacy laws and increased cost for security and remediation, each of which could adversely affect our business and financial results.

If we are unable to maintain reliable information technology systems and appropriate controls with respect to global data privacy and security requirements and prevent data breaches, we may suffer regulatory consequences in addition to business consequences. As a global organization, we are subject to data privacy and security laws, regulations, and customer-imposed controls in numerous jurisdictions as a result of having access to and processing confidential, personal and/or sensitive data in the course of our business. For example, in the United States, individual states regulate data breach and security requirements and multiple governmental bodies assert authority over aspects of the protection of personal privacy. European laws require us to have an approved legal mechanism to transfer personal data out of Europe, and the EU General Data Protection Regulation imposes significantly stricter requirements in how we collect and process personal data. Several countries, such as China and Russia, have passed laws that require personal data relating to their citizens to be maintained on local servers and impose additional data transfer restrictions. Government enforcement actions can be costly and interrupt the regular operation of our business, and data breaches or violations of data privacy laws can result in fines, reputational damage and civil lawsuits, any of which may adversely affect our business, reputation and financial statements.

We may incur unexpected costs from increases in fuel and raw material prices, which could reduce our earnings and cash flows. Our primary commodity exposures are for fuel, petroleum-based resins and steel. While we may seek to minimize the impact of price increases through higher prices to customers and various cost-saving measures, our earnings and cash flows could be adversely affected in the event these measures are insufficient to cover our costs.

Because we rely heavily on third-party package-delivery services, a significant disruption in these services or significant increases in prices may disrupt our ability to ship products, increase our costs and lower our profitability. We ship a significant portion of our products to our customers through independent package delivery companies, such as Federal Express in the U.S. and DHL in Europe. We also maintain a small fleet of vehicles dedicated to the delivery of our products and ship our products through other carriers, including national and regional trucking firms, overnight carrier services and the U.S. Postal Service. If one or more of these third-party package-delivery providers were to experience a major work stoppage, preventing our products from being delivered in a timely fashion or causing us to incur additional shipping costs we could not pass on to our customers, our costs could increase and our relationships with certain of our customers could be adversely affected. In addition, if one or more of these third-party package-delivery providers were to increase prices, and we were not able to find comparable alternatives or make adjustments in our delivery network, our profitability could be adversely affected.

Natural disasters, public health crises, political crises, and other catastrophic events or other events outside of our control may disrupt our facilities or the facilities of third parties on which we depend, and could impact customer spending. We have significant operations in California, near major earthquake faults, which make us susceptible to earthquake risk. An earthquake or other natural disaster such as a fire or hurricane or power shortages or outages could disrupt our operations or impair our critical systems. Any of these disruptions or other events outside of our control, such as strikes or other labor unrest, could have an adverse effect on our results of operations. In addition, if any of our facilities, including our manufacturing or warehouse facilities, or the facilities of our suppliers, third-party service providers, or customers, is affected by natural disasters, such as earthquakes, tsunamis, power shortages or outages, floods or monsoons, public health crises, such as pandemics and epidemics, political crises, such as terrorism, war, political instability or other conflict, or other events outside of our control, such as strikes or other labor unrest, our results of operations could be adversely affected. Moreover, these types of

events could negatively impact customer spending in the impacted regions or depending upon the severity, globally, which could also adversely impact our operating results. For example, as described above, the COVID-19 pandemic has impacted and could have a material adverse effect on our business and results of operations.

Risk Factors (continued)

Legal, Quality and Regulatory Risks

Changes in governmental regulations may reduce demand for our products or increase our expenses. We compete in many markets in which we and our customers must comply with federal, state, local and international regulations, such as environmental, health and safety and food and drug regulations. We develop, configure and market our products to meet customer needs created by those regulations. Any significant change in regulations could reduce demand for our products or increase our expenses. For example, we manufacture pharmaceuticals and many of our instruments are marketed to the pharmaceutical industry for use in discovering and developing drugs. Changes in the U.S. Food and Drug Administration's regulation of the drug discovery and development process could have an adverse effect on the demand for these products.

We are subject to laws and regulations governing government contracts, and failure to address these laws and regulations or comply with government contracts could harm our business by leading to a reduction in revenues associated with these customers. We have agreements relating to the sale of our products to government entities and, as a result, we are subject to various statutes and regulations that apply to companies doing business with the government. The laws governing government contracts differ from the laws governing private contracts and government contracts may contain pricing terms and conditions that are not applicable to private contracts. We are also subject to investigation for compliance with the regulations governing government contracts. A failure to comply with these regulations could result in suspension of these contracts, criminal, civil and administrative penalties or debarment.

Our pharma services offerings are highly complex, and if we are unable to provide quality and timely offerings to our customers, our business could suffer. Our pharma services offerings are highly exacting and complex, due in part to strict quality and regulatory requirements. Our operating results in this business depend on our ability to execute and, when necessary, improve our quality management strategy and systems, and our ability to effectively train and maintain our employee base with respect to quality management. A failure of our quality control systems could result in problems with facility operations or preparation or provision of products. In each case, such problems could arise for a variety of reasons, including equipment malfunction, failure to follow specific protocols and procedures, problems with raw materials or environmental factors and damage to, or loss of, manufacturing operations. Such problems could affect production of a particular batch or series of batches of products, requiring the destruction of such products or a halt of facility production altogether.

In addition, our failure to meet required quality standards may result in our failure to timely deliver products to our customers, which in turn could damage our reputation for quality and service. Any such failure could, among other things, lead to increased costs, lost revenues, reimbursement to customers for lost drug product, registered intermediates, registered starting materials, and active pharmaceutical ingredients, other customer claims, damage to and possibly termination of existing customer relationships, time and expense spent investigating the cause and, depending on the cause, similar losses with respect to other batches or products. Production problems in our drug and biologic manufacturing operations could be particularly significant because the cost of raw materials for such manufacturing is often high. If problems in preparation or manufacture of a product or failures to meet required quality standards for that product are not discovered before such product is released to the market, we may be subject to adverse regulatory actions, including product recalls, product seizures, injunctions to halt manufacture and distribution, restrictions on our operations, civil sanctions, including monetary sanctions, and criminal actions. In addition, such problems or failures could subject us to litigation claims, including claims from our customers for reimbursement for the cost of lost or damaged active pharmaceutical ingredients, the cost of which could be significant.

We are subject to product and other liability risks for which we may not have adequate insurance coverage. We may be named as a defendant in product liability lawsuits, which may allege that products or services we have provided from our pharma services offerings have resulted or could result in an unsafe condition or injury to consumers. Additionally, products currently or previously sold by our environmental and process instruments and radiation measurement and security instruments businesses include fixed and portable instruments used for chemical, radiation and trace explosives detection. These products are used in airports, embassies, cargo facilities, border crossings and other high-threat facilities for the detection and prevention of terrorist acts. If any of these products were to malfunction, it is possible that explosive or radioactive material could fail to be detected by our product,

which could lead to product liability claims. There are also many other factors beyond our control that could lead to liability claims, such as the reliability and competence of the customers' operators and the training of such operators.

Any such product liability claims brought against us could be significant and any adverse determination may result in liabilities in excess of our insurance coverage. Although we carry product liability insurance, we cannot be certain that our current insurance will be sufficient to cover these claims or that it can be maintained on acceptable terms, if at all.

We are required to comply with a wide variety of laws and regulations, and are subject to regulation by various federal, state and foreign agencies. We are subject to various local, state, federal, foreign and transnational laws and regulations, which include the operating and security standards of the U.S. Federal Drug Administration (the FDA), the U.S.

Drug Enforcement Agency (the DEA), various state boards of pharmacy, state health departments, the U.S. Department of Health and Human Services (the DHHS), the European Medicines Agency (the EMA), in Europe, the EU member states and other comparable agencies and, in the future, any changes to such laws and regulations could adversely affect us. In particular, we are subject to laws and regulations concerning current good manufacturing practices and drug safety. Our subsidiaries may be required to register for permits and/or licenses with, and may be required to comply with the laws and regulations of the DEA, the FDA, the DHHS, foreign agencies including the EMA, and other various state boards of pharmacy, state health departments and/or comparable state agencies as well as certain accrediting bodies depending upon the type of operations and location of product distribution, manufacturing and sale.

The manufacture, distribution and marketing of many of our products and services, including medical devices and pharma services, are subject to extensive ongoing regulation by the FDA, the DEA, the EMA, and other equivalent local, state, federal and non-U.S. regulatory authorities. In addition, we are subject to inspections by these regulatory authorities. Failure by us or by our customers to comply with the requirements of these regulatory authorities, including without limitation, remediating any inspectional observations to the satisfaction of these regulatory authorities, could result in warning letters, product recalls or seizures, monetary sanctions, injunctions to halt manufacture and distribution, restrictions on our operations, civil or criminal sanctions, or withdrawal of existing or denial of pending approvals, including those relating to products or facilities. In addition, such a failure could expose us to contractual or product liability claims, contractual claims from our customers, including claims for reimbursement for lost or damaged active pharmaceutical ingredients, as well as ongoing remediation and increased compliance costs, any or all of which could be significant. We are the sole manufacturer of a number of pharmaceuticals for many of our customers and a negative regulatory event could impact our customers' ability to provide products to their customers.

We are also subject to a variety of federal, state, local and international laws and regulations that govern, among other things, the handling, transportation and manufacture of substances that could be classified as hazardous, and we are required to comply with various import laws and export control and economic sanctions laws, which may affect our transactions with certain customers. In certain circumstances, export control and economic sanctions regulations may prohibit the export of certain products, services and technologies. In other circumstances, we may be required to obtain an export license before exporting the controlled item. Compliance with the various import laws that apply to our businesses can restrict our access to, and increase the cost of obtaining, certain products and at times can interrupt our supply of imported inventory. Any noncompliance by us with applicable laws and regulations or the failure to maintain, renew or obtain necessary permits and licenses could result in criminal, civil and administrative penalties and could have an adverse effect on our results of operations.

Our reputation, ability to do business and financial statements may be impaired by improper conduct by any of our employees, agents or business partners. We have internal controls and compliance systems to protect the company against acts committed by employees, agents or businesses that we acquire that would violate U.S. and/or non-U.S. laws, including the laws governing payments to government officials, bribery, fraud, kickbacks and false claims, pricing, sales and marketing practices, conflicts of interest, competition, employment practices and workplace behavior, export and import compliance, money laundering and data privacy, but we cannot provide assurance that these controls and systems will prevent every such wrongful act. In particular, the U.S. Foreign Corrupt Practices Act, the U.K. Bribery Act and similar anti-bribery laws in other jurisdictions generally prohibit companies and their intermediaries from making improper payments to government officials for the purpose of obtaining or retaining business, and we operate in many parts of the world that have experienced governmental corruption to some degree. Any such improper actions or allegations of such acts could damage our reputation and subject us to civil or criminal investigations in the United States and in other jurisdictions and related shareholder lawsuits, could lead to substantial civil and criminal, monetary and nonmonetary penalties and could cause us to incur significant legal and investigatory fees. In addition, the government may seek to hold us liable for violations committed by companies which we acquire. We also rely on our suppliers to adhere to our supplier standards of conduct, and material violations of such standards of conduct could occur that could have a material effect on our business, reputation and financial statements.

Our inability to protect our intellectual property could have a material adverse effect on our business. In addition, third parties may claim that we infringe their intellectual property, and we could suffer significant litigation or licensing expense as a result. We place considerable emphasis on obtaining patent and trade secret

protection for significant new technologies, products and processes because of the length of time and expense associated with bringing new products through the development process and into the marketplace. Our success depends in part on our ability to develop patentable products and obtain and enforce patent protection for our products both in the United States and in other countries. We own numerous U.S. and foreign patents, and we intend to file additional applications, as appropriate, for patents covering our products. Patents may not be issued for any pending or future patent applications owned by or licensed to us, and the claims allowed under any issued patents may not be sufficiently broad to protect our technology. Any issued patents owned by or licensed to us may be challenged, invalidated or circumvented, and the rights under these patents may not provide us with competitive advantages. In

addition, competitors may design around our technology or develop competing technologies. Intellectual property rights may also be unavailable or limited in some foreign countries, which could make it easier for competitors to capture increased market position. We could incur substantial costs to defend ourselves in suits brought against us or in suits in which we may assert our patent rights against others. An unfavorable outcome of any such litigation could materially adversely affect our business and results of operations.

We also rely on trade secrets and proprietary know-how with which we seek to protect our products, in part, by confidentiality agreements with our collaborators, employees and consultants. These agreements may be breached and we may not have adequate remedies for any breach. In addition, our trade secrets may otherwise become known or be independently developed by our competitors.

Third parties may assert claims against us to the effect that we are infringing on their intellectual property rights. In the event that a claim relating to intellectual property is asserted against us, or third parties not affiliated with us hold pending or issued patents that relate to our products or technology, we may seek licenses to such intellectual property or challenge those patents. However, we may be unable to obtain these licenses on commercially reasonable terms, if at all, and our challenge of the patents may be unsuccessful. Our failure to obtain the necessary licenses or other rights could prevent the sale, manufacture, or distribution of our products and, therefore, could have a material adverse effect on our business, financial condition and results of operations.

Risks Relating to Financial Profile

Fluctuations in our effective tax rate may adversely affect our results of operations and cash flows. As a global company, we are subject to taxation in numerous countries, states and other jurisdictions. In preparing our financial statements, we record the amount of tax that is payable in each of the countries, states and other jurisdictions in which we operate. Our future effective tax rate, however, may be lower or higher than experienced in the past due to numerous factors, including a change in the mix of our profitability from country to country, changes in accounting for income taxes and recently enacted and future changes in tax laws in jurisdictions in which we operate. Any of these factors could cause us to experience an effective tax rate significantly different from previous periods or our current expectations, which could have an adverse effect on our business, results of operations and cash flows.

Our existing and future indebtedness may restrict our investment opportunities or limit our activities and negatively impact our credit ratings. As of December 31, 2020, we had approximately $21.74 billion in outstanding indebtedness. In addition, we have availability to borrow under a revolving credit facility that provides for up to $3.00 billion of unsecured multi-currency revolving credit. We may also obtain additional long-term debt and lines of credit to meet future financing needs, which would have the effect of increasing our total leverage.

Our leverage could have negative consequences, including increasing our vulnerability to adverse economic and industry conditions, limiting our ability to obtain additional financing and limiting our ability to acquire new products and technologies through strategic acquisitions.

Our ability to make scheduled payments, refinance our obligations or obtain additional financing will depend on our future operating performance and on economic, financial, competitive and other factors beyond our control. Our business may not generate sufficient cash flow to meet our obligations. If we are unable to service our debt, refinance our existing debt or obtain additional financing, we may be forced to delay strategic acquisitions, capital expenditures or research and development expenditures.

Additionally, the agreements governing our debt require that we maintain certain financial ratios, and contain affirmative and negative covenants that restrict our activities by, among other limitations, limiting our ability to incur additional indebtedness, merge or consolidate with other entities, make investments, create liens, sell assets and enter into transactions with affiliates. The covenants in the Facility include a Consolidated Net Interest Coverage Ratio (Consolidated EBITDA to Consolidated Net Interest Expense), as such terms are defined in the Facility. Specifically, the company has agreed that, so long as any lender has any commitment under the Facility, any letter of credit is outstanding under the Facility, or any loan or other obligation is outstanding under the Facility, it will maintain a minimum Consolidated Interest Coverage Ratio of 3.5:1.0 as of the last day of any fiscal quarter.

Our ability to comply with these financial restrictions and covenants is dependent on our future performance, which is subject to prevailing economic conditions and other factors, including factors that are beyond our control such as the impact of public health epidemics/pandemics like COVID-19, foreign exchange rates and interest rates. Our failure to comply with any of these restrictions or covenants may result in an event of default under the applicable debt instrument, which could permit

acceleration of the debt under that instrument and require us to prepay that debt before its scheduled due date. Also, an acceleration of the debt under certain of our debt instruments would trigger an event of default under other of our debt instruments.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

The company owns and leases office, engineering, laboratory, production and warehouse space throughout the world.

Item 3. Legal Proceedings

There are various lawsuits and claims against the company involving product liability, intellectual property, employment and commercial issues. See "Note 12 to our Consolidated Financial Statements – Commitments and Contingencies."

Item 4. Mine Safety Disclosures

Not applicable.

PART II

Item 5. Market for the Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities

Market Price of Common Stock

Our common stock is traded on the New York Stock Exchange under the symbol TMO.

Holders of Common Stock

As of February 6, 2021, the company had 2,861 holders of record of its common stock. This does not include holdings in street or nominee names.

Issuer Purchases of Equity Securities

There was no share repurchase activity for the company's fourth quarter of 2020. On November 8, 2019, the Board of Directors authorized the repurchase of up to $2.50 billion of the company's common stock. On November 5, 2020, the Board of Directors replaced the existing authorization to repurchase the company's common stock, of which $1.00 billion was remaining, with a new authorization to repurchase up to $2.50 billion of the company's common stock. Early in the first quarter of 2021, the company repurchased $1.50 billion of the company's common stock. At February 24, 2021, $1.00 billion was available for future repurchases of the company's common stock under this authorization.

Item 6. Reserved

Not applicable.

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

Reference is made throughout this Management's Discussion and Analysis of Financial Condition and Results of Operations to Notes to the Consolidated Financial Statements, which begin on page F-1 of this report. Management's discussion and analysis of financial condition and results of operations for 2018 is included in Item 7 of the company's 2019 Annual Report on Form 10-K filed with the Securities and Exchange Commission.

Overview

The company develops, manufactures and sells a broad range of products that are sold worldwide. The company expands the product lines and services it offers by developing and commercializing its own technologies and by making strategic acquisitions of complementary businesses. The company's operations fall into four segments (Note 4): Life Sciences Solutions, Analytical Instruments, Specialty Diagnostics and Laboratory Products and Services.

The company mobilized in early 2020 to support the COVID-19 pandemic response with products and services that help analyze, diagnose and protect from the virus. However, the company saw a significant reduction in customer activity in several businesses by late March 2020 that materially adversely affected primarily the 2020 results of the Analytical Instruments segment and, to a lesser extent, some businesses within the company's other three segments. The extent and duration of the negative impacts continuing into 2021 are uncertain and dependent in part on the success of global efforts to control the pandemic and economic activity ramping up. The company believes the impacted businesses' long-term prospects remain excellent given the company's attractive markets served, its industry-leading position and proven growth strategy. Several of the company's businesses have had a significant increase in revenues due to sales of product and services addressing diagnosis and treatment of COVID-19, including test kits and, to a lesser extent, products and services for therapy and vaccine development and manufacturing. While these positive impacts are expected to continue into 2021, the duration and extent of future revenues from such sales are uncertain and dependent primarily on customer testing demand.

Recent Acquisitions and Divestiture

The company's strategy is to augment internal growth at existing businesses with complementary acquisitions. The company's principal recent acquisitions and divestitures are described below.

On April 30, 2019, the company acquired, within the Laboratory Products and Services segment, Brammer Bio for approximately $1.67 billion in cash. Brammer Bio is a leading viral vector contract development and manufacturing organization for gene and cell therapies. The acquisition expanded the segment's contract manufacturing capabilities. Brammer Bio reported revenues of approximately $140 million in 2018.

On June 28, 2019, the company sold its Anatomical Pathology business to PHC Holdings Corporation for $1.13 billion, net of cash divested. The business was part of the Specialty Diagnostics segment. Revenues in 2019, through the date of sale, and the full year 2018 of the business sold were approximately $115 million and $238 million, respectively, net of retained sales through the company's healthcare market and research and safety market channel businesses.

Overview of Results of Operations and Liquidity

(Dollars in millions)	2020		2019	
Revenues				
Life Sciences Solutions	$ 12,168	37.8 %	$ 6,856	26.8 %
Analytical Instruments	5,124	15.9 %	5,522	21.6 %
Specialty Diagnostics	5,343	16.6 %	3,718	14.6 %
Laboratory Products and Services	12,245	38.0 %	10,599	41.5 %
Eliminations	(2,662)	(8.3)%	(1,153)	(4.5)%
	$ 32,218	100 %	$ 25,542	100 %

Sales in 2020 were $32.22 billion, an increase of $6.68 billion from 2019. Sales increased $78 million due to acquisitions, net of a divestiture. The favorable effects of currency translation resulted in an increase in revenues of $133 million in 2020.

Overview of Results of Operations and Liquidity (continued)

Aside from the effects of acquisitions/divestitures and currency translation, revenues increased $6.47 billion (25%) primarily due to increased demand. Sales of products that address COVID-19 testing and treatment totaled $6.63 billion in 2020, and were offset in part by lower revenues in the remainder of the business during the first half of 2020. Sales were particularly strong in diagnostic and healthcare markets, due to demand for products supporting customers diagnosing the COVID-19 virus, offset in part by lower sales of other products due to pandemic-related impacts on customer activity. Sales were also strong to customers in pharma and biotech markets where demand was strong for products and services and pandemic-related demand for therapies and vaccines also contributed to growth. Sales to customers in industrial markets decreased primarily due to lower demand from weakened economic conditions related to COVID-19. Sales to these customers returned to positive growth in the fourth quarter of 2020. Sales to academic and government customers decreased due primarily to closure of academic labs during the global pandemic. Sales to these customers returned to positive growth in the third quarter of 2020. Sales growth was particularly strong in North America and Europe and, to a lesser extent, in the Asia-Pacific region.

In 2020, total company operating income and operating income margin were $7.79 billion and 24.2%, respectively, compared with $4.59 billion and 18.0%, respectively, in 2019. The increase in operating income was primarily due to profit on higher sales and, to a lesser extent, sales mix, offset in part by a gain on the sale of the Anatomical Pathology business included in the 2019 period and strategic growth investments in 2020. The company's references to strategic growth investments generally refer to targeted spending for enhancing commercial capabilities, including expansion of geographic sales reach and e-commerce platforms, marketing initiatives, expanded service and operational infrastructure, focused research and development projects and other expenditures to enhance the customer experience, as well as incentive compensation and recognition for employees. The company's references throughout this discussion to productivity improvements generally refer to improved cost efficiencies from its Practical Process Improvement (PPI) business system, reduced costs resulting from global sourcing initiatives, a lower cost structure following restructuring actions, including headcount reductions and consolidation of facilities, and low cost region manufacturing. Productivity improvements are calculated net of inflationary cost increases.

The company recorded a provision for income taxes of $850 million in 2020 (effective tax rate of 11.8%). In 2020, the company implemented foreign tax credit planning in Sweden which resulted in $96 million of foreign tax credits, with no related incremental U.S. income tax expense and also recorded a net income tax benefit of $51 million from a domestication transaction involving the transfer of non-U.S. subsidiaries to the U.S.; a $47 million income tax benefit related to a foreign exchange loss for tax purposes on certain intercompany financing arrangements; and a $27 million tax benefit from tax audit settlements.

The company recorded a provision for income taxes of $374 million in 2019 (effective tax rate of 9.2%) including $191 million related to the gain on the sale of the Anatomical Pathology business. In 2019, the company recorded a $62 million income tax benefit related to a foreign exchange loss for tax purposes on certain intercompany financing arrangements; implemented foreign tax credit planning in Sweden which resulted in $75 million of foreign tax credits, with no related incremental U.S. income tax expense; and recorded a $79 million income tax benefit related to the deferred tax implications of intra-entity transactions which included a tax benefit to release a valuation allowance against net operating losses previously determined to be unrealizable.

The effective tax rate in both 2020 and 2019 was also affected by relatively significant earnings in lower tax jurisdictions. Due primarily to the non-deductibility of intangible asset amortization for tax purposes, the company's cash payments for income taxes were higher than its income tax expense for financial reporting purposes and totaled $1.32 billion and $0.90 billion in 2020 and 2019, respectively.

The company expects its effective tax rate in 2021 will be between 11% and 13% based on currently forecasted rates of profitability in the countries in which the company conducts business and expected generation of foreign tax credits. The effective tax rate can vary significantly from period to period as a result of discrete income tax factors and events.

Net income increased to $6.38 billion in 2020, from $3.70 billion in 2019 principally due to the increase in operating income in 2020 (discussed above) offset in part by the increase in the income tax provision.

During 2020, the company's cash flow from operations totaled $8.29 billion compared with $4.97 billion for 2019. The increase primarily resulted from higher cash provided by income and, to a lesser extent, lower investment in working capital in 2020.

As of December 31, 2020, the company's short-term debt totaled $2.63 billion, substantially all of which was redeemed in January 2021. The company has a revolving credit facility with a bank group that provides up to $3.00 billion of unsecured multi-currency revolving credit (Note 10). If the company borrows under this facility, it intends to leave undrawn an amount

Overview of Results of Operations and Liquidity (continued)

equivalent to outstanding commercial paper to provide a source of funds in the event that commercial paper markets are not available. As of December 31, 2020, no borrowings were outstanding under the company's revolving credit facility, although available capacity was reduced by approximately $31 million as a result of outstanding letters of credit.

The company believes that its existing cash and cash equivalents of $10.33 billion as of December 31, 2020 and its future cash flow from operations together with available borrowing capacity under its revolving credit agreement will be sufficient to meet the cash requirements of its existing businesses for the foreseeable future, including at least the next 24 months.

Critical Accounting Policies and Estimates

The company's discussion and analysis of its financial condition and results of operations is based upon its financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States of America. The preparation of these financial statements requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenues and expenses and related disclosure of contingent liabilities. On an on-going basis, management evaluates its estimates, including those related to intangible assets and goodwill, income taxes and contingencies and litigation. Management believes the most complex and sensitive judgments, because of their significance to the consolidated financial statements, result primarily from the need to make estimates about the effects of matters that are inherently uncertain. Management bases its estimates on historical experience, current market and economic conditions and other assumptions that management believes are reasonable. The results of these estimates form the basis for judgments about the carrying value of assets and liabilities where the values are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

The company believes the following represent its critical accounting policies and estimates used in the preparation of its financial statements:

(a) *Intangible Assets and Goodwill*

The company uses assumptions and estimates in determining the fair value of assets acquired and liabilities assumed in a business combination. The determination of the fair value of intangible assets, which represent a significant portion of the purchase price in many of the company's acquisitions, requires the use of significant judgment with regard to (i) the fair value; and (ii) whether such intangibles are amortizable or non-amortizable and, if the former, the period and the method by which the intangible asset will be amortized. The company estimates the fair value of acquisition-related intangible assets principally based on projections of cash flows that will arise from identifiable intangible assets of acquired businesses. The projected cash flows are discounted to determine the present value of the assets at the dates of acquisition. Definite-lived intangible assets totaled $11.45 billion at December 31, 2020. The company reviews definite-lived intangible assets for impairment when indication of potential impairment exists, such as a significant reduction in cash flows associated with the assets. Actual cash flows arising from a particular intangible asset could vary from projected cash flows which could imply different carrying values from those established at the dates of acquisition and which could result in impairment of such asset.

The company evaluates goodwill and indefinite-lived intangible assets for impairment annually and when events occur or circumstances change that would more likely than not reduce the fair value of the asset below its carrying amount. Events or circumstances that might require an interim evaluation include unexpected adverse business conditions, economic factors, unanticipated technological changes or competitive activities, loss of key personnel and acts by governments and courts. Goodwill and indefinite-lived intangible assets totaled $26.04 billion and $1.24 billion, respectively, at December 31, 2020. Estimates of discounted future cash flows require assumptions related to revenue and operating income growth rates, discount rates and other factors. For the goodwill impairment tests, the company considers (i) peer revenues and earnings trading multiples from companies that have operational and financial characteristics that are similar to the respective reporting units and (ii) estimated weighted average costs of

capital. Different assumptions from those made in the company's analysis could materially affect projected cash flows and the company's evaluation of goodwill and indefinite-lived intangible assets for impairment.

The company performed the quantitative goodwill impairment test for all of its reporting units and indefinite-lived intangible assets. Indications of fair value based on projections of profitability and on peer revenues and earnings trading multiples were sufficient to conclude that no impairment of goodwill or indefinite-lived intangible assets existed at the end of the tenth fiscal month of 2020, the date of the company's annual impairment testing. There can be no assurance, however, that an economic downturn will not materially adversely affect peer trading multiples and the

Critical Accounting Policies and Estimates (continued)

company's businesses such that they do not achieve their forecasted profitability and these assets become impaired. Should the fair value of the company's goodwill or indefinite-lived intangible assets decline because of reduced operating performance, market declines, or other indicators of impairment, or as a result of changes in the discount rate, charges for impairment may be necessary.

(b) Income Taxes

In the ordinary course of business there is inherent uncertainty in quantifying the company's income tax positions. The company assesses income tax positions and records tax benefits for all years subject to examination based upon management's evaluation of the facts, circumstances and information available at the reporting date. For those tax positions where it is more likely than not that a tax benefit will be sustained, the company has recorded the largest amount of tax benefit with a greater than 50 percent likelihood of being realized upon ultimate settlement with a taxing authority that has full knowledge of all relevant information. For those income tax positions where it is not more likely than not that a tax benefit will be sustained, no tax benefit has been recognized in the financial statements. Should tax return positions that the company expects are sustainable not be sustained upon audit, the company could be required to record an incremental tax provision for such taxes. The company's liability for these unrecognized tax benefits totaled $1.09 billion at December 31, 2020.

The company operates in numerous countries under many legal forms and, as a result, is subject to the jurisdiction of numerous domestic and non-U.S. tax authorities, as well as to tax agreements and treaties among these governments. Determination of taxable income in any jurisdiction requires the company to interpret the related tax laws and regulations and the use of estimates and assumptions regarding significant future events, such as the amount, timing and character of deductions, permissible revenue recognition methods under the tax law and the sources and character of income and tax credits. Changes in tax laws, regulations, agreements and treaties, currency exchange restrictions or the company's level of operations or profitability in each taxing jurisdiction could have an impact upon the amount of current and deferred tax balances and hence the company's net income.

The company estimates the degree to which tax assets will result in a benefit, after consideration of all positive and negative evidence, and provides a valuation allowance for tax assets that it believes will more likely than not go unused. In situations in which the company has been able to determine that its deferred tax assets will be realized, that determination generally relies on future reversals of taxable temporary differences and expected future taxable income. If it becomes more likely than not that a tax asset will be used, the company reverses the related valuation allowance. Any such reversals are recorded as a reduction of the company's tax provision. The company's tax valuation allowance totaled $933 million at December 31, 2020. Should the company's actual future taxable income by tax jurisdiction vary from estimates, additional allowances or reversals thereof may be necessary.

The company has not provided U.S. state income taxes or additional non-U.S. taxes on certain of its non-U.S. subsidiaries' undistributed earnings, as such amounts are intended to be reinvested outside the United States indefinitely in the respective jurisdictions based on specific business plans and tax strategies. These business plans and tax strategies consider: short-term and long-term forecasts and budgets of the U.S. parent and non-U.S. subsidiaries; working capital and other needs in locations where earnings are generated; the company's past practices regarding non-U.S. subsidiary dividends; sources of financing by the U.S. parent, such as issuing debt or equity; and uses of cash by the U.S. parent that are more discretionary in nature, such as business combinations and share repurchase programs. However, should the company change its business plans and tax strategies in the future and decide to repatriate a portion of these earnings to one of its U.S. subsidiaries, including cash maintained by these non-U.S. subsidiaries, the company would recognize additional tax liabilities. It is not practicable to estimate the amount of additional U.S. state income tax and non-U.S. tax liabilities that the company would incur. The company's intent is to only make distributions from non-U.S. subsidiaries in the future when they can be made at no net tax costs.

(c) Contingencies and Litigation

The company records accruals for various contingencies, including legal proceedings, environmental, workers' compensation, product, general and auto liabilities, and other claims that arise in the normal course of business. The accruals are based on management's judgment, historical claims experience, the probability of losses and, where applicable, the consideration of opinions of internal and/or external legal counsel and actuarial estimates. Accruals of acquired businesses, including product liability and environmental accruals, are initially recorded at fair value and discounted to their net present value. Additionally, the company records receivables from third-party insurers when recovery has been determined to be probable.

Results of Operations

2020 Compared With 2019

(In millions)	2020	2019	Total Change	Currency Translation	Acquisitions/ Divestitures	Operations
Revenues						
Life Sciences Solutions	$ 12,168	$ 6,856	$ 5,312	$ 29	$ —	$ 5,283
Analytical Instruments	5,124	5,522	(398)	39	—	(437)
Specialty Diagnostics	5,343	3,718	1,625	14	(121)	1,732
Laboratory Products and Services	12,245	10,599	1,646	52	184	1,410
Eliminations	(2,662)	(1,153)	(1,509)	(1)	15	(1,523)
Consolidated Revenues	$ 32,218	$ 25,542	$ 6,676	$ 133	$ 78	$ 6,465

Sales in 2020 were $32.22 billion, an increase of $6.68 billion from 2019. Sales increased $78 million due to acquisitions, net of a divestiture. The favorable effects of currency translation resulted in an increase in revenues of $133 million in 2020. Aside from the effects of acquisitions and currency translation, revenues increased $6.47 billion (25%) primarily due to increased demand. Sales of products that address COVID-19 testing and treatment totaled $6.63 billion in 2020, and were offset in part by lower revenues in the remainder of the business during the first half of 2020. Sales were particularly strong in diagnostic and healthcare markets, due to demand for products supporting customers diagnosing the COVID-19 virus, offset in part by lower sales of other products due to pandemic-related impacts on customer activity. Sales were also strong to customers in pharma and biotech markets where demand was strong for products and services and pandemic-related demand for therapies and vaccines also contributed to growth. Sales to customers in industrial markets decreased primarily due to lower demand from weakened economic conditions related to COVID-19. Sales to these customers returned to positive growth in the fourth quarter of 2020. Sales to academic and government customers decreased due primarily to closure of academic labs during the global pandemic. Sales to these customers returned to positive growth in the third quarter of 2020. Sales growth was particularly strong in North America and Europe and, to a lesser extent, in the Asia-Pacific region.

In 2020, total company operating income and operating income margin were $7.79 billion and 24.2%, respectively, compared with $4.59 billion and 18.0%, respectively, in 2019. The increase in operating income was primarily due to profit on higher sales and, to a lesser extent, sales mix, offset in part by a gain on the sale of the Anatomical Pathology business included in the 2019 period and strategic growth investments in 2020.

In 2020, the company recorded restructuring and other costs, net, of $95 million (Note 16). In 2019, the company recorded restructuring and other income, net, of $334 million, including $482 million of net gains on the sale of businesses, principally the Anatomical Pathology business (Note 2). The restructuring projects for which charges were incurred in 2020 are expected to result in annual cost savings of approximately $55 million beginning in part in 2020 and, to a greater extent, in 2021. The restructuring actions for which charges were incurred in 2019 resulted in annual cost savings of approximately $60 million beginning in part in 2019 and to a greater extent in 2020.

Segment Results

The company’s management evaluates segment operating performance using operating income before certain charges/credits to cost of revenues and selling, general and administrative expenses, principally associated with acquisition-related activities; restructuring and other costs/income including costs arising from facility consolidations such as severance and abandoned lease expense and gains and losses from the sale of real estate and product lines; and amortization of acquisition-related intangible assets. The company uses this measure because it helps management understand and evaluate the segments’ core operating results and facilitate comparison of performance for determining compensation (Note 4). Accordingly, the following segment data is reported on this basis.

Results of Operations (continued)

(Dollars in millions)	2020	2019	Change
Revenues			
Life Sciences Solutions	$ 12,168	$ 6,856	77 %
Analytical Instruments	5,124	5,522	(7)%
Specialty Diagnostics	5,343	3,718	44 %
Laboratory Products and Services	12,245	10,599	16 %
Eliminations	(2,662)	(1,153)	131 %
Consolidated Revenues	$ 32,218	$ 25,542	26 %
Segment Income			
Life Sciences Solutions	$ 6,109	$ 2,446	150 %
Analytical Instruments	808	1,273	(37)%
Specialty Diagnostics	1,368	930	47 %
Laboratory Products and Services	1,271	1,324	(4)%
Subtotal Reportable Segments	9,556	5,973	60 %
Cost of Revenues Charges	(6)	(17)	
Selling, General and Administrative Charges, Net	10	(62)	
Restructuring and Other (Costs) Income, Net	(99)	413	
Amortization of Acquisition-related Intangible Assets	(1,667)	(1,713)	
Consolidated Operating Income	$ 7,794	$ 4,594	70 %
Reportable Segments Income Margin	29.7 %	23.4 %	
Consolidated Operating Income Margin	24.2 %	18.0 %	

Income from the company's reportable segments increased 60% to $9.56 billion in 2020 due primarily to profit on higher sales and, to a lesser extent, sales mix, offset in part by strategic growth investments.

Life Sciences Solutions

(Dollars in millions)	2020	2019	Change
Revenues	$ 12,168	$ 6,856	77 %
Operating Income Margin	50.2 %	35.7 %	14.5 pt

Sales in the Life Sciences Solutions segment increased $5.31 billion to $12.17 billion in 2020. Sales increased $5.28 billion (77%) due to higher revenues at existing businesses. The favorable effects of currency translation resulted in an increase in revenues of $29 million. The increase in revenues at existing businesses was primarily driven by demand for testing to diagnose COVID-19 with higher sales of genetic sciences products and, to a lesser extent, bioscience products. Sales also grew due to higher demand for bioproduction products.

Operating income margin was 50.2% in 2020 compared to 35.7% in 2019. The increase resulted primarily from profit on higher sales and, to a lesser extent, sales mix, offset in part by strategic growth investments.

Analytical Instruments

(Dollars in millions)	2020	2019	Change
Revenues	$ 5,124	$ 5,522	(7)%
Operating Income Margin	15.8 %	23.1 %	-7.3 pt

Results of Operations (continued)

Sales in the Analytical Instruments segment decreased $398 million to $5.12 billion in 2020. Sales decreased $437 million (-8%) due to lower revenues at existing businesses. The favorable effects of currency translation resulted in an increase in revenues of $39 million. The decrease in revenues at existing businesses was primarily the result of reduced demand from industrial customers following business slowing and closures due to COVID-19 and lower sales to academic customers due to pandemic-related closures. The segment returned to positive growth in the fourth quarter of 2020.

Operating income margin was 15.8% in 2020 compared to 23.1% in 2019. The decrease was primarily due to sales mix, the decrease in sales, a $108 million charge related to a long-term supply contract (discussed in Note 12), and, to a lesser extent, strategic growth investments, offset in part by productivity improvements.

Specialty Diagnostics

(Dollars in millions)	2020	2019	Change
Revenues	$ 5,343	$ 3,718	44 %
Operating Income Margin	25.6 %	25.0 %	0.6 pt

Sales in the Specialty Diagnostics segment increased $1.63 billion to $5.34 billion in 2020. Sales increased $1.73 billion (48%) due to higher revenues at existing businesses. The favorable effects of currency translation resulted in an increase in revenues of $14 million and the divestiture of the Anatomical Pathology business in June 2019 decreased revenues by $121 million. The increase in revenues at existing businesses was due to higher demand primarily driven by products addressing treatment of COVID-19, with particular strength in sales of products sold through the segment's healthcare market channel business, and to a lesser extent, microbiology and clinical diagnostics products. These increases were offset in part by lower sales in some of the segment’s businesses due to pandemic-related reductions in demand.

Operating income margin was 25.6% in 2020 and 25.0% in 2019. The increase was primarily due to profit on higher sales, offset in part by sales mix and, to a lesser extent, strategic growth investments.

Laboratory Products and Services

(Dollars in millions)	2020	2019	Change
Revenues	$ 12,245	$ 10,599	16 %
Operating Income Margin	10.4 %	12.5 %	-2.1 pt

Sales in the Laboratory Products and Services segment increased $1.65 billion to $12.25 billion in 2020. Sales increased $1.41 billion (13%) due to higher revenues at existing businesses and $184 million due to acquisitions. The favorable effects of currency translation resulted in an increase in revenues of $52 million. The increase in revenues at existing businesses was primarily due to increased demand for products sold through its research and safety market channel business and, to a lesser extent, service offerings of the segment's pharma services business. The increase in demand was driven by pandemic response as well as the segment’s other products and services.

Operating income margin was 10.4% in 2020 and 12.5% in 2019. The decrease was primarily due to sales mix and strategic growth investments, offset in part by profit on higher sales and, to a lesser extent, productivity improvements.

Other Expense, Net

In 2020, the company recorded $81 million of financing costs for a terminated acquisition, primarily for amortization of loan commitment fees and entering into currency hedging contracts. In 2019, the company recorded

$184 million of losses on the early extinguishment of debt, offset in part by $44 million of net gains on investments. The investment gains include a $28 million gain on the sale of a joint venture for net proceeds of $42 million. In the first quarter of 2021, the company recorded approximately $197 million of losses on the early extinguishment of debt (Note 10).

Provision for Income Taxes

The company recorded a provision for income taxes of $850 million in 2020 (effective tax rate of 11.8%). In 2020, the company implemented foreign tax credit planning in Sweden which resulted in $96 million of foreign tax credits, with no related incremental U.S. income tax expense and also recorded a net income tax benefit of $51 million from a domestication

Results of Operations (continued)

transaction involving the transfer of non-U.S. subsidiaries to the U.S.; a $47 million income tax benefit related to a foreign exchange loss for tax purposes on certain intercompany financing arrangements; and a $27 million tax benefit from tax audit settlements.

The company recorded a provision for income taxes of $374 million in 2019 (effective tax rate of 9.2%) including $191 million related to the gain on the sale of the Anatomical Pathology business. In 2019, the company recorded a $62 million income tax benefit related to a foreign exchange loss for tax purposes on certain intercompany financing arrangements; implemented foreign tax credit planning in Sweden which resulted in $75 million of foreign tax credits, with no related incremental U.S. income tax expense; and recorded a $79 million income tax benefit related to the deferred tax implications of intra-entity transactions which included a tax benefit to release a valuation allowance against net operating losses previously determined to be unrealizable.

The effective tax rate in both 2020 and 2019 was also affected by relatively significant earnings in lower tax jurisdictions. Due primarily to the non-deductibility of intangible asset amortization for tax purposes, the company's cash payments for income taxes were higher than its income tax expense for financial reporting purposes and totaled $1.32 billion and $0.90 billion in 2020 and 2019, respectively.

The company expects its effective tax rate in 2021 will be between 11% and 13% based on currently forecasted rates of profitability in the countries in which the company conducts business and expected generation of foreign tax credits. The effective tax rate can vary significantly from period to period as a result of discrete income tax factors and events.

The company has operations and a taxable presence in approximately 50 countries outside the U.S. Some of these countries have lower tax rates than the U.S. The company's ability to obtain a benefit from lower tax rates outside the U.S. is dependent on its relative levels of income in countries outside the U.S. and on the statutory tax rates in those countries. Based on the dispersion of the company's non-U.S. income tax provision among many countries, the company believes that a change in the statutory tax rate in any individual country is not likely to materially affect the company's income tax provision or net income, aside from any resulting one-time adjustment to the company's deferred tax balances to reflect a new rate.

Recent Accounting Pronouncements

A description of recently issued accounting standards is included under the heading "Recent Accounting Pronouncements" in Note 1.

Contingent Liabilities

The company is contingently liable with respect to certain legal proceedings and related matters. An unfavorable outcome that differs materially from current accrual estimates, if any, for one or more of the matters described under the heading "Product Liability, Workers Compensation and Other Personal Injury Matters," in Note 12 could have a material adverse effect on the company's financial position as well as its results of operations and cash flows.

Liquidity and Capital Resources

Consolidated working capital (current assets less current liabilities) was $11.65 billion at December 31, 2020, compared with $5.70 billion at December 31, 2019. Included in working capital were cash and cash equivalents of $10.33 billion at December 31, 2020 and $2.40 billion at December 31, 2019. The increase in cash was primarily due to the issuance of long-term senior notes in March and April 2020 and higher cash flow from operations in 2020.

2020

Cash provided by operating activities was $8.29 billion during 2020. Cash provided by income was offset in part by investments in working capital. Increases in accounts receivable and inventories used cash of $1.30 billion and $508 million, respectively, primarily to support growth in sales. Changes in other assets and liabilities provided cash of $1.45 billion primarily due to the timing of incentive compensation payments and, to a lesser extent, customer

billings. Cash payments for income taxes increased to $1.32 billion during 2020, compared with $0.90 billion in 2019.

During 2020, the company's investing activities used $1.51 billion of cash, principally for the purchase of property, plant and equipment. In January and February 2021, the company completed acquisitions for approximately $950 million in cash plus contingent consideration and entered an agreement to acquire another business for $450 million in cash plus contingent consideration (Note 17).

Liquidity and Capital Resources (continued)

The company's financing activities provided $959 million of cash during 2020. Issuance of senior notes provided cash of $3.46 billion. Repayment of senior notes used cash of $713 million. The company's financing activities also included the repurchase of $1.50 billion of the company's common stock and the payment of $337 million in cash dividends, offset in part by $196 million of net proceeds from employee stock option exercises. On November 8, 2019, the Board of Directors authorized the repurchase of up to $2.50 billion of the company's common stock. On November 5, 2020, the Board of Directors replaced the existing authorization to repurchase the company's common stock, of which $1.00 billion was remaining, with a new authorization to repurchase up to $2.50 billion of the company's common stock. Early in the first quarter of 2021, the company repurchased $1.50 billion of the company's common stock. At February 24, 2021, authorization remained for $1.00 billion of future repurchases of the company's common stock.

As of December 31, 2020, the company's short-term debt totaled $2.63 billion, substantially all of which was redeemed in January 2021. The company has a revolving credit facility with a bank group that provides up to $3.00 billion of unsecured multi-currency revolving credit (Note 10). If the company borrows under this facility, it intends to leave undrawn an amount equivalent to outstanding commercial paper to provide a source of funds in the event that commercial paper markets are not available. As of December 31, 2020, no borrowings were outstanding under the company's revolving credit facility, although available capacity was reduced by approximately $31 million as a result of outstanding letters of credit.

Approximately half of the company's cash balances and cash flows from operations are from outside the U.S. The company uses its non-U.S. cash for needs outside of the U.S. including acquisitions and repayment of acquisition-related intercompany debt to the U.S. In addition, the company also transfers cash to the U.S. using non-taxable returns of capital as well as dividends where the related U.S. dividend received deduction or foreign tax credit equals any tax cost arising from the dividends. As a result of using such means of transferring cash to the U.S., the company does not expect any material adverse liquidity effects from its significant non-U.S. cash balances for the foreseeable future.

The company believes that its existing cash and cash equivalents of $10.33 billion as of December 31, 2020 and its future cash flow from operations together with available borrowing capacity under its revolving credit agreement will be sufficient to meet the cash requirements of its existing businesses for the foreseeable future, including at least the next 24 months.

The company expects that for 2021, expenditures for property, plant and equipment, net of disposals, will be between $2.2 and $2.4 billion.

In addition to the obligations on the balance sheet at December 31, 2020, which include debt (Note 10), unrecognized tax benefits (Note 8), operating leases (Note 11) and pension obligations (Note 7), the company has entered into unconditional purchase obligations, in the ordinary course of business, that include agreements to purchase goods, services or fixed assets and to pay royalties (Note 12).

2019

Cash provided by operating activities was $4.97 billion during 2019. Cash provided by income was offset in part by increased investments in working capital. Increases in accounts receivable and inventories used cash of $225 million and $458 million, respectively, primarily to support growth in sales. Changes in other assets and liabilities used cash of $198 million primarily due to the timing of customer billings and tax refunds, offset in part by advanced payments from customers. Cash payments for income taxes increased to $896 million during 2019, compared with $591 million in 2018.

During 2019, the company's investing activities used $1.49 billion of cash. Acquisitions used cash of $1.84 billion. Proceeds from the sale of the Anatomical Pathology business provided $1.13 billion. The company's investing activities also included the purchase of $926 million of property, plant and equipment.

The company's financing activities used $3.12 billion of cash during 2019. Repayment of senior notes used cash of $6.36 billion. New long-term borrowings provided cash of $5.64 billion. A net decrease in commercial paper obligations used cash of $683 million. The company's financing activities also included the repurchase of $1.50

billion of the company's common stock and the payment of $297 million in cash dividends, offset in part by $153 million of net proceeds from employee stock option exercises.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

The company is exposed to market risk from changes in interest rates and currency exchange rates, which could affect its future results of operations and financial condition. The company manages its exposure to these risks through its regular operating and financing activities. The company has periodically hedged interest rate risks of fixed-rate instruments with offsetting interest rate swaps. Additionally, the company uses short-term forward and option contracts primarily to hedge certain balance sheet and operational exposures resulting from changes in currency exchange rates. Such exposures result from purchases, sales, cash and intercompany loans that are denominated in currencies other than the functional currencies of the respective operations. The currency-exchange contracts principally hedge transactions denominated in Swiss franc, euro, British pounds sterling, Canadian dollars, Hong Kong dollars, Japanese yen and Czech koruna. Income and losses arising from these derivative contracts are recognized as offsets to losses and income resulting from the underlying exposure being hedged. The company does not enter into speculative derivative agreements.

Interest Rates

The company is exposed to changes in interest rates while conducting normal business operations as a result of ongoing investing and financing activities, which affect the company's debt as well as cash and cash equivalents. As of December 31, 2020, the company's debt portfolio was comprised primarily of fixed rate borrowings. The fair market value of the company's fixed interest rate debt is subject to interest rate risk. Generally, the fair market value of fixed interest rate debt will increase as interest rates fall and decrease as interest rates rise. The total estimated fair value of the company's debt at December 31, 2020 was $24.67 billion (Note 14). Fair values were determined from available market prices using current interest rates and terms to maturity. If interest rates were to decrease by 100 basis points, the fair value of the company's debt at December 31, 2020 would increase by approximately $1.52 billion. If interest rates were to increase by 100 basis points, the fair value of the company's debt at December 31, 2020 would decrease by approximately $1.92 billion.

In addition, interest rate changes would result in a change in the company's interest expense due to variable-rate debt instruments including swap arrangements. In 2020, a 100 basis point increase in interest rates on the swap arrangements and variable-rate debt would have increased the company's annual pre-tax interest expense by approximately $14 million.

Currency Exchange Rates

The company views its investment in international subsidiaries with a functional currency other than the U.S. dollar as permanent. The company's investment in international subsidiaries is sensitive to fluctuations in currency exchange rates. The functional currencies of the company's international subsidiaries are principally denominated in euro, British pounds sterling, Swedish kronor, Canadian dollars, Swiss franc, Norwegian kroner and Danish kroner. The effect of a change in the period ending currency exchange rates on the company's net investment in international subsidiaries is reflected in the "accumulated other comprehensive items" component of shareholders' equity. The company also uses foreign currency-denominated debt to partially hedge its net investments in foreign operations against adverse movements in exchange rates. A 10% depreciation in year-end 2020 functional currencies, relative to the U.S. dollar, would result in a reduction of shareholders' equity of approximately $1.22 billion.

The fair value of forward currency-exchange contracts is sensitive to changes in currency exchange rates. The fair value of forward currency-exchange contracts is the estimated amount that the company would pay or receive upon termination of the contract, taking into account the change in currency exchange rates. A 10% depreciation in year-end 2020 non-functional currency exchange rates related to the company's contracts would result in an additional unrealized loss on forward currency-exchange contracts of $410 million. A 10% appreciation in year-end 2020 non-functional currency exchange rates related to the company's contracts would result in an unrealized gain on forward currency-exchange contracts of $348 million. The unrealized gains or losses on forward currency-exchange contracts resulting from changes in currency exchange rates are expected to approximately offset losses or gains on the exposures being hedged.

Certain of the company's cash and cash equivalents are denominated in currencies other than the functional currency of the depositor and are sensitive to changes in currency exchange rates. A 10% depreciation in the related

year-end 2020 non-functional currency exchange rates applied to such cash balances would result in a negative impact of $18 million on the company's net income.

Item 8. Financial Statements and Supplementary Data

This data is submitted as a separate section to this report. See Item 15 "Exhibits and Financial Statement Schedules."

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

Not applicable.

Item 9A. Controls and Procedures

Management's Evaluation of Disclosure Controls and Procedures

The company's management, with the participation of the company's chief executive officer and chief financial officer, has evaluated the effectiveness of the company's disclosure controls and procedures (as such term is defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act) as of the end of the period covered by this report. Based on such evaluation, the company's chief executive officer and chief financial officer concluded that, as of the end of such period, the company's disclosure controls and procedures were effective at the reasonable assurance level.

Changes in Internal Control over Financial Reporting

There have been no changes in the company's internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) during the fiscal quarter ended December 31, 2020, that have materially affected or are reasonably likely to materially affect the company's internal control over financial reporting.

Management's Annual Report on Internal Control Over Financial Reporting

The company's management, including the company's chief executive officer and chief financial officer, is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the company. Internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. The company's management conducted an assessment of the effectiveness of the company's internal control over financial reporting as of December 31, 2020 based on criteria established in "Internal Control - Integrated Framework" (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on this assessment, the company's management concluded that, as of December 31, 2020, the company's internal control over financial reporting was effective.

The company's independent registered public accounting firm, PricewaterhouseCoopers LLP, has audited the effectiveness of the company's internal control over financial reporting as of December 31, 2020, as stated in their report that appears on page F-2 of this Annual Report on Form 10-K.

Item 9B. Other Information

Not applicable.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

The information with respect to directors required by this Item will be contained in our definitive proxy statement to be filed with the SEC not later than 120 days after the close of business of the fiscal year (2021 Definitive Proxy Statement) and is incorporated in this report by reference.

The information with respect to executive officers required by this Item is included in Item 1 of Part I of this report.

The other information required by this Item will be contained in our 2021 Definitive Proxy Statement and is incorporated in this report by reference.

Item 11. Executive Compensation

The information required by this Item will be contained in our 2021 Definitive Proxy Statement and is incorporated in this report by reference.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

The information required by this Item will be contained in our 2021 Definitive Proxy Statement and is incorporated in this report by reference.

Item 13. Certain Relationships and Related Transactions, and Director Independence

The information required by this Item will be contained in our 2021 Definitive Proxy Statement and is incorporated in this report by reference.

Item 14. Principal Accountant Fees and Services

The information required by this Item will be contained in our 2021 Definitive Proxy Statement and is incorporated in this report by reference.

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a) The following documents are filed as part of this report:

(1) Consolidated Financial Statements (see Index on page F-1 of this report)

Report of Independent Registered Public Accounting Firm

Consolidated Balance Sheet

Consolidated Statement of Income

Consolidated Statement of Comprehensive Income

Consolidated Statement of Cash Flows

Consolidated Statement of Shareholders' Equity

Notes to Consolidated Financial Statements

(2) All schedules are omitted because they are not applicable or not required, or because the required information is included either in the consolidated financial statements or in the notes thereto.

(b) Exhibits

See the Exhibit Index on page 37.

Item 16. Form 10-K Summary

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this Report to be signed on its behalf by the undersigned, thereunto duly authorized.

Date: February 24, 2021 THERMO FISHER SCIENTIFIC INC.

By: /s/ Marc N. Casper

Marc N. Casper

Chairman, President and Chief Executive Officer

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the Registrant and in the capacities indicated, as of February 24, 2021.

By: /s/ Marc N. Casper

Marc N. Casper

Chairman, President and Chief Executive Officer

(Principal Executive Officer)

By: /s/ Stephen Williamson

Stephen Williamson

Senior Vice President and Chief Financial Officer

(Principal Financial Officer)

By: /s/ Peter E. Hornstra

Peter E. Hornstra

Vice President and Chief Accounting Officer

(Principal Accounting Officer)

By: /s/ Nelson J. Chai

Nelson J. Chai

Director

By: /s/ C. Martin Harris

C. Martin Harris

Director

By: /s/ Tyler E. Jacks

Tyler E. Jacks

Director

By: /s/ R. Alexandra Keith

R. Alexandra Keith

Director

By: /s/ Judy C. Lewent

Judy C. Lewent

Director

By: /s/ Thomas J. Lynch

Thomas J. Lynch

Lead Director

By: /s/ Jim P. Manzi

Jim P. Manzi

Director

By: /s/ James C. Mullen

James C. Mullen

Director

By: /s/ Lars R. Sørensen

Lars R. Sørensen

Director

By: /s/ Debora L. Spar

Debora L. Spar

Director

By: /s/ Scott M. Sperling

Scott M. Sperling

Director

By: /s/ Dion J. Weisler

Dion J. Weisler

Director

THERMO FISHER SCIENTIFIC INC.

EXHIBIT INDEX

Exhibit Number	Description of Exhibit
3.1	Amended and Restated Certificate of Incorporation of the Registrant (filed as Exhibit 3.1 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2005 [File No. 1-8002] and incorporated in this document by reference).
3.2	Amendment to Thermo Fisher Scientific Inc.'s Third Amended and Restated Certificate of Incorporation (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed November 14, 2006 [File No. 1-8002] and incorporated in this document by reference).
3.3	Certificate of Elimination of the Series B Junior Participating Preferred Stock of the Company, dated November 13, 2015 (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed November 16, 2015 [File No. 1-8002] and incorporated in this document by reference).
3.4	Amended and Restated By-Laws of the Registrant, as amended and effective as of February 23, 2021 (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed February 24, 2021 [File No. 1-8002] and incorporated in this document by reference).
	The Registrant agrees, pursuant to Item 601(b)(4)(iii)(A) of Regulation S-K, to furnish to the Commission, upon request, a copy of each instrument with respect to long-term debt of the Registrant or its consolidated subsidiaries.
4.1	Indenture dated as of November 20, 2009 between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 99.1 to the Registrant's Current Report on Form 8-K filed November 20, 2009 [File No. 1-8002] and incorporated in this document by reference).
4.2	Sixth Supplemental Indenture, dated as of December 11, 2013, between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 99.2 to the Registrant's Current Report on Form 8-K filed December 11, 2013 [File No. 1-8002] and incorporated in this document by reference).
4.3	Eighth Supplemental Indenture, dated as of November 24, 2014, among the Company, The Bank of New York Mellon Trust Company, N.A., as trustee, and The Bank of New York Mellon, London Branch, as paying agent (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed November 24, 2014 [File No. 1-8002] and incorporated in this document by reference).
4.4	Ninth Supplemental Indenture, dated as of July 21, 2015, among the Company, The Bank of New York Mellon Trust Company, N.A., as trustee, and The Bank of New York Mellon, London Branch, as paying agent (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed July 21, 2015 [File No. 1-8002] and incorporated in this document by reference).
4.5	Eleventh Supplemental Indenture, dated as of December 9, 2015, between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed December 9, 2015 [File No. 1-8002] and incorporated in this document by reference).
4.6	Twelfth Supplemental Indenture, dated as of April 13, 2016, between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed April 13, 2016 [File No. 1-8002] and incorporated in this document by reference).
4.7	Thirteenth Supplemental Indenture, dated as of September 12, 2016, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed September 12, 2016 [File No. 1-8002] and incorporated in this document by reference).
4.8	Fourteenth Supplemental Indenture, dated as of September 19, 2016, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed September 19, 2016 [File No. 1-8002] and incorporated in this document by reference).
4.9	Fifteenth Supplemental Indenture, dated as of March 16, 2017, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed March 16, 2017 [File No. 1-8002] and incorporated in this document by reference).
4.10	Sixteenth Supplemental Indenture, dated as of July 24, 2017, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed July 24, 2017 [File No. 1-8002] and incorporated in this document by reference).
4.11	Seventeenth Supplemental Indenture, dated as of August 14, 2017, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed August 14, 2017 [File No. 1-8002] and incorporated in this document by reference).
4.12	Eighteenth Supplemental Indenture, dated as of September 30, 2019, between the Company, as issuer, and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed September 30, 2019 [File No. 1-8002] and incorporated in this document by reference).
4.13	Nineteenth Supplemental Indenture, dated as of October 8, 2019, between the Company, as issuer, and the Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed October 8, 2019 [File No. 1-8002] and incorporated in this document by reference).
4.14	Twentieth Supplemental Indenture, dated as of March 25, 2020 between the Company, as issuer, and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed March 26, 2020 [File No. 1-8002] and incorporated in this document by reference).
4.15	Twenty-First Supplemental Indenture, dated as of April 2, 2020, between the Company, as issuer, and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed April 2, 2020 [File No. 1-8002] and incorporated in this document by reference).

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EXHIBIT INDEX

Exhibit Number	Description of Exhibit
4.16	Description of the Registrant's Securities (filed as Exhibit 4.16 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).
10.1	Thermo Fisher Scientific Inc. Deferred Compensation Plan for Directors of the Registrant, as amended and restated on September 12, 2007 (filed as Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 29, 2007 [File No. 1-8002] and incorporated in this document by reference).*
10.2	Thermo Electron Corporation Deferred Compensation Plan, effective November 1, 2001 (filed as Exhibit 10.13 to the Registrant's Annual Report on Form 10-K for the fiscal year ended December 29, 2001 [File No. 1-8002] and incorporated in this document by reference).*
10.3	Form of Amended and Restated Indemnification Agreement between the Registrant and its directors and officers (filed as Exhibit 10.2 to the Registrant's Registration Statement on Form S-4 [Reg. No. 333-90661] and incorporated in this document by reference).*
10.4	Summary of Thermo Fisher Scientific Inc. Annual Director Compensation (filed as Exhibit 10.4 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.5	Summary of 2019 Annual Cash Incentive Plan Matters (set forth in Item 5.02 to the Registrant's Current Report on Form 8-K filed February 28, 2019 [File No.1-8002] under the heading "Compensatory Arrangements of Certain Officers" and incorporated in this document by reference).*
10.6	Form of Noncompetition Agreement between the Registrant and certain key employees and executive officers (filed as Exhibit 10.25 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.7	Retirement Plan for Non-Employee Directors of Fisher Scientific International Inc. (filed as Exhibit 10.12 to Fisher Scientific International Inc.'s Annual Report on Form 10-K for the year ended December 31, 1992 [File No. 1-10920] and incorporated in this document by reference).*
10.8	First Amendment to the Fisher Scientific International Inc. Retirement Plan for Non-Employee Directors (filed as Exhibit 10.04 to Fisher Scientific International Inc.'s Quarterly Report on Form 10-Q for the quarter ended March 31, 2005 [File No. 1-10920] and incorporated in this document by reference).*
10.9	Amendment to Retirement Plan for Non-Employee Directors of Fisher Scientific International Inc. (filed as Exhibit 10.02 to Fisher Scientific International Inc.'s Current Report on Form 8-K filed March 7, 2006 [File No. 1-10920] and incorporated in this document by reference).*
10.10	Thermo Fisher Scientific Inc. Amended and Restated 2005 Deferred Compensation Plan, effective January 1, 2020 (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 27, 2020 [File No. 1-8002] and incorporated in this document by reference).*
10.11	2009 Restatement of Executive Severance Agreement, between Marc Casper and the Registrant, dated November 21, 2009 (filed as Exhibit 10.5 to the Registrant's Current Report on Form 8-K filed November 25, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.12	Executive Change In Control Retention Agreement, between Marc Casper and the Registrant, dated November 21, 2009 (filed as Exhibit 10.6 to the Registrant's Current Report on Form 8-K filed November 25, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.13	Noncompetition Agreement, between Marc Casper and the Registrant, dated November 21, 2009 (filed as Exhibit 10.7 to the Registrant's Current Report on Form 8-K filed November 25, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.14	Amendment No. 1 to 2009 Restatement of Executive Severance Agreement, dated February 25, 2010, between the Registrant and Marc N. Casper (filed as Exhibit 10.2 to the Registrant's Current Report on Form 8-K filed February 25, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.15	Amendment No. 2 to 2009 Restatement of Executive Severance Agreement, dated November 30, 2010, between the Registrant and Marc N. Casper (filed as Exhibit 10.55 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.16	Amendment No. 1 to Executive Change In Control Retention Agreement, dated November 30, 2010, between Marc N. Casper and the Registrant (filed as Exhibit 10.56 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.17	Amendment No. 2 to Executive Change in Control Retention Agreement, dated March 16, 2018, between Marc N. Casper and the Registrant (filed as Exhibit 10.3 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 31, 2018 [File No. 1-8002] and incorporated in this document by reference).*
10.18	Form of Executive Change in Control Retention Agreement for Officers (other than Marc Casper) (filed as Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 31, 2018 [File No. 1-8002] and incorporated in this document by reference).*
10.19	Form of Thermo Fisher Scientific Inc.'s Restricted Stock Unit Agreement for Directors (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended April 2, 2011 [File No. 1-8002] and incorporated in this document by reference).*

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EXHIBIT INDEX

Exhibit Number	Description of Exhibit
10.20	Form of Thermo Fisher Scientific Inc.'s Performance Restricted Stock Unit Agreement (filed as Exhibit 10.4 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.21	Form of Thermo Fisher Scientific Inc.'s Restricted Stock Unit Agreement (filed as Exhibit 10.2 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.22	Form of Performance Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc Casper (filed as Exhibit 10.3 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.23	Form of Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc Casper (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.24	Form of Stock Option Agreement between Thermo Fisher Scientific Inc. and Marc Casper (filed as Exhibit 10.5 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.25	Thermo Fisher Scientific Inc. 2013 Stock Incentive Plan (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed May 23, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.26	Supplemental Executive Retirement Plan effective as of December 31, 2005, as amended and restated as of August 28, 2006 (filed as Exhibit 10.3 to Applera Corporation's Quarterly Report on Form 10-Q for the quarter ended September 30, 2006 [File No. 1-04389] and incorporated in this document by reference).*
10.27	Amendment to Supplemental Executive Retirement Plan, effective as of January 1, 2010 (filed as Exhibit 10.1 to Life Technologies Corporation's Current Report on Form 8-K filed December 18, 2009 [File No. 000-25317] and incorporated in this document by reference).*
10.28	Noncompetition Agreement between the Registrant and Mark Stevenson, dated September 10, 2015 (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 26, 2015 [File No. 1-8002] and incorporated in this document by reference).*
10.29	Form of Thermo Fisher Scientific Inc.'s Stock Option Agreement for Officers (filed as Exhibit 10.44 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2016 [File No. 1-8002] and incorporated in this document by reference).*
10.30	Patheon N.V. 2016 Omnibus Incentive Plan (filed as Exhibit 10.2 to the Current Report on Form 8-K filed by Patheon N.V. on July 26, 2016 [File No. 001-37837] and incorporated in this document by reference).*
10.31	Amendment to Patheon N.V. 2016 Omnibus Incentive Plan, dated March 7, 2017 (filed as exhibit 4.5 to the Registrant's Registration Statement on Form S-8 filed August 29, 2017 [File No. 1-8002] and incorporated in this document by reference).*
10.32	Amendment to Patheon N.V. 2016 Omnibus Incentive Plan, dated August 23, 2017 (filed as exhibit 4.6 to the Registrant's Registration Statement on Form S-8 filed August 29, 2017 [File No. 1-8002] and incorporated in this document by reference).*
10.33	Credit Agreement, dated December 4, 2020, among Thermo Fisher Scientific Inc., certain Subsidiaries of Thermo Fisher Scientific Inc. from time to time party thereto, Bank of America, N.A., as Administrative Agent and each lender from time to time party thereto (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed December 4, 2020 [File No. 1-8002] and incorporated in this document by reference).
10.34	Form of Performance Restricted Stock Unit Agreement effective February 26, 2019 (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 30, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.35	Form of Performance Restricted Stock Unit Agreement for Marc Casper effective February 26, 2019 (filed as Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 30, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.36	Letter Agreement between the Registrant and Michel Lagarde dated August 28, 2017 (filed as Exhibit 10.39 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.37	Option Agreement Under the Patheon N.V. 2016 Omnibus Incentive Plan between Patheon N.V. and Michel Lagarde dated July 20, 2016 (filed as Exhibit 10.40 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.38	Option Agreement Under the Patheon N.V. 2016 Omnibus Incentive Plan between Patheon N.V. and Michel Lagarde dated March 23, 2017 (filed as Exhibit 10.42 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.39	Thermo Fisher Scientific Inc. Executive Severance Policy (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 29, 2019 [File No. 1-8002] and incorporated in this document by reference).*

THERMO FISHER SCIENTIFIC INC.

EXHIBIT INDEX

Exhibit Number	Description of Exhibit
10.40	Form of Noncompetition Agreement between the Registrant and certain key employees and executive officers (filed as Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 29, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.41	Form of Thermo Fisher Scientific Inc.'s Performance Restricted Stock Unit Agreement (filed as Exhibit 10.45 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.42	Form of Thermo Fisher Scientific Inc.'s Restricted Stock Unit Agreement (filed as Exhibit 10.46 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.43	Form of Thermo Fisher Scientific Inc.'s Stock Option Agreement for Officers (filed as Exhibit 10.47 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.44	Form of Performance Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc Casper (filed as Exhibit 10.48 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.45	Form of Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc Casper (filed as Exhibit 10.49 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.46	Form of Stock Option Agreement between Thermo Fisher Scientific Inc. and Marc Casper (filed as Exhibit 10.50 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.47	Form of Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc Casper*
10.48	Form of Performance Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc Casper*
10.49	Form of Thermo Fisher Scientific Inc.'s Performance Restricted Stock Unit Agreement*
21	Subsidiaries of the Registrant.
23.1	Consent of PricewaterhouseCoopers LLP, an Independent Registered Public Accounting Firm.
31.1	Certification of Chief Executive Officer required by Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification of Chief Financial Officer required by Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1	Certification of Chief Executive Officer required by Exchange Act Rules 13a-14(b) and 15d-14(b), as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.**
32.2	Certification of Chief Financial Officer required by Exchange Act Rules 13a-14(b) and 15d-14(b), as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.**
101.INS	XBRL Instance Document - the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.
101.SCH	XBRL Taxonomy Extension Schema Document.
101.CAL	XBRL Taxonomy Calculation Linkbase Document.
101.DEF	XBRL Taxonomy Definition Linkbase Document.
101.LAB	XBRL Taxonomy Label Linkbase Document.
101.PRE	XBRL Taxonomy Presentation Linkbase Document.
104	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101).

*Indicates management contract or compensatory plan, contract or arrangement.

** Certification is not deemed "filed" for purposes of Section 18 of the Exchange Act or otherwise subject to the liability of that section. Such certification is not deemed to be incorporated by reference into any filing under the Securities Act or the Exchange Act except to the extent that the registrant specifically incorporates it by reference.

THERMO FISHER SCIENTIFIC INC.

INDEX OF CONSOLIDATED FINANCIAL STATEMENTS

The following Consolidated Financial Statements of the Registrant and its subsidiaries are required to be included in Item 15:

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Shareholders of Thermo Fisher Scientific Inc.

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheet of Thermo Fisher Scientific Inc. and its subsidiaries (the "Company") as of December 31, 2020 and 2019, and the related consolidated statements of income, of comprehensive income, of shareholders' equity and of cash flows for each of the three years in the period ended December 31, 2020, including the related notes (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 2020, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2020 and 2019, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2020 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2020, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the COSO.

Change in Accounting Principle

As discussed in Note 1 to the consolidated financial statements, the Company changed the manner in which it accounts for leases in 2019.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in Management's Annual Report on Internal Control Over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of

internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current period audit of the consolidated financial statements that were communicated or required to be communicated to the audit committee and that (i) relate to accounts or disclosures that are material to the consolidated financial statements and (ii) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Goodwill impairment assessment

As described in Note 1 to the consolidated financial statements, the Company's consolidated goodwill balance was $26,041 million as of December 31, 2020. Management assesses goodwill for impairment at the reporting unit level annually and whenever events occur or circumstances change that would more likely than not reduce the fair value of the reporting unit below its carrying amount. Management estimates the fair values of its reporting units by using forecasts of discounted future cash flows and peer market multiples. The Company would record an impairment charge based on the excess of a reporting unit's carrying amount over its fair value (limited to the amount of goodwill). As disclosed by management, estimates of discounted future cash flows require management to make assumptions related to revenue and operating income growth rates, discount rates and other factors. Management also considers peer revenues and earnings trading multiples from companies that have operational and financial characteristics that are similar to the respective reporting units and estimates weighted average costs of capital.

The principal considerations for our determination that performing procedures relating to the goodwill impairment assessment is a critical audit matter are (i) the significant judgment by management when estimating the fair value of the reporting units, (ii) a high degree of auditor judgment and effort in performing procedures to evaluate management's significant assumptions related to discount rates and peer market multiples, and (iii) the audit effort involved the use of professionals with specialized skill and knowledge.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to the goodwill impairment assessment, including controls over the valuation of the Company's reporting units. These procedures also included, among others, testing management's process for developing the fair value estimates; evaluating the appropriateness of the discounted cash flow and market models; testing the completeness, accuracy, and relevance of underlying data used in the models; and evaluating the significant assumptions used by management related to the discount rates, the terminal growth rates and peer market multiples. Evaluating management's assumptions related to the terminal growth rates involved evaluating whether the assumptions used were reasonable considering the consistency with external market data. Evaluating management's assumptions related to the peer market multiples involved evaluating the population of peer companies used in the analyses and testing selected market data used by management to determine the multiples by comparison to publicly available information. Professionals with specialized skill and knowledge were used to assist in the evaluation of the Company's discounted cash flow models and the discount rate assumptions.

Income taxes

As described in Notes 1 and 8 to the consolidated financial statements, the Company's total income tax expense for the period ended December 31, 2020 was $850 million. The Company has deferred income tax liabilities, net, of $1,105 million (including a valuation allowance of $933 million) and unrecognized income tax benefits of $1,091 million as of December 31, 2020. As disclosed by management, the Company operates in numerous countries under many legal forms and, as a result, is subject to the jurisdiction of numerous domestic and non-U.S. tax authorities, as well as to tax agreements and treaties among these governments. Determination of taxable income in any jurisdiction requires management to interpret the related tax laws and regulations and to use estimates and assumptions regarding significant future events, such as the amount, timing and character of deductions, permissible revenue recognition methods under the tax law and the sources and character of income and tax credits. Management assesses income tax positions and records tax benefits for all years subject to examination based upon evaluation of the facts, circumstances and information available at the reporting date. For those tax positions where it is more likely than not that a tax benefit will be sustained, management has recorded the largest amount of tax benefit with a greater than 50 percent likelihood of being realized upon ultimate settlement with a taxing authority that has full knowledge of all relevant information. For those income tax positions where it is not more likely than not that a tax benefit will be sustained, no tax benefit has been recognized in the financial statements. Management estimates the degree to which tax assets will result in a benefit, after consideration of all positive and negative evidence, and provides a valuation allowance for tax assets that it believes will more likely than not go unused. In situations in which management has been able to determine that the Company's deferred tax assets will be realized, that determination generally relies on future reversals of taxable temporary differences and expected future taxable income. If it becomes more likely than not that a tax asset will be used, management reverses the related valuation allowance.

The principal considerations for our determination that performing procedures relating to income taxes is a critical audit matter are (i) the significant judgment by management when determining the provision for income taxes, deferred tax assets and liabilities, and liabilities for unrecognized tax benefits due to numerous and complex tax laws, the frequency of tax filings, as well as judgments regarding the realizability of deferred tax assets, (ii) a high degree of auditor judgment, subjectivity, and effort in performing procedures and evaluating audit evidence related to the provision for income taxes, deferred tax assets and liabilities, and liabilities for unrecognized tax benefits, and (iii) the audit effort involved the use of professionals with specialized skill and knowledge.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to the provision for income

taxes, deferred tax assets and liabilities, and liabilities for unrecognized tax benefits, including controls over the realizability of deferred tax assets. These procedures also included, among others, (i) testing the accuracy of the income tax provision, including the rate reconciliation and permanent and temporary differences, (ii) evaluating whether the data utilized in the calculation of the provision for income taxes was appropriate and consistent with evidence obtained in other areas of the audit, (iii) evaluating management's assessment of the realizability of deferred tax assets on a jurisdictional basis, (iv) evaluating the identification of reserves for unrecognized tax benefits and the reasonableness of the "more likely than not" determination in consideration of jurisdictions, court decisions, legislative actions, statutes of limitations, and developments in tax examinations, (v) testing the calculation of the liability for unrecognized tax benefits by jurisdiction, including estimates of the amount of tax benefit expected to be sustained, and (vi) evaluating the adequacy of the Company's disclosures. Professionals with specialized skill and knowledge were used to assist in evaluating the reasonableness of management's judgments and estimates related to the application of foreign and domestic tax laws and regulations.

/s/ PricewaterhouseCoopers LLP
Boston, Massachusetts
February 24, 2021

We have served as the Company's auditor since 2002.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED BALANCE SHEET

(In millions except share and per share amounts)	December 31, 2020	December 31, 2019
Assets		
Current Assets:		
Cash and cash equivalents	$ 10,325	$ 2,399
Accounts receivable, less allowances of $135 and $102	5,741	4,349
Inventories	4,029	3,370
Contract assets, net	731	603
Other current assets	1,131	1,172
Total current assets	21,957	11,893
Property, Plant and Equipment, Net	5,912	4,749
Acquisition-related Intangible Assets, Net	12,685	14,014
Other Assets	2,457	2,011
Goodwill	26,041	25,714
Total Assets	$ 69,052	$ 58,381
Liabilities and Shareholders' Equity		
Current Liabilities:		
Short-term obligations and current maturities of long-term obligations	$ 2,628	$ 676
Accounts payable	2,175	1,920
Accrued payroll and employee benefits	1,916	1,010
Contract liabilities	1,271	916
Other accrued expenses	2,314	1,675
Total current liabilities	10,304	6,197
Deferred Income Taxes	1,794	2,192
Other Long-term Liabilities	3,340	3,241
Long-term Obligations	19,107	17,076
Commitments and Contingencies (Note 12)		
Shareholders' Equity:		
Preferred stock, $100 par value, 50,000 shares authorized; none issued		
Common stock, $1 par value, 1,200,000,000 shares authorized; 437,088,297 and 434,416,804 shares issued	437	434
Capital in excess of par value	15,579	15,064
Retained earnings	28,116	22,092
Treasury stock at cost, 40,417,789 and 35,676,421 shares	(6,818)	(5,236)
Accumulated other comprehensive items	(2,807)	(2,679)
Total shareholders' equity	34,507	29,675
Total Liabilities and Shareholders' Equity	$ 69,052	$ 58,381

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF INCOME

(In millions except per share amounts)	Year Ended December 31, 2020	December 31, 2019	December 31, 2018
Revenues			
Product revenues	$ 25,306	$ 19,496	$ 18,868
Service revenues	6,912	6,046	5,490
Total revenues	32,218	25,542	24,358
Costs and Operating Expenses:			
Cost of product revenues	11,407	10,037	9,682
Cost of service revenues	4,807	4,177	3,819
Selling, general and administrative expenses	6,930	6,144	6,057
Research and development expenses	1,181	1,003	967
Restructuring and other costs (income), net	99	(413)	50
Total costs and operating expenses	24,424	20,948	20,575
Operating Income	7,794	4,594	3,783
Interest Income	65	224	137
Interest Expense	(553)	(676)	(667)
Other (Expense) Income, Net	(81)	(72)	9
Income Before Income Taxes	7,225	4,070	3,262
Provision for Income Taxes	(850)	(374)	(324)
Net Income	$ 6,375	$ 3,696	$ 2,938
Earnings per Share			
Basic	$ 16.09	$ 9.24	$ 7.31
Diluted	$ 15.96	$ 9.17	$ 7.24
Weighted Average Shares			
Basic	396	400	402
Diluted	399	403	406

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF COMPREHENSIVE INCOME

(In millions)	Year Ended December 31, 2020	December 31, 2019	December 31, 2018
Comprehensive Income			
Net Income	$ 6,375	$ 3,696	$ 2,938
Other Comprehensive Items:			
Currency translation adjustment:			
Currency translation adjustment (net of tax (benefit) provision of $(221), $25 and $84)	(118)	(107)	(434)
Reclassification adjustment for losses included in net income	—	30	—
Unrealized gains and losses on hedging instruments:			
Unrealized losses on hedging instruments (net of tax benefit of $20, $12 and $0)	(65)	(38)	—
Reclassification adjustment for losses included in net income (net of tax benefit of $14, $6 and $3)	45	19	9
Pension and other postretirement benefit liability adjustments:			
Pension and other postretirement benefit liability adjustments arising during the period (net of tax (benefit) provision of $(1), $(31) and $2)	(8)	(93)	3
Amortization of net loss and prior service benefit included in net periodic pension cost (net of tax benefit of $4, $2 and $5)	18	8	15
Total other comprehensive items	(128)	(181)	(407)
Comprehensive Income	$ 6,247	$ 3,515	$ 2,531

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF CASH FLOWS

(In millions)	Year Ended December 31, 2020	December 31, 2019	December 31, 2018
Operating Activities			
Net income	$ 6,375	$ 3,696	$ 2,938
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation of property, plant and equipment	658	564	526
Amortization of acquisition-related intangible assets	1,667	1,713	1,741
Change in deferred income taxes	(552)	(302)	(379)
Gain on sales of businesses	—	(482)	—
Stock-based compensation	196	181	181
Loss on early extinguishment of debt	—	184	3
Other non-cash expenses, net	340	84	103
Changes in assets and liabilities, excluding the effects of acquisitions and disposition:			
Accounts receivable	(1,302)	(225)	(366)
Inventories	(508)	(458)	(324)
Accounts payable	59	266	201
Contributions to retirement plans	(96)	(50)	(93)
Other	1,452	(198)	12
Net cash provided by operating activities	8,289	4,973	4,543
Investing Activities			
Acquisitions, net of cash acquired	(38)	(1,843)	(536)
Proceeds from sale of business, net of cash divested	—	1,128	—
Purchase of property, plant and equipment	(1,474)	(926)	(758)
Proceeds from sale of property, plant and equipment	8	36	50
Other investing activities, net	(6)	118	(9)
Net cash used in investing activities	(1,510)	(1,487)	(1,253)
Financing Activities			
Net proceeds from issuance of debt	3,464	5,638	690
Repayment of debt	(713)	(6,360)	(2,052)
Proceeds from issuance of commercial paper	383	2,781	5,060
Repayments of commercial paper	(387)	(3,464)	(5,254)
Purchases of company common stock	(1,500)	(1,500)	(500)
Dividends paid	(337)	(297)	(266)
Net proceeds from issuance of company common stock under employee stock plans	196	153	136
Other financing activities, net	(147)	(69)	(51)
Net cash provided by (used in) financing activities	959	(3,118)	(2,237)
Exchange Rate Effect on Cash	176	(63)	(297)
Increase in Cash, Cash Equivalents and Restricted Cash	7,914	305	756
Cash, Cash Equivalents and Restricted Cash at Beginning of Year	2,422	2,117	1,361
Cash, Cash Equivalents and Restricted Cash at End of Year	$ 10,336	$ 2,422	$ 2,117

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF SHAREHOLDERS' EQUITY

(In millions)	Common Stock Shares	Common Stock Amount	Capital in Excess of Par Value	Retained Earnings	Treasury Stock Shares	Treasury Stock Amount	Accumulated Other Comprehensive Items	Total Shareholders' Equity
Balance at December 31, 2017	428	$ 428	$ 14,177	$ 15,914	27	$ (3,103)	$ (2,003)	$ 25,413
Cumulative effect of accounting changes	—	—	—	118	—	—	(88)	30
Issuance of shares under employees' and directors' stock plans	4	4	236	—	—	(62)	—	178
Stock-based compensation	—	—	181	—	—	—	—	181
Purchases of company common stock	—	—	—	—	2	(500)	—	(500)
Dividends declared ($0.68 per share)	—	—	—	(274)	—	—	—	(274)
Net income	—	—	—	2,938	—	—	—	2,938
Other comprehensive items	—	—	—	—	—	—	(407)	(407)
Other	—	—	27	—	—	—	—	27
Balance at December 31, 2018	432	432	14,621	18,696	29	(3,665)	(2,498)	27,586
Cumulative effect of accounting changes	—	—	—	4	—	—	—	4
Issuance of shares under employees' and directors' stock plans	2	2	262	—	1	(71)	—	193
Stock-based compensation	—	—	181	—	—	—	—	181
Purchases of company common stock	—	—	—	—	6	(1,500)	—	(1,500)
Dividends declared ($0.76 per share)	—	—	—	(304)	—	—	—	(304)
Net income	—	—	—	3,696	—	—	—	3,696
Other comprehensive items	—	—	—	—	—	—	(181)	(181)
Balance at December 31, 2019	434	434	15,064	22,092	36	(5,236)	(2,679)	29,675
Cumulative effect of accounting change	—	—	—	(1)	—	—	—	(1)
Issuance of shares under employees' and directors' stock plans	3	3	319	—	—	(82)	—	240
Stock-based compensation	—	—	196	—	—	—	—	196
Purchases of company common stock	—	—	—	—	4	(1,500)	—	(1,500)
Dividends declared ($0.88 per share)	—	—	—	(350)	—	—	—	(350)
Net income	—	—	—	6,375	—	—	—	6,375
Other comprehensive items	—	—	—	—	—	—	(128)	(128)
Balance at December 31, 2020	437	$ 437	$ 15,579	$ 28,116	40	$ (6,818)	$ (2,807)	$ 34,507

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Note 1. Nature of Operations and Summary of Significant Accounting Policies

Nature of Operations

Thermo Fisher Scientific Inc. (the company or Thermo Fisher) enables customers to make the world healthier, cleaner and safer by helping them accelerate life sciences research, solve complex analytical challenges, improve patient diagnostics, deliver medicines to market and increase laboratory productivity. Markets served include pharmaceutical and biotech, academic and government, industrial and applied, as well as healthcare and diagnostics.

Principles of Consolidation

The accompanying financial statements include the accounts of the company and its wholly and majority-owned subsidiaries. All material intercompany accounts and transactions have been eliminated. The company accounts for investments in businesses using the equity method when it has the ability to exercise significant influence but not control (generally between 20% and 50% ownership) and is not the primary beneficiary.

Presentation

Certain reclassifications of prior year amounts have been made to conform to the current year presentation.

Revenue Recognition

Consumables revenues consist of single-use products and are recognized at a point in time following the transfer of control of such products to the customer, which generally occurs upon shipment. Instruments revenues typically consist of longer-lived assets that, for the substantial majority of sales, are recognized at a point in time in a manner similar to consumables. Service revenues (clinical trial logistics, pharmaceutical development and manufacturing services, asset management, diagnostic testing, training, service contracts, and field services including related time and materials) are recognized over time as customers receive and consume the benefits of such services. For revenues recognized over time, the company generally uses costs accumulated relative to total estimated costs to measure progress as this method approximates satisfaction of the performance obligation. For contracts that contain multiple performance obligations, the company allocates the consideration to which it expects to be entitled (i.e., the transaction price) to each performance obligation based on relative standalone selling prices and recognizes the related revenues when or as control of each individual performance obligation is transferred to customers. The company exercises judgment in determining the timing of revenue by analyzing the point in time or the period over which the customer has the ability to direct the use of and obtain substantially all of the remaining benefits of the asset. The company immediately expenses contract costs that would otherwise be capitalized and amortized over a period of less than one year.

Payments from customers for most instruments and consumables are typically due in a fixed number of days after shipment or delivery of the product. Service arrangements commonly call for payments in advance of performing the work (e.g. extended service contracts), upon completion of the service (e.g. pharmaceutical development and manufacturing) or a mix of both. Some arrangements include variable amounts of consideration that arise from discounts, rebates, and other programs and practices. In such arrangements, the company estimates the amount by which to reduce the stated contract amount to reflect the transaction price.

Contract-related Balances

Accounts receivable include amounts that have been billed and are currently due from customers. They are recorded at the invoiced amount and do not bear interest. The company maintains allowances for doubtful accounts for estimates of expected losses resulting from the inability of its customers to pay amounts due. The allowance for doubtful accounts is the company’s best estimate of the amount of probable credit losses in existing accounts receivable. The company determines the allowance based on history of similarly aged receivables, the

creditworthiness of the customer, reasons for delinquency, current economic conditions, expectations associated with future events and circumstances where reasonable and supportable forecasts are available and any other information that is relevant to the judgment. Receivables from academic and government customers as well as large, well-capitalized commercial customers have historically experienced less collectability risk. Account balances are charged off against the allowance when the company believes it is probable the receivable will not be recovered. The company does not have any off-balance-sheet credit exposure related to customers.

The changes in the allowance for doubtful accounts are as follows:

	Year Ended December 31,		
(In millions)	2020	2019	2018
Balance at Beginning of Year	$ 102	$ 117	$ 109
Cumulative effect of accounting change	1	—	—
Provision charged to expense	63	20	18
Accounts written off	(34)	(32)	(12)
Acquisitions, currency translation and other	3	(3)	2
Balance at End of Year	$ 135	$ 102	$ 117

Contract assets include revenues recognized in advance of billings and are recorded net of estimated losses resulting from the inability to invoice customers, which is primarily due to risk associated with the company's performance. Contract assets are classified as current or noncurrent based on the amount of time expected to lapse until the company's right to consideration becomes unconditional. Noncurrent contract assets are included within other assets in the accompanying balance sheet.

Contract liabilities include billings in excess of revenues recognized, such as those resulting from customer advances and deposits and unearned revenues on service contracts. Contract liabilities are classified as current or noncurrent based on the periods over which remaining performance obligations are expected to be transferred to customers. Noncurrent contract liabilities are included within other long-term liabilities in the accompanying balance sheet. Contract assets and liabilities are presented on a net basis in the consolidated balance sheet if they arise from different performance obligations in the same contract. Contract asset and liability balances are as follows:

(In millions)	December 31, 2020	December 31, 2019
Current Contract Assets, Net	$ 731	$ 603
Noncurrent Contract Assets, Net	11	17
Current Contract Liabilities	1,271	916
Noncurrent Contract Liabilities	763	594

Substantially all of the current contract liabilities balance at December 31, 2019 and 2018 was recognized in revenues during 2020 and 2019, respectively.

Warranty Obligations

The company provides for the estimated cost of standard product warranties, primarily from historical information, in cost of product revenues at the time product revenues are recognized. While the company engages in extensive product quality programs and processes, including actively monitoring and evaluating the quality of its component supplies, the company's warranty obligation is affected by product failure rates, utilization levels, material usage, service delivery costs incurred in correcting a product failure and supplier warranties on parts delivered to the company. Should actual product failure rates, utilization levels, material usage, service delivery costs or supplier warranties on parts differ from the company's estimates, revisions to the estimated warranty liability would be required. The liability for warranties is included in other accrued expenses in the accompanying balance sheet. Extended warranty agreements are considered service contracts, which are discussed above. Costs of service

contracts are recognized as incurred. The changes in the carrying amount of standard product warranty obligations are as follows:

(In millions)	Year Ended December 31, 2020	Year Ended December 31, 2019
Balance at Beginning of Year	$ 93	$ 92
Provision charged to expense	115	115
Usage	(108)	(112)
Adjustments to previously provided warranties, net	(3)	(2)
Currency translation	3	—
Balance at End of Year	$ 100	$ 93

Leases

Operating leases that have commenced are included in other assets, other accrued expenses and other long-term liabilities in the consolidated balance sheet. Classification of operating lease liabilities as either current or noncurrent is based on the expected timing of payments due under the company's obligations.

Right-of-use (ROU) assets represent the company's right to use an underlying asset for the lease term and lease liabilities represent the company's obligation to make lease payments arising from the lease. Operating lease ROU assets and liabilities are recognized at the lease commencement date based on the present value of lease payments over the lease term. Leases with an initial term of 12 months or less are not recorded on the consolidated balance sheet. The company recognizes lease expense for these leases on a straight-line basis over the lease term.

Because most of the company's leases do not provide an implicit rate, the company estimates incremental borrowing rates based on the information available at the commencement date in determining the present value of lease payments. The company uses the implicit rate when readily determinable. Lease terms include the effect of options to extend or terminate the lease when it is reasonably certain that the company will exercise that option. Operating lease expense is recognized on a straight-line basis over the lease term.

As a lessee, the company accounts for the lease and non-lease components as a single lease component.

Research and Development

The company conducts research and development activities to increase its depth of capabilities in technologies, software and services. Research and development costs include employee compensation and benefits, consultants, facilities related costs, material costs, depreciation and travel. Research and development costs are expensed as incurred.

Restructuring Costs

Accounting for the timing and amount of termination benefits provided by the company to employees is determined based on whether: (a) the company has a substantive plan to provide such benefits, (b) the company has a written employment contract with the affected employees that includes a provision for such benefits, (c) the termination benefits are due to the occurrence of an event specified in an existing plan or agreement, or (d) the termination benefits are a one-time benefit. In certain circumstances, employee termination benefits may meet more than one of the characteristics listed above and therefore, may have individual elements that are subject to different accounting models.

From time to time when executing a restructuring or exit plan, the company also incurs costs other than termination benefits, such as lease termination costs, that are not associated with or will not be incurred to generate

revenues. These include costs that represent amounts under contractual obligations that exist prior to the restructuring plan communication date and will either continue after the restructuring plan is completed with no economic benefit or result in a penalty to cancel a contractual obligation. Such costs are recognized when incurred, which generally occurs at the contract termination or over the period from when a plan to abandon a leased facility is approved through the cease-use date but charges may continue over the remainder of the original contractual period.

Income Taxes

The company recognizes deferred income taxes based on the expected future tax consequences of differences between the financial statement basis and the tax basis of assets and liabilities, calculated using enacted tax rates in effect for the year in which the differences are expected to be reflected in the tax return.

The financial statements reflect expected future tax consequences of uncertain tax positions that the company has taken or expects to take on a tax return presuming the taxing authorities' full knowledge of the positions and all relevant facts, but without discounting for the time value of money.

Earnings per Share

Basic earnings per share has been computed by dividing net income by the weighted average number of shares outstanding during the year. Except where the result would be antidilutive to net income, diluted earnings per share has been computed using the treasury stock method for outstanding stock options and restricted units.

Cash and Cash Equivalents

Cash equivalents consists principally of money market funds, commercial paper and other marketable securities purchased with an original maturity of three months or less. These investments are carried at cost, which approximates market value.

Inventories

Inventories are valued at the lower of cost or net realizable value, cost being determined principally by the first-in, first-out (FIFO) method with certain of the company's businesses utilizing the last-in, first-out (LIFO) method. The company periodically reviews quantities of inventories on hand and compares these amounts to the expected use of each product or product line. In addition, the company has certain inventory that is subject to fluctuating market pricing. The company assesses the carrying value of this inventory based on a lower of cost or net realizable value analysis. The company records a charge to cost of sales for the amount required to reduce the carrying value of inventory to net realizable value. Costs associated with the procurement of inventories, such as inbound freight charges, purchasing and receiving costs, and internal transfer costs, are included in cost of revenues in the accompanying statement of income. The components of inventories are as follows:

(In millions)	December 31, 2020	December 31, 2019
Raw Materials	$ 1,305	$ 971
Work in Process	540	517
Finished Goods	2,184	1,882
Inventories	$ 4,029	$ 3,370

The value of inventories maintained using the LIFO method was $274 million and $268 million at December 31, 2020 and 2019, respectively, which was below estimated replacement cost by $49 million and $39 million, respectively. Reductions to cost of revenues as a result of the liquidation of LIFO inventories were nominal during the three years ended December 31, 2020.

Property, Plant and Equipment

Property, plant and equipment are recorded at cost. The costs of additions and improvements are capitalized, while maintenance and repairs are charged to expense as incurred. The company generally provides for depreciation and amortization using the straight-line method over the estimated useful lives of the property as follows: buildings and improvements, 25 to 40 years; machinery and equipment (including software), 3 to 10 years; and leasehold improvements, the shorter of the term of the lease or the life of the asset. When assets are retired or otherwise disposed of, the assets and related accumulated depreciation are eliminated from the accounts and the resulting gain

or loss is reflected in the accompanying statement of income. Property, plant and equipment consists of the following:

(In millions)	December 31, 2020	December 31, 2019
Land	$ 410	$ 396
Buildings and Improvements	2,192	1,873
Machinery, Equipment and Leasehold Improvements	6,975	5,495
Property, Plant and Equipment, at Cost	9,577	7,764
Less: Accumulated Depreciation and Amortization	3,665	3,015
Property, Plant and Equipment, Net	$ 5,912	$ 4,749

Acquisition-related Intangible Assets

Acquisition-related intangible assets include the costs of acquired customer relationships, product technology, tradenames and other specifically identifiable intangible assets, and are being amortized using the straight-line method over their estimated useful lives, which range from 2 to 20 years. In addition, the company has tradenames and in-process research and development that have indefinite lives and which are not amortized. The company reviews intangible assets for impairment when indication of potential impairment exists, such as a significant reduction in cash flows associated with the assets. Intangible assets with indefinite lives are reviewed for impairment annually or whenever events or changes in circumstances indicate they may be impaired. Acquisition-related intangible assets are as follows:

	Balance at December 31, 2020			Balance at December 31, 2019		
(In millions)	Gross	Accumulated Amortization	Net	Gross	Accumulated Amortization	Net
Definite Lived:						
Customer relationships	$ 16,593	$ (7,450)	$ 9,143	$ 16,906	$ (6,997)	$ 9,909
Product technology	5,523	(3,532)	1,991	5,544	(3,121)	2,423
Tradenames	1,213	(897)	316	1,300	(869)	431
Other	—	—	—	9	(9)	—
	23,329	(11,879)	11,450	23,759	(10,996)	12,763
Indefinite Lived:						
Tradenames	1,235	N/A	1,235	1,235	N/A	1,235
In-process research and development	—	N/A	—	16	N/A	16
	1,235	N/A	1,235	1,251	N/A	1,251
Acquisition-related Intangible Assets	$ 24,564	$ (11,879)	$ 12,685	$ 25,010	$ (10,996)	$ 14,014

The estimated future amortization expense of acquisition-related intangible assets with definite lives is as follows:

(In millions)	
2021	$ 1,591
2022	1,441
2023	1,365
2024	1,201
2025	1,101
2026 and Thereafter	4,751
Estimated Future Amortization Expense of Definite-lived Intangible Assets	$ 11,450

Other Assets

Other assets in the accompanying balance sheet include operating lease right-of-use assets, deferred tax assets, pension assets, cash surrender value of life insurance, insurance recovery receivables related to product liability matters, investments, certain intangible assets and other assets.

At December 31, 2020 and 2019, the company had $43 million and $52 million, respectively, of intangible assets not derived from acquisitions, net of accumulated amortization, which are being amortized using the straight-line method over their estimated useful lives, which range from 2 to 20 years.

Equity investments that do not have readily determinable fair values are measured at cost minus impairment, if any, plus or minus changes resulting from observable price changes in orderly transactions for the identical or similar investments of the same issuer. The company performs qualitative assessments to identify impairments of these investments. At December 31, 2020 and 2019, the company had such investments with carrying amounts of $28 million and $34 million, respectively, which are included in other assets.

Goodwill

The company assesses goodwill for impairment at the reporting unit level annually and whenever events occur or circumstances change that would more likely than not reduce the fair value of a reporting unit below its carrying amount. Such events or circumstances generally include the occurrence of operating losses or a significant decline in earnings associated with one or more of the company's reporting units. The company is permitted to first assess qualitative factors to determine whether the quantitative goodwill impairment test is necessary. If the qualitative assessment results in a determination that the fair value of a reporting unit is more likely than not less than its carrying amount, the company performs a quantitative goodwill impairment test. The company may bypass the qualitative assessment for the reporting unit in any period and proceed directly to the goodwill impairment test. The company estimates the fair value of its reporting units by using forecasts of discounted future cash flows and peer market multiples. The company would record an impairment charge based on the excess of a reporting unit's carrying amount over its fair value (limited to the amount of goodwill). The company determined that no impairments existed in 2020, 2019 or 2018.

The changes in the carrying amount of goodwill by segment are as follows:

(In millions)	Life Sciences Solutions	Analytical Instruments	Specialty Diagnostics	Laboratory Products and Services	Total
Balance at December 31, 2018	$ 8,548	$ 4,950	$ 3,735	$ 8,114	$ 25,347
Acquisitions	—	9	—	938	947
Finalization of purchase price allocations for 2018 acquisitions	(2)	—	—	—	(2)
Sale of a business	—	—	(478)	—	(478)
Currency translation	(3)	(38)	(72)	11	(102)
Other	1	7	(1)	(5)	2
Balance at December 31, 2019	8,544	4,928	3,184	9,058	25,714
Acquisition	35	—	—	—	35
Currency translation	11	151	186	(56)	292
Balance at December 31, 2020	$ 8,590	$ 5,079	$ 3,370	$ 9,002	$ 26,041

Loss Contingencies

Accruals are recorded for various contingencies, including legal proceedings, environmental, workers' compensation, product, general and auto liabilities, self-insurance and other claims that arise in the normal course of business. The accruals are based on management's judgment, historical claims experience, the probability of losses and, where applicable, the consideration of opinions of internal and/or external legal counsel and actuarial estimates. Additionally, the company records receivables from third-party insurers up to the amount of the loss when recovery has been determined to be probable. Liabilities acquired in acquisitions have been recorded at fair value and, as such, were discounted to present value at the dates of acquisition.

Currency Translation

All assets and liabilities of the company's subsidiaries operating in non-U.S. dollar currencies are translated at period-end exchange rates. Resulting translation adjustments are reflected in the "accumulated other comprehensive items" component of shareholders' equity. Revenues and expenses are translated at average exchange rates for the

period. Currency transaction gains are included in the accompanying statement of income and in aggregate were $24 million, $52 million and $19 million in 2020, 2019 and 2018, respectively.

Derivative Contracts

The company is exposed to certain risks relating to its ongoing business operations including changes to interest rates and currency exchange rates. The company uses derivative instruments primarily to manage currency exchange and interest rate risks. The company recognizes derivative instruments as either assets or liabilities and measures those instruments at fair value. If a derivative is a hedge, depending on the nature of the hedge, changes in the fair value of the derivative are either offset against the change in fair value of the hedged item through earnings or recognized in other comprehensive items until the hedged item is recognized in earnings. Derivatives that are not designated as hedges are recorded at fair value through earnings.

The company uses short-term forward and option currency exchange contracts primarily to hedge certain balance sheet and operational exposures resulting from changes in currency exchange rates, predominantly intercompany loans and cash balances that are denominated in currencies other than the functional currencies of the respective operations. The currency-exchange contracts principally hedge transactions denominated in Swiss franc, euro, British pounds sterling, Canadian dollars, Hong Kong dollars, Japanese yen and Czech koruna. The company does not hold or engage in transactions involving derivative instruments for purposes other than risk management.

Cash flow hedges. For derivative instruments that are designated and qualify as a cash flow hedge, the gain or loss on the derivative is reported as a component of other comprehensive items and reclassified into earnings in the same period or periods during which the hedged transaction affects earnings and is presented in the same income statement line item as the earnings effect of the hedged item.

Fair value hedges. For derivative instruments that are designated and qualify as a fair value hedge, the gain or loss on the derivative, as well as the offsetting loss or gain on the hedged item attributable to the hedged risk, are recognized in earnings.

Net investment hedges. The company uses foreign currency-denominated debt and cross-currency interest rate swaps to partially hedge its net investments in foreign operations against adverse movements in exchange rates. The majority of the company's euro-denominated senior notes and certain of its cross-currency interest rate swaps have been designated as, and are effective as, economic hedges of part of the net investment in a foreign operation. Accordingly, foreign currency transaction gains or losses due to spot rate fluctuations on the euro-denominated debt instruments and contract fair value changes on the cross-currency interest rate swaps, excluding interest accruals, are included in currency translation adjustment within other comprehensive items and shareholders' equity.

Use of Estimates

The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period.

The company's estimates include, among others, asset reserve requirements as well as the amounts of future cash flows associated with certain assets and businesses that are used in assessing the risk of impairment. Risks and uncertainties associated with the ongoing COVID-19 global pandemic materially adversely affected certain of the company's businesses in 2020, particularly in the Analytical Instruments segment and, to a lesser extent, some businesses within the other three segments. The extent and duration of negative impacts continuing into 2021 are uncertain and may require changes to estimates. Actual results could differ from those estimates.

Recent Accounting Pronouncements

In January 2020, the FASB issued new guidance to clarify the interaction of the accounting for certain equity securities, equity method investments, and certain forward contracts and purchased options. Among other things, the new guidance clarifies that an entity should consider observable transactions that require it to either apply or discontinue the equity method of accounting for the purposes of applying measurement principles for certain equity securities immediately before applying or discontinuing the equity method. The company adopted this guidance in 2020 using a prospective method. The adoption of this guidance did not have a material impact on the company's consolidated financial statements.

In December 2019, the FASB issued new guidance to simplify the accounting for income taxes. Among other things, the new guidance requires the effects of enacted changes in tax laws or rates to be reflected in the annual effective tax rate computation in the interim period that includes the enactment date. The company expects to adopt this guidance when it is effective in 2021 using a prospective method. The adoption of this guidance is not expected to have a material impact on the company's consolidated financial statements; however, the impact in future periods

will be dependent on the extent of future events or conditions that would be affected such as enacted changes in tax laws or rates.

In August 2018, the FASB issued new guidance to modify the disclosure requirements for employers that sponsor defined benefit pension or other postretirement plans. The company adopted the guidance in 2020 using a retrospective method. The adoption of this guidance did not have a material impact on the company's disclosures.

In August 2018, the FASB issued new guidance to modify the disclosure requirements on fair value measurements. The company adopted the guidance in 2020 with some items requiring a prospective method and others requiring a retrospective method. The adoption of this guidance did not have a material impact on the company's disclosures.

In February 2018, the FASB issued new guidance to allow reclassifications from accumulated other comprehensive items (AOCI) to retained earnings for certain tax effects on items within AOCI resulting from the Tax Cuts and Jobs Act of 2017 (the Tax Act). The company adopted this guidance in January 2018 and recorded the reclassifications in the period of adoption. The adoption of this guidance increased retained earnings and reduced accumulated other comprehensive items by $87 million and $89 million, respectively, on January 1, 2018. This guidance only relates to the effects of the Tax Act. For all other tax law changes that have occurred or may occur in the future, the company reclassifies the tax effects to the consolidated statement of income on an item-by-item basis when the pre-tax item in AOCI is reclassified to income.

In December 2017, the SEC staff issued guidance to address the application of accounting guidance in situations when a registrant does not have the necessary information available, prepared, or analyzed (including computations) in reasonable detail to complete the accounting for certain income tax effects of the Tax Act enacted on December 22, 2017. The company reported provisional amounts in its 2017 financial statements for certain income tax effects of the Tax Act for which a reasonable estimate could be determined. Adjustments to provisional amounts identified during the measurement period, which ended December 22, 2018, are included as adjustments to Provision for Income Taxes in 2018.

In August 2017, the FASB issued new guidance to simplify the application of hedge accounting guidance. Among other things, the new guidance will permit more hedging strategies to qualify for hedge accounting, allow for additional time to perform an initial assessment of a hedge's effectiveness, and permit a qualitative effectiveness test for certain hedges after initial qualification. The company adopted this guidance in January 2018. The adoption of this guidance increased retained earnings by $3 million on January 1, 2018.

In October 2016, the FASB issued new guidance eliminating the deferral of the tax effects of intra-entity asset transfers. The impact of this guidance in future periods will be dependent on the extent of future asset transfers which usually occur in connection with planning around acquisitions and other business structuring activities. The adoption of this guidance reduced retained earnings by $20 million on January 1, 2018.

In June 2016, the FASB issued new guidance to require a financial asset measured at amortized cost basis, such as accounts receivable, to be presented at the net amount expected to be collected based on relevant information about past events, including historical experience, current conditions, and reasonable and supportable forecasts that affect the collectability of the reported amount. During 2018 and 2019, the FASB issued additional guidance and clarification. The company adopted the guidance in 2020 using a modified retrospective method. The adoption of this guidance reduced accounts receivable and retained earnings by $1 million on January 1, 2020.

In February 2016, the FASB issued new guidance which requires lessees to record most leases on their balance sheets as lease liabilities, initially measured at the present value of the future lease payments, with corresponding right-of-use assets. The new guidance also sets forth new disclosure requirements related to leases. During 2017 - 2019, the FASB issued additional guidance and clarification. The company adopted this guidance in January 2019. The company elected to adopt the guidance using a modified retrospective method, by applying the transition approach as of the beginning of the period of adoption. Comparative periods have not been restated. As permitted upon transition, the company did not reassess whether any expired or existing contracts were or contained embedded leases, the lease classification for any expired or existing leases, initial direct costs for any leases, or whether land easements met the definition of a lease if they were not accounted for as leases under the prior guidance. The adoption of this guidance increased retained earnings by $4 million on January 1, 2019.

In January 2016, the FASB issued new guidance which affects the accounting for equity investments, financial liabilities under the fair value option, and the presentation and disclosure requirements for financial instruments. This guidance requires equity investments to be measured at fair value with subsequent changes recognized in net income, except for those accounted for under the equity method or requiring consolidation. The guidance also changes the accounting for investments without a readily determinable fair value and that do not qualify for the practical expedient permitted by the guidance to estimate fair value. The adoption of this guidance reduced retained earnings and increased accumulated other comprehensive items by $1 million on January 1, 2018.

In May 2014, the FASB issued new revenue recognition guidance which provides a single comprehensive model for entities to use in accounting for revenues arising from contracts with customers and supersedes most previous revenue recognition guidance. The new standard also requires significantly expanded disclosures regarding the qualitative and quantitative information of an entity's nature, amount, timing, and uncertainty of revenues and cash flows arising from contracts with customers. During 2016 and 2017, the FASB issued additional guidance and clarification, including the elimination of certain SEC Staff Guidance. The guidance is effective for the company in 2018. The company elected to adopt this guidance through application of the modified retrospective method by applying it to contracts that were not completed as of December 31, 2017 (in addition to new contracts in 2018 and thereafter). The adoption of this guidance increased retained earnings by $49 million on January 1, 2018.

Note 2. Acquisitions and Dispositions

The company's acquisitions have historically been made at prices above the determined fair value of the acquired identifiable net assets, resulting in goodwill, primarily due to expectations of the synergies that will be realized by combining the businesses. These synergies include the elimination of redundant facilities, functions and staffing; use of the company's existing commercial infrastructure to expand sales of the acquired businesses' products; and use of the commercial infrastructure of the acquired businesses to cost-effectively expand sales of company products.

Acquisitions have been accounted for using the acquisition method of accounting, and the acquired companies' results have been included in the accompanying financial statements from their respective dates of acquisition. Acquisition transaction costs are recorded in selling, general and administrative expenses as incurred.

2020

In 2020, the company acquired, within the Life Sciences Solutions segment, a U.S.-based provider of a spectral dye platform for high-resolution biology applications which will extend the company's existing tools for protein and cell analysis applications, for a total purchase price of $63 million including the fair value of contingent consideration.

2019

On April 30, 2019, the company acquired, within the Laboratory Products and Services segment, Brammer Bio for approximately $1.67 billion in cash. Brammer Bio is a leading viral vector contract development and manufacturing organization for gene and cell therapies. The acquisition expanded the segment's contract manufacturing capabilities. The purchase price exceeded the fair value of the identifiable net assets and, accordingly, $938 million was allocated to goodwill, $405 million of which is tax deductible.

In addition, in 2019 the company acquired, within the Analytical Instruments segment, a Slovakia-based provider of mass spectrometry software used for identification of compounds, and, within the Laboratory Products and Services segment, an active pharmaceutical ingredient manufacturing facility in Cork, Ireland, for an aggregate purchase price of $169 million.

The components of the purchase price and net assets acquired for 2019 acquisitions are as follows:

(In millions)	Brammer Bio	Other	Total
Purchase Price			
Cash paid	$ 1,710	$ 169	$ 1,879
Cash acquired	(36)	—	(36)
	$ 1,674	$ 169	$ 1,843
Net Assets Acquired			
Current assets	$ 52	$ 58	$ 110
Property, plant and equipment	147	102	249
Definite-lived intangible assets:			
Customer relationships	744	—	744
Product technology	65	7	72
Tradenames	7	—	7
Goodwill	938	9	947
Other assets	49	—	49
Contract liabilities	(110)	—	(110)
Deferred tax liabilities	(110)	(6)	(116)
Other liabilities assumed	(108)	(1)	(109)
	$ 1,674	$ 169	$ 1,843

The weighted-average amortization periods for definite-lived intangible assets acquired in 2019 are 14 years for customer relationships, 13 years for product technology and 2 years for tradenames. The weighted average amortization period for all definite-lived intangible assets acquired in 2019 is 14 years.

2018

On October 25, 2018, the company acquired, within the Life Sciences Solutions segment, Becton Dickinson and Company's Advanced Bioprocessing business for $477 million in cash. This North America-based business adds complementary cell culture products that expanded the segment's bioproduction offerings to help customers increase yield during production of biologic drugs. The purchase price exceeded the fair value of the identifiable net assets and, accordingly, $146 million was allocated to goodwill, all of which is tax deductible.

In 2018, the company acquired, within the Life Sciences Solutions segment, a North America-based provider of a rapid DNA platform for use in forensics and law enforcement applications, for an aggregate purchase price of $65 million.

The components of the purchase price and net assets acquired for 2018 acquisitions are as follows:

(In millions)	Advanced Bioprocessing business	Other	Total
Purchase Price			
Cash paid	$ 477	$ 55	$ 532
Fair value of contingent consideration	—	11	11
Cash acquired	—	(1)	(1)
	$ 477	$ 65	$ 542
Net Assets Acquired			
Current assets	$ 53	$ 4	$ 57
Property, plant and equipment	42	—	42
Definite-lived intangible assets:			
Customer relationships	108	—	108
Product technology	132	31	163
Tradenames	8	—	8
Indefinite-lived intangible assets:			
In-process research and development	—	10	10
Goodwill	146	15	161
Other assets	—	14	14
Deferred tax liabilities	(7)	—	(7)
Other liabilities assumed	(5)	(9)	(14)
	$ 477	$ 65	$ 542

The weighted-average amortization periods for definite-lived intangible assets acquired in 2018 are 14 years for customer relationships, 13 years for product technology and 6 years for tradenames. The weighted average amortization period for all definite-lived intangible assets acquired in 2018 is 13 years.

Disposition

On June 28, 2019, the company sold its Anatomical Pathology business to PHC Holdings Corporation for $1.13 billion, net of cash divested. The business was part of the Specialty Diagnostics segment. The sale of this

business resulted in a pre-tax gain of approximately $478 million, included in restructuring and other (income) costs, net. Revenues in 2019, through the date of sale, and the full year 2018 of the business sold were approximately $115 million and $238 million, respectively, net of retained sales through the company's healthcare market and research and safety market channel businesses.

Note 3. Revenues

Disaggregated Revenues

Revenues by type are as follows:

(In millions)	2020	2019	2018
Revenues			
Consumables	$ 18,527	$ 13,109	$ 12,576
Instruments	6,779	6,387	6,292
Services	6,912	6,046	5,490
Consolidated revenues	$ 32,218	$ 25,542	$ 24,358

Revenues by geographic region based on customer location are as follows:

(In millions)	2020	2019	2018
Revenues			
North America	$ 17,081	$ 12,896	$ 12,143
Europe	8,284	6,358	6,215
Asia-Pacific	5,822	5,524	5,250
Other regions	1,031	764	750
Consolidated revenues	$ 32,218	$ 25,542	$ 24,358

Each reportable segment earns revenues from consumables, instruments and services in North America, Europe, Asia-Pacific and other regions. See Note 4 for revenues by reportable segment and other geographic data.

Remaining Performance Obligations

The aggregate amount of the transaction price allocated to the remaining performance obligations for all open customer contracts as of December 31, 2020 was $12.81 billion. The company will recognize revenues for these performance obligations as they are satisfied, approximately 74% of which is expected to occur within the next twelve months.

Note 4. Business Segment and Geographical Information

The company's financial performance is reported in four segments. A description of each segment follows.

Life Sciences Solutions: provides an extensive portfolio of reagents, instruments and consumables used in biological and medical research, discovery and production of new drugs and vaccines as well as diagnosis of disease (including COVID-19 through its polymerase chain reaction (PCR) testing and sample preparation capabilities). These products and services are used by customers in pharmaceutical, biotechnology, agricultural, clinical, academic, and government markets.

Analytical Instruments: provides a broad offering of instruments, consumables, software and services that are used for a range of applications in the laboratory, on the production line and in the field. These products and services are used by customers in pharmaceutical, biotechnology, academic, government, environmental and other research and industrial markets, as well as the clinical laboratory.

Specialty Diagnostics: provides a wide range of diagnostic test kits, reagents, culture media, instruments and associated products used to increase the speed and accuracy of diagnoses. These products are used by customers in healthcare, clinical, pharmaceutical, industrial and food safety laboratories.

Laboratory Products and Services: provides virtually everything needed for the laboratory, including a combination of self-manufactured and sourced products for customers in research, academic, government, industrial and healthcare settings. The segment also includes a comprehensive offering of outsourced services used by the pharmaceutical and biotech industries for drug development, clinical trials logistics and commercial drug manufacturing.

The company’s management evaluates segment operating performance based on operating income before certain charges/credits to cost of revenues and selling, general and administrative expenses, principally associated with acquisition accounting; restructuring and other costs/income including costs arising from facility consolidations such as severance and abandoned lease

expense and gains and losses from the sale of real estate and product lines as well as from significant litigation-related matters; and amortization of acquisition-related intangible assets. The company uses this measure because it helps management understand and evaluate the segments' core operating results and facilitates comparison of performance for determining compensation.

Business Segment Information

(In millions)	2020	2019	2018
Revenues			
Life Sciences Solutions	$ 12,168	$ 6,856	$ 6,269
Analytical Instruments	5,124	5,522	5,469
Specialty Diagnostics	5,343	3,718	3,724
Laboratory Products and Services	12,245	10,599	10,035
Eliminations	(2,662)	(1,153)	(1,139)
Consolidated revenues	32,218	25,542	24,358
Segment Income			
Life Sciences Solutions	6,109	2,446	2,158
Analytical Instruments	808	1,273	1,247
Specialty Diagnostics	1,368	930	952
Laboratory Products and Services	1,271	1,324	1,258
Subtotal reportable segments	9,556	5,973	5,615
Cost of revenues charges, net	(6)	(17)	(12)
Selling, general and administrative credits (charges), net	10	(62)	(29)
Restructuring and other (costs) income, net	(99)	413	(50)
Amortization of acquisition-related intangible assets	(1,667)	(1,713)	(1,741)
Consolidated operating income	7,794	4,594	3,783
Interest income	65	224	137
Interest expense	(553)	(676)	(667)
Other (expense) income, net	(81)	(72)	9
Income Before Income Taxes	$ 7,225	$ 4,070	$ 3,262
Depreciation			
Life Sciences Solutions	$ 140	$ 130	$ 119
Analytical Instruments	76	75	73
Specialty Diagnostics	100	67	76
Laboratory Products and Services	342	292	258
Consolidated depreciation	$ 658	$ 564	$ 526

(In millions)	2020	2019	2018
Total Assets			
Life Sciences Solutions	$ 20,209	$ 18,306	$ 18,774
Analytical Instruments	9,773	9,896	9,907
Specialty Diagnostics	6,534	5,867	6,663
Laboratory Products and Services	22,711	21,761	19,051
Corporate/Other (a)	9,825	2,551	1,837
Consolidated total assets	$ 69,052	$ 58,381	$ 56,232
Capital Expenditures			
Life Sciences Solutions	$ 392	$ 151	$ 107
Analytical Instruments	74	64	85
Specialty Diagnostics	175	83	103
Laboratory Products and Services	772	554	374
Corporate/Other	61	74	89
Consolidated capital expenditures	$ 1,474	$ 926	$ 758

(a) Corporate assets consist primarily of cash and cash equivalents and property and equipment at the company's corporate offices.

Geographical Information

(In millions)	2020	2019	2018
Revenues (b)			
United States	$ 16,435	$ 12,366	$ 11,629
China	2,797	2,752	2,504
Other	12,986	10,424	10,225
Consolidated revenues	$ 32,218	$ 25,542	$ 24,358
Long-lived Assets (c)			
United States	$ 3,686	$ 3,099	$ 2,444
Other	3,001	2,349	1,721
Consolidated long-lived assets	$ 6,687	$ 5,448	$ 4,165

(b) Revenues are attributed to countries based on customer location.
(c) Includes property, plant and equipment, net, and beginning in 2019, operating lease ROU assets.

Note 5. Other Expense/Income, Net

In all periods, other expense/income, net includes currency transaction gains and losses on monetary assets and liabilities and net periodic pension benefit cost/income, excluding the service cost component which is included in operating expenses on the accompanying statement of income. In 2020, other expense, net includes $81 million of financing costs for a terminated acquisition, primarily for loan commitment fees and entering into hedging contracts,

offset in part by $10 million of net gains on investments. The company had a cash outlay of $51 million in 2020 associated with obtaining the loan commitments included in other financing activities, net, in the accompanying statement of cash flows.

In 2019, other expense, net includes $184 million of losses on the early extinguishment of debt (Note 10), offset in part by $44 million of net gains on investments. The investment gains include a $28 million gain on the sale of a joint venture for net proceeds of $42 million.

In 2018, other expense, net includes $15 million of net losses on investments.

Note 6. Stock-based Compensation Expense

The company has stock-based compensation plans for its key employees, directors and others. These plans permit the grant of a variety of stock and stock-based awards, including restricted stock units, stock options or performance-based shares, as determined by the compensation committee of the company's Board of Directors or, for certain non-officer grants, by the company's employee equity committee, which consists of its chief executive officer. The company generally issues new shares of its common stock to satisfy option exercises and restricted unit vesting. Grants of stock options and restricted units generally provide that in the event of both a change in control of the company and a qualifying termination of an option or unit holder's employment, all options and service-based restricted unit awards held by the recipient become immediately vested (unless an employment or other agreement with the employee provides for different treatment).

Compensation cost is based on the grant-date fair value and is recognized ratably over the requisite vesting period or to the date based on qualifying retirement eligibility, if earlier, and is primarily included in selling, general and administrative expenses.

Stock Options

The company's practice is to grant stock options at fair market value. Options vest over 3-5 years with terms of 7-10 years, assuming continued employment with certain exceptions. Vesting of the option awards is contingent upon meeting certain service conditions. The fair value of most option grants is estimated using the Black-Scholes option pricing model. For option grants that require the achievement of both service and market conditions, a lattice model is used to estimate fair value. The fair value is then amortized on a straight-line basis over the requisite service periods of the awards, which is generally the vesting period. Use of a valuation model requires management to make certain assumptions with respect to selected model inputs. Expected volatility was calculated based on the historical volatility of the company's stock. Historical data on exercise patterns is the basis for estimating the expected life of an option. The risk-free interest rate is based on U.S. Treasury zero-coupon issues with a remaining term which approximates the expected life assumed at the date of grant. The expected annual dividend rate was calculated by dividing the company's annual dividend, based on the most recent quarterly dividend rate, by the closing stock price on the grant date. The compensation expense recognized for all stock-based awards is net of estimated forfeitures. Forfeitures are estimated based on an analysis of actual option forfeitures.

The weighted average assumptions used in the Black-Scholes option pricing model are as follows:

	2020	2019	2018
Expected Stock Price Volatility	22 %	21 %	20 %
Risk Free Interest Rate	1.1 %	2.4 %	2.6 %
Expected Life of Options (years)	4.3	4.3	4.3
Expected Annual Dividend	0.3 %	0.3 %	0.3 %

The weighted average per share grant-date fair values of options granted during 2020, 2019 and 2018 were $61.19, $53.37 and $43.45, respectively. The total intrinsic value of options exercised during the same periods was $457 million, $320 million and $312 million, respectively. The intrinsic value is the difference between the market value of the shares on the exercise date and the exercise price of the option.

A summary of the company's option activity for the year ended December 31, 2020 is presented below:

	Shares (in millions)	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term (in years)	Aggregate Intrinsic Value (a) (in millions)
Outstanding at December 31, 2019	6.9	$ 176.26		
Granted	1.2	343.18		
Exercised	(2.0)	140.99		
Canceled/Expired	(0.2)	227.67		
Outstanding at December 31, 2020	5.9	$ 221.22	4.3	
Vested and Unvested Expected to Vest at December 31, 2020	5.7	$ 217.96	4.2	$ 1,410
Exercisable at December 31, 2020	2.5	$ 165.71	3.2	$ 741

As of December 31, 2020, there was $107 million of total unrecognized compensation cost related to unvested stock options granted. The cost is expected to be recognized through 2024 with a weighted average amortization period of 2.5 years.

Restricted Share/Unit Awards

Awards of restricted units convert into an equivalent number of shares of common stock. The awards generally vest over 3-4 years, assuming continued employment, with some exceptions. Vesting of the awards is contingent upon meeting certain service conditions and may also be contingent upon meeting certain performance and/or market conditions. The fair market value of the award at the time of the grant is amortized to expense over the requisite service period of the award, which is generally the vesting period. Recipients of restricted units have no voting rights but are entitled to accrue dividend equivalents. The fair value of service- and performance-based restricted unit awards is determined based on the number of units granted and the market value of the company's shares on the grant date. For awards with market-based vesting conditions, the company uses a lattice model to estimate the grant-date fair value of the award.

A summary of the company's restricted unit activity for the year ended December 31, 2020 is presented below:

	Units (in millions)	Weighted Average Grant-Date Fair Value
Unvested at December 31, 2019	1.0	$ 218.34
Granted	0.5	316.10
Vested	(0.6)	215.35
Forfeited	(0.1)	241.26
Unvested at December 31, 2020	0.8	$ 276.74

The total fair value of shares vested during 2020, 2019 and 2018 was $126 million, $118 million and $114 million, respectively.

As of December 31, 2020, there was $151 million of total unrecognized compensation cost related to unvested restricted stock unit awards. The cost is expected to be recognized through 2024 with a weighted average amortization period of 2.0 years.

Employee Stock Purchase Plans

Qualifying employees are eligible to participate in an employee stock purchase plan sponsored by the company. Shares may be purchased under the program at 95% of the fair market value at the end of the purchase period and the shares purchased are not subject to a holding period. Shares are purchased through payroll deductions of up to 10% of each participating employee's qualifying gross wages. The company issued 0.1 million, 0.2 million and 0.1 million shares, respectively, of its common stock in 2020, 2019 and 2018 under the employee stock purchase plan.

Note 7. Pension and Other Postretirement Benefit Plans

401(k) Savings Plan and Other Defined Contribution Plans

The company's 401(k) savings and other defined contribution plans cover the majority of the company's eligible U.S. and certain non-U.S. employees. Contributions to the plans are made by both the employee and the company. Company contributions are based on the level of employee contributions. Company contributions to these plans are based on formulas determined by the company. In 2020, 2019 and 2018, the company charged to expense $254 million, $232 million and $204 million, respectively, related to its defined contribution plans.

Defined Benefit Pension Plans

Employees of a number of the company's non-U.S. and certain U.S. subsidiaries participate in defined benefit pension plans covering substantially all full-time employees at those subsidiaries. Some of the plans are unfunded, as permitted under the plans and applicable laws. The company also maintains postretirement healthcare programs at several acquired businesses where certain employees are eligible to participate. The costs of the postretirement healthcare programs are generally funded on a self-insured and insured-premium basis.

The company recognizes the funded status of defined benefit pension and other postretirement benefit plans as an asset or liability. This amount is defined as the difference between the fair value of plan assets and the benefit obligation. The company is required to recognize as a component of other comprehensive items, net of tax, the actuarial gains/losses and prior service costs/credits that arise but were not previously required to be recognized as components of net periodic benefit cost. Other comprehensive items is adjusted as these amounts are later recognized in income as components of net periodic benefit cost.

When a company with a pension plan is acquired, any excess of projected benefit obligation over the plan assets is recognized as a liability and any excess of plan assets over the projected benefit obligation is recognized as an asset. The recognition of a new liability or a new asset results in the elimination of (a) previously existing unrecognized net gain or loss and (b) unrecognized prior service cost or credits.

The company funds annually, at a minimum, the statutorily required minimum amount as actuarially determined. During 2020, 2019 and 2018, the company made cash contributions of approximately $96 million, $50 million and $93 million, respectively. Contributions to the plans included in the following table are estimated at between $30 and $50 million for 2021.

The following table provides a reconciliation of benefit obligations and plan assets of the company's domestic and non-U.S. pension plans and postretirement benefit plans:

(In millions)	Domestic Pension Benefits 2020	Domestic Pension Benefits 2019	Non-U.S. Pension Benefits 2020	Non-U.S. Pension Benefits 2019	Postretirement Benefits 2020	Postretirement Benefits 2019
Change in Projected Benefit Obligations						
Benefit Obligation at Beginning of Year	$ 1,302	$ 1,179	$ 1,303	$ 1,193	$ 55	$ 50
Divestiture	—	—	—	(23)	—	—
Service costs	—	—	24	23	1	1
Interest costs	35	45	18	24	1	2
Settlements	—	—	(38)	(34)	—	—
Plan participants' contributions	—	—	5	5	—	—
Actuarial (gains) losses	44	156	119	136	(2)	3
Benefits paid	(79)	(78)	(26)	(27)	(2)	(2)
Currency translation and other	—	—	81	6	1	1
Benefit Obligation at End of Year	$ 1,302	$ 1,302	$ 1,486	$ 1,303	$ 54	$ 55
Change in Fair Value of Plan Assets						
Fair Value of Plan Assets at Beginning of Year	$ 1,201	$ 1,091	$ 986	$ 932	$ 10	$ 8
Divestiture	—	—	—	(15)	—	—
Actual return on plan assets	138	183	92	60	2	2
Employer contribution	7	5	87	43	2	2
Settlements	—	—	(38)	(34)	—	—
Plan participants' contributions	—	—	5	5	—	—
Benefits paid	(79)	(78)	(26)	(27)	(2)	(2)
Currency translation and other	—	—	54	22	—	—
Fair Value of Plan Assets at End of Year	$ 1,267	$ 1,201	$ 1,160	$ 986	$ 12	$ 10
Funded Status	$ (35)	$ (101)	$ (326)	$ (317)	$ (42)	$ (45)
Accumulated Benefit Obligation	$ 1,302	$ 1,302	$ 1,417	$ 1,238		
Amounts Recognized in Balance Sheet						
Noncurrent assets	$ 38	$ —	$ 157	$ 97	$ 11	$ 9
Current liability	(8)	(6)	(9)	(8)	(3)	(3)
Noncurrent liabilities	(65)	(95)	(474)	(406)	(50)	(51)
Net amount recognized	$ (35)	$ (101)	$ (326)	$ (317)	$ (42)	$ (45)
Amounts Recognized in Accumulated Other Comprehensive Items						
Net actuarial loss	$ 142	$ 195	$ 242	$ 200	$ 1	$ 5
Prior service credits	—	—	(2)	(3)	(4)	(5)
Net amount recognized	$ 142	$ 195	$ 240	$ 197	$ (3)	$ —

For both domestic and non-U.S. pension plans, actuarial losses experienced in 2020 and 2019 were principally driven by decreases in the weighted average discount rates that were used to determine the projected benefit obligation. For domestic pension plans, the 2020 actuarial losses were partially offset by gains recognized due to the adoption of an updated mortality assumption.

The actuarial assumptions used to compute the funded status for the plans are based upon information available as of December 31, 2020 and 2019 and are as follows:

	Domestic Pension Benefits		Non-U.S. Pension Benefits		Postretirement Benefits	
	2020	2019	2020	2019	2020	2019
Weighted Average Assumptions Used to Determine Projected Benefit Obligations						
Discount rate for determining benefit obligation	2.33 %	3.12 %	0.95 %	1.60 %	2.20 %	2.86 %
Interest crediting rate for cash balance plans	2.16 %	3.02 %	1.25 %	1.00 %	N/A	N/A
Average rate of increase in employee compensation	N/A	N/A	2.30 %	2.27 %	N/A	N/A
Initial healthcare cost trend rate					5.78 %	5.98 %
Ultimate healthcare cost trend rate					4.39 %	4.48 %

The ultimate healthcare cost trend rates for the postretirement benefit plans are expected to be reached between 2021 and 2040.

The actuarial assumptions used to compute the net periodic pension benefit cost (income) are based upon information available as of the beginning of the year, as presented in the following table:

	Domestic Pension Benefits			Non-U.S. Pension Benefits		
	2020	2019	2018	2020	2019	2018
Weighted Average Assumptions Used to Determine Net Benefit Cost (Income)						
Discount rate - service cost	N/A	N/A	N/A	1.21 %	1.97 %	1.63 %
Discount rate - interest cost	3.13 %	4.22 %	3.54 %	1.44 %	2.06 %	1.84 %
Average rate of increase in employee compensation	N/A	N/A	N/A	2.27 %	2.47 %	2.59 %
Expected long-term rate of return on assets	5.00 %	5.76 %	5.75 %	2.33 %	3.25 %	3.31 %

The discount rate reflects the rate the company would have to pay to purchase high-quality investments that would provide cash sufficient to settle its current pension obligations. The discount rate is determined based on a range of factors, including the rates of return on high-quality, fixed-income corporate bonds and the related expected duration of the obligations or, in certain instances, the company has used a hypothetical portfolio of high quality instruments with maturities that mirror the benefit obligation in order to accurately estimate the discount rate relevant to a particular plan.

The company utilizes a full yield curve approach in the estimation of these components by applying the specific spot-rates along the yield curve used in the determination of the benefit obligation to the relevant projected cash flows.

The expected long-term rate of return on plan assets reflects the average rate of earnings expected on the funds invested, or to be invested, to provide for the benefits included in the projected benefit obligations. In determining the expected long-term rate of return on plan assets, the company considers the relative weighting of plan assets, the

historical performance of total plan assets and individual asset classes and economic and other indicators of future performance. In addition, the company may consult with and consider the opinions of financial and other professionals in developing appropriate return benchmarks.

Asset management objectives include maintaining an adequate level of diversification to reduce interest rate and market risk and providing adequate liquidity to meet immediate and future benefit payment requirements.

The expected rate of compensation increase reflects the long-term average rate of salary increases and is based on historic salary increase experience and management’s expectations of future salary increases.

The projected benefit obligation and fair value of plan assets for the company's qualified and non-qualified pension plans with projected benefit obligations in excess of plan assets are as follows:

	Pension Plans	
(In millions)	2020	2019
Pension Plans with Projected Benefit Obligations in Excess of Plan Assets		
Projected benefit obligation	$ 2,047	$ 2,072
Fair value of plan assets	1,529	1,557

The accumulated benefit obligation and fair value of plan assets for the company's qualified and non-qualified pension plans with accumulated benefit obligations in excess of plan assets are as follows:

	Pension Plans	
(In millions)	2020	2019
Pension Plans with Accumulated Benefit Obligations in Excess of Plan Assets		
Accumulated benefit obligation	$ 1,976	$ 1,976
Fair value of plan assets	1,526	1,525

The measurement date used to determine benefit information is December 31 for all plan assets and benefit obligations.

The net periodic pension benefit cost (income) includes the following components:

	Domestic Pension Benefits			Non-U.S. Pension Benefits		
(In millions)	2020	2019	2018	2020	2019	2018
Components of Net Benefit Cost (Income)						
Service cost-benefits earned	$ —	$ —	$ —	$ 24	$ 23	$ 26
Interest cost on benefit obligation	35	45	41	18	24	23
Expected return on plan assets	(47)	(55)	(55)	(19)	(30)	(32)
Amortization of actuarial net loss	6	2	3	10	6	7
Amortization of prior service benefit	—	—	—	(1)	(1)	—
Settlement/curtailment loss	—	—	—	8	4	7
Net periodic benefit cost (income)	$ (6)	$ (8)	$ (11)	$ 40	$ 26	$ 31

The net periodic postretirement benefit cost was not material in 2020, 2019 and 2018.

Expected benefit payments are estimated using the same assumptions used in determining the company's benefit obligation at December 31, 2020. Benefit payments will depend on future employment and compensation levels, average years employed and average life spans, among other factors, and changes in any of these factors could significantly affect these estimated future benefit payments. Estimated future benefit payments during the next five years and in the aggregate for the five fiscal years thereafter, are as follows:

(In millions)	Domestic Pension Benefits	Non-U.S. Pension Benefits	Post-retirement Benefits
Expected Benefit Payments			
2021	$ 93	$ 37	$ 3
2022	88	40	3
2023	86	41	2
2024	85	45	2
2025	83	47	2
2026-2030	373	268	11

Domestic Pension Plan Assets

The company's overall objective is to manage the assets in a liability framework where investments are selected that are expected to have similar changes in fair value as the related liabilities will have upon changes in interest rates. The company invests in a portfolio of both return-seeking and liability-hedging assets, primarily through the use of institutional collective funds, to achieve long-term growth and to insulate the funded position from interest rate volatility. The strategic asset allocation uses a combination of risk controlled and index strategies in fixed income and global equities. The target allocations for the investments are approximately 10% to funds investing in U.S. equities, approximately 10% to funds investing in international equities and approximately 80% to funds investing in fixed income securities. The portfolio maintains enough liquidity at all times to meet the near-term benefit payments.

Non-U.S. Pension Plan Assets

The company maintains specific plan assets for many of the individual pension plans outside the U.S. The investment strategy of each plan has been uniquely established based on the country specific standards and characteristics of the plans. Several of the plans have contracts with insurance companies whereby the market risks of the benefit obligations are borne by the insurance companies. When assets are held directly in investments, generally the objective is to invest in a portfolio of diversified assets with a variety of fund managers. The investments may include equity funds, fixed income funds, hedge funds, multi-asset funds, alternative investments and derivative funds with the target asset allocations ranging from approximately 5% - 25% for equity funds, 40% - 90% for fixed income funds, 0% - 10% for hedge funds, 0% - 5% for multi-asset funds, 0% to 5% for alternative investments and 0% - 20% for funds holding derivatives. The derivatives held by the funds are primarily interest rate swaps intended to match the movements in the plan liabilities as well as equity futures in a synthetic equity fund which provide targeted exposure to equity markets without the fund holding individual equity positions. Each plan maintains enough liquidity at all times to meet the near-term benefit payments.

The fair values of the company's plan assets at December 31, 2020 and 2019, by asset category are as follows:

(In millions)	December 31, 2020	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Not Subject to Leveling (a)
Domestic Pension Plan Assets					
U.S. equity funds	$ 125	$ —	$ —	$ —	$ 125
International equity funds	126	—	—	—	126
Fixed income funds	1,001	—	—	—	1,001
Money market funds	15	—	—	—	15
Total Domestic Pension Plans	$ 1,267	$ —	$ —	$ —	$ 1,267
Non-U.S. Pension Plan Assets					
Equity funds	$ 74	$ —	$ —	$ —	$ 74
Fixed income funds	510	—	—	—	510
Hedge funds	59	—	—	—	59
Multi-asset funds	45	—	—	—	45
Derivative funds	149	—	—	—	149
Alternative investments	6	—	—	—	6
Insurance contracts	262	—	262	—	—
Cash / money market funds	55	7	—	—	48
Total Non-U.S. Pension Plans	$ 1,160	$ 7	$ 262	$ —	$ 891

(a) Investments measured at the net asset value per share (or its equivalent) practical expedient have not been classified in the fair value hierarchy.

(In millions)	December 31, 2019	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Not Subject to Leveling (a)
Domestic Pension Plan Assets					
U.S. equity funds	$ 122	$ —	$ —	$ —	$ 122
International equity funds	116	—	—	—	116
Fixed income funds	951	—	—	—	951
Money market funds	12	—	—	—	12
Total Domestic Pension Plans	$ 1,201	$ —	$ —	$ —	$ 1,201
Non-U.S. Pension Plan Assets					
Equity funds	$ 37	$ —	$ —	$ —	$ 37
Fixed income funds	430	—	—	—	430
Hedge funds	61	—	—	—	61
Multi-asset funds	76	—	—	—	76
Derivative funds	129	—	—	—	129
Alternative investments	4	—	—	—	4
Insurance contracts	237	—	237	—	—
Cash / money market funds	12	9	—	—	3
Total Non-U.S. Pension Plans	$ 986	$ 9	$ 237	$ —	$ 740

(a) Investments measured at the net asset value per share (or its equivalent) practical expedient have not been classified in the fair value hierarchy.

The tables above present the fair value of the company's plan assets in accordance with the fair value hierarchy (Note 14). Certain investments that are measured at fair value using the net asset value per share practical expedient have not been classified in the fair value hierarchy. The fair value amounts of these investments presented in the above tables are intended to permit reconciliation of the fair value hierarchy to the amounts presented for the total pension plan assets. These investments were also redeemable at the balance sheet date or within limited time restrictions.

Note 8. Income Taxes

The components of income before provision for income taxes are as follows:

(In millions)	2020	2019	2018
U.S.	$ 4,757	$ 2,278	$ 1,329
Non-U.S.	2,468	1,792	1,933
Income Before Income Taxes	$ 7,225	$ 4,070	$ 3,262

The components of the provision for income taxes are as follows:

(In millions)	2020	2019	2018
Current Income Tax Provision			
Federal	$ 521	$ 267	$ 165
Non-U.S.	423	544	574
State	175	62	59
	1,119	873	798
Deferred Income Tax Provision (Benefit)			
Federal	$ (237)	$ (222)	$ (258)
Non-U.S.	(18)	(252)	(187)
State	(14)	(25)	(29)
	(269)	(499)	(474)
Provision for Income Taxes	$ 850	$ 374	$ 324

The provision for income taxes in the accompanying statement of income differs from the provision calculated by applying the statutory federal income tax rate to income before income taxes due to the following:

(In millions)	2020	2019	2018
Statutory Federal Income Tax Rate	21 %	21 %	21 %
Provision for Income Taxes at Statutory Rate	$ 1,517	$ 855	$ 685
Increases (Decreases) Resulting From:			
Foreign rate differential	(223)	(204)	(375)
Income tax credits	(335)	(213)	(211)
Global intangible low-taxed income	86	92	29
Foreign-derived intangible income	(156)	(111)	(47)
Excess tax benefits from stock options and restricted stock units	(114)	(80)	(77)
Provision for (reversal of) tax reserves, net	(26)	62	(49)
Intra-entity transfers	—	(79)	—
Foreign exchange loss on inter-company debt refinancing	(47)	(62)	—
Domestication transaction	(263)	—	—
Valuation allowance	379	(4)	260
Transition tax and other impacts of U.S. tax reform	—	8	117
Withholding taxes	115	38	31
Basis difference on disposal of business	—	73	—
Tax return reassessments and settlements	(196)	(6)	(26)
State income taxes, net of federal tax	147	22	21
Other, net	(34)	(17)	(34)
Provision for Income Taxes	$ 850	$ 374	$ 324

The company has operations and a taxable presence in approximately 50 countries outside the U.S. The company's effective income tax rate differs from the U.S. federal statutory rate each year due to certain operations that are subject to tax incentives, state and local taxes, and foreign taxes that are different than the U.S. federal statutory rate.

During 2020, the company settled an IRS audit relating to the 2014, 2015, and 2016 tax years. The company recorded a $25 million net tax benefit primarily from this settlement and related impacts, which resulted in a decrease in the company’s unrecognized tax benefits of $378 million, of which $144 million was reclassified to income taxes payable. The company recorded $53 million of charges for expired tax credits and other related components of the settlement. The company recorded a

charge of $156 million to establish a valuation allowance against certain U.S. foreign tax credits which the company believes will more likely than not expire unutilized.

U.S. Tax Cuts and Jobs Act of 2017

On December 22, 2017, the Tax Cuts and Jobs Act of 2017 was enacted. The Tax Act includes significant changes to existing U.S. tax laws that affect the company, including a reduction of the U.S. corporate income tax rate beginning in 2018 and creation of a territorial tax system with a one-time transition tax on deemed repatriated earnings and profits of foreign subsidiaries (transition tax). The company recognized a net charge for certain aspects of the Tax Act in its 2017 financial statements for which the accounting was provisional, but a reasonable estimate could be determined. During 2018, the company completed its accounting for the income tax effects of the Tax Act and recognized net adjustments (detailed below) to the provisional amounts, totaling a net charge of $68 million, as a component of income tax expense.

The transition tax is based on the company's total post-1986 earnings and profits, the tax on which was previously deferred from U.S. income taxes under U.S. law. The company recorded a provisional amount for the transition tax liability for each of the foreign subsidiaries at December 31, 2017. After further analysis of new U.S. Treasury guidance, available tax accounting methods and elections, legislative updates, regulations, earnings and profits computations and foreign taxes, the company finalized the calculations of the transition tax liability during 2018. The increase in the liability for the transition tax in 2018 consisted of an incremental provision of $117 million offset in part by a $49 million reduction of related unrecognized tax benefits established in 2017.

During 2019, the company recorded a net tax provision of $1 million to adjust the impacts of U.S. tax reform based on final regulations issued by the U.S. Treasury in 2019. The income tax provision consists of an incremental charge of $8 million offset by a $7 million reduction of related unrecognized tax benefits.

The Tax Act included a provision for global intangible low-taxed income. The company has adopted a policy to account for this provision as a period cost.

Other Tax Impacts

In 2020, the company recorded a $263 million income tax benefit related to a domestication transaction involving the transfer of certain non-U.S. subsidiaries to the U.S., including interest expense of those subsidiaries. The company also recorded a valuation allowance of $212 million against the amount of interest expense that the company believes will more likely than not go unused. Also in 2020, the company recorded a $47 million income tax benefit, including both U.S. federal and state taxes, related to a foreign exchange loss for tax purposes on certain intercompany financing arrangements.

In 2019, the company recorded a $62 million income tax benefit, including both U.S. federal and state taxes, related to a foreign exchange loss for tax purposes on certain intercompany financing arrangements as well as a tax provision of $191 million related to the gain on the sale of the Anatomical Pathology business. Also in 2019, the company recorded a $79 million benefit related to the deferred tax implications of intra-entity transactions which included a tax benefit to release a valuation allowance against net operating losses previously determined to be unrealizable.

In 2018, the provision for income taxes also included a $71 million charge to establish a valuation allowance against net operating losses that will not be utilized as a result of the 2019 sale of the Anatomical Pathology business (Note 2).

The foreign tax credits discussed below are the result of foreign earnings and profits remitted or deemed remitted to the U.S. during the reporting year and the U.S. treatment of taxes paid in the foreign jurisdictions in the years those profits were originally earned.

In 2020, the company implemented foreign tax credit planning in Sweden which resulted in $96 million of foreign tax credits, with no related incremental U.S. income tax expense.

In 2019, the company implemented foreign tax credit planning in Sweden which resulted in $75 million of foreign tax credits, with no related incremental U.S. income tax expense.

The company generally receives a tax deduction upon the exercise of non-qualified stock options by employees, or the vesting of restricted stock units held by employees, for the difference between the exercise price and the market price of the underlying common stock on the date of exercise. The company uses the incremental tax benefit approach for utilization of tax attributes. These excess tax benefits reduce the tax provision. In 2020, 2019 and 2018, the company's tax provision was reduced by $114 million, $80 million and $77 million, respectively, of such benefits.

Net deferred tax asset (liability) in the accompanying balance sheet consists of the following:

(In millions)	2020	2019
Deferred Tax Asset (Liability)		
Depreciation and amortization	$ (2,962)	$ (3,084)
Net operating loss and credit carryforwards	1,668	1,231
Reserves and accruals	164	144
Accrued compensation	253	261
Inventory basis difference	112	99
Deferred interest	227	18
Other capitalized costs	44	53
Unrealized losses on hedging instruments	242	10
Other, net	80	57
Deferred tax assets (liabilities), net before valuation allowance	(172)	(1,211)
Less: Valuation allowance	933	408
Deferred tax assets (liabilities), net	$ (1,105)	$ (1,619)

The company estimates the degree to which tax assets and loss and credit carryforwards will result in a benefit based on expected profitability by tax jurisdiction and provides a valuation allowance for tax assets and loss and credit carryforwards that it believes will more likely than not expire unutilized. At December 31, 2020, all of the company's valuation allowance relates to deferred tax assets, primarily net operating losses and disallowed interest expense carryforward, for which any subsequently recognized tax benefits will reduce income tax expense.

The changes in the valuation allowance are as follows:

	Year Ended December 31,		
(In millions)	2020	2019	2018
Balance at Beginning of Year	$ 408	$ 471	$ 256
Additions (reductions) charged to income tax provision, net	514	(27)	223
Additions due to acquisitions	—	—	17
Reduction due to a divestiture	—	(33)	—
Deductions	—	—	(15)
Currency translation and other	11	(3)	(10)
Balance at End of Year	$ 933	$ 408	$ 471

At December 31, 2020, the company had federal, state and non-U.S. net operating loss carryforwards of $383 million, $1.69 billion and $5.75 billion, respectively. Use of the carryforwards is limited based on the future income of certain subsidiaries. The federal and state net operating loss carryforwards expire in the years 2021 through 2040. Of the non-U.S. net operating loss carryforwards, $1.62 billion expire in the years 2025 through 2040, and the remainder do not expire.

At December 31, 2020, the company had foreign tax credit carryforwards of $645 million and deferred interest carryforwards of $915 million. The foreign tax credit carryforwards will expire in the years 2022 through 2030 while deferred interest carryforwards do not expire.

As a result of the Tax Act, U.S. federal taxes have been recorded on $18 billion of undistributed foreign earnings as of December 31, 2020. A provision has not been made for certain U.S. state income taxes or additional non-U.S. taxes that would be due when cash is repatriated to the U.S. as the company's undistributed foreign earnings are intended to be reinvested outside of the U.S. indefinitely. The determination of the amount of the unrecognized deferred tax liability related to the undistributed foreign earnings is not practicable due to the uncertainty in the manner in which these earnings will be distributed. The company's intent is to only make distributions from non-U.S. subsidiaries in the future when they can be made at no net tax cost.

Unrecognized Tax Benefits

As of December 31, 2020, the company had $1.09 billion of unrecognized tax benefits substantially all of which, if recognized, would reduce the effective tax rate.

A reconciliation of the beginning and ending amounts of unrecognized tax benefits is as follows:

(In millions)	2020	2019	2018
Balance at Beginning of Year	$ 1,552	$ 1,442	$ 1,409
Reductions due to acquisitions	—	—	(5)
Additions for tax positions of current year	8	53	48
Additions for tax positions of prior years	—	69	82
Reductions for tax positions of prior years	(296)	(7)	—
Closure of tax years	—	—	(5)
Settlements	(173)	(5)	(87)
Balance at End of Year	$ 1,091	$ 1,552	$ 1,442

Substantially all of the unrecognized tax benefits are classified as long-term liabilities. The company does not expect its unrecognized tax benefits to change significantly over the next twelve months.

During 2020, the company’s unrecognized tax benefits decreased $51 million as a result of uncertain tax positions relating to foreign tax positions and $410 million relating to U.S. federal and state tax positions which included $378 million from the settlement of the IRS audit of the 2014, 2015 and 2016 tax years.

During 2019, the company’s unrecognized tax benefits increased $70 million as a result of uncertain tax positions relating to foreign tax positions and $45 million relating to U.S. federal and state tax positions.

During 2018, the company's unrecognized tax benefits increased $85 million as a result of uncertain tax positions relating to foreign tax positions and $45 million relating to U.S. federal and state tax positions.

The company classified interest and penalties related to unrecognized tax benefits as income tax expense. The total amount of interest and penalties related to uncertain tax positions and recognized in the balance sheet as of December 31, 2020 and 2019 was $78 million and $67 million, respectively.

The company conducts business globally and, as a result, Thermo Fisher or one or more of its subsidiaries files income tax returns in the U.S. federal jurisdiction and various state and foreign jurisdictions. In the normal course of business, the company is subject to examination by taxing authorities throughout the world, including such major jurisdictions as Australia, Canada, China, Denmark, Finland, France, Germany, Japan, Singapore, Sweden, the United Kingdom and the United States. With few exceptions, the company is no longer subject to U.S. state and local or non-U.S. income tax examinations for years before 2012 and no longer subject to U.S. federal income tax examinations for years before 2017.

Note 9. Earnings per Share

(In millions except per share amounts)	2020	2019	2018
Net Income	$ 6,375	$ 3,696	$ 2,938
Basic Weighted Average Shares	396	400	402
Plus Effect of: Stock options and restricted units	3	3	4
Diluted Weighted Average Shares	399	403	406
Basic Earnings per Share	$ 16.09	$ 9.24	$ 7.31
Diluted Earnings per Share	$ 15.96	$ 9.17	$ 7.24
Antidilutive Stock Options Excluded from Diluted Weighted Average Shares	1	1	2

Note 10. Debt and Other Financing Arrangements

(Dollars in millions)	Effective Interest Rate at December 31, 2020	December 31, 2020	December 31, 2019
Floating Rate 2-Year Senior Notes, Due 8/7/2020 (euro-denominated)		$ —	673
2.15% 7-Year Senior Notes, Due 7/21/2022 (euro-denominated)	2.28 %	611	561
3.00% 7-Year Senior Notes, Due 4/15/2023	1.84 %	1,000	1,000
4.15% 10-Year Senior Notes, Due 2/1/2024	4.16 %	1,000	1,000
0.75% 8-Year Senior Notes, Due 9/12/2024 (euro-denominated)	0.95 %	1,222	1,121
0.125% 5.5-Year Senior Notes, Due 3/1/2025 (euro-denominated)	0.42 %	977	897
4.133% 5-Year Senior Notes, Due 3/25/2025	4.32 %	1,100	—
2.00% 10-Year Senior Notes, Due 4/15/2025 (euro-denominated)	2.10 %	782	717
3.65% 10-Year Senior Notes, Due 12/15/2025	3.77 %	350	350
1.40% 8.5-Year Senior Notes, Due 1/23/2026 (euro-denominated)	1.53 %	855	785
2.95% 10-Year Senior Notes, Due 9/19/2026	3.19 %	1,200	1,200
1.45% 10-Year Senior Notes, Due 3/16/2027 (euro-denominated)	1.67 %	611	561
1.75% 7-Year Senior Notes, Due 4/15/2027 (euro-denominated)	1.98 %	733	—
3.20% 10-Year Senior Notes, Due 8/15/2027	3.39 %	750	750
0.50% 8.5-Year Senior Notes, Due 3/1/2028 (euro-denominated)	0.78 %	977	897
1.375% 12-Year Senior Notes, Due 9/12/2028 (euro-denominated)	1.46 %	733	673
1.95% 12-Year Senior Notes, Due 7/24/2029 (euro-denominated)	2.08 %	855	785
2.60% 10-Year Senior Notes, Due 10/1/2029	2.74 %	900	900
4.497% 10-Year Senior Notes, Due 3/25/2030	5.31 %	1,100	—
0.875% 12-Year Senior Notes, Due 10/1/2031 (euro-denominated)	1.14 %	1,099	1,009
2.375% 12-Year Senior Notes, Due 4/15/2032 (euro-denominated)	2.56 %	733	—
2.875% 20-Year Senior Notes, Due 7/24/2037 (euro-denominated)	2.94 %	855	785
1.50% 20-Year Senior Notes, Due 10/1/2039 (euro-denominated)	1.73 %	1,099	1,009
5.30% 30-Year Senior Notes, Due 2/1/2044	5.37 %	400	400
4.10% 30-Year Senior Notes, Due 8/15/2047	4.23 %	750	750
1.875% 30-Year Senior Notes, Due 10/1/2049 (euro-denominated)	1.99 %	1,222	1,121
Other		12	16
Total Borrowings at Par Value		21,926	17,960
Fair Value Hedge Accounting Adjustments		25	(13)
Unamortized Discount		(102)	(94)
Unamortized Debt Issuance Costs		(114)	(101)
Total Borrowings at Carrying Value		21,735	17,752
Less: Short-term Obligations and Current Maturities		2,628	676
Long-term Obligations		$ 19,107	$ 17,076

The effective interest rates for the fixed-rate debt include the stated interest on the notes, the accretion of any discount or amortization of any premium, the amortization of any debt issuance costs and, if applicable, adjustments related to hedging.

See Note 14 for fair value information pertaining to the company’s long-term obligations.

As of December 31, 2020, the annual repayment requirements for debt obligations are as follows:

(In millions)	
2021	$ 2,613
2022	2
2023	2
2024	1,223
2025	3,211
2026 and Thereafter	14,875
	$ 21,926

In addition to available borrowings under the company's revolving credit agreements, discussed below, the company had unused lines of credit of $108 million as of December 31, 2020. These unused lines of credit generally provide for short-term unsecured borrowings at various interest rates.

Credit Facilities

The company has a revolving credit facility (the Facility) with a bank group that provides for up to $3.00 billion of unsecured multi-currency revolving credit. The Facility expires on December 4, 2025. The revolving credit agreement calls for interest at either a LIBOR-based rate (or LIBOR successor rate), a EURIBOR-based rate (for funds drawn in euro) or a rate based on the prime lending rate of the agent bank, at the company's option. The agreement contains affirmative, negative and financial covenants, and events of default customary for facilities of this type. The covenants in the Facility include a Consolidated Net Interest Coverage Ratio (Consolidated EBITDA to Consolidated Net Interest Expense), as such terms are defined in the Facility. Specifically, the company has agreed that, so long as any lender has any commitment under the Facility, any letter of credit is outstanding under the Facility, or any loan or other obligation is outstanding under the Facility, it will maintain a minimum Consolidated Interest Coverage Ratio of 3.5:1.0 as of the last day of any fiscal quarter. As of December 31, 2020, no borrowings were outstanding under the Facility, although available capacity was reduced by approximately $31 million as a result of outstanding letters of credit.

Commercial Paper Programs

The company has commercial paper programs pursuant to which it may issue and sell unsecured, short-term promissory notes (CP Notes). Under the U.S. program, a) maturities may not exceed 397 days from the date of issue and b) the CP Notes are issued on a private placement basis under customary terms in the commercial paper market and are not redeemable prior to maturity nor subject to voluntary prepayment. Under the euro program, maturities may not exceed 183 days and may be denominated in euro, U.S. dollars, Japanese yen, British pounds sterling, Swiss franc, Canadian dollars or other currencies. Under both programs, the CP Notes are issued at a discount from par (or premium to par, in the case of negative interest rates), or, alternatively, are sold at par and bear varying interest rates on a fixed or floating basis. As of December 31, 2020, there were no outstanding borrowings under these programs.

Senior Notes

Interest is payable annually on the euro-denominated senior notes and semi-annually on all other senior notes. Each of the notes may be redeemed at a redemption price of 100% of the principal amount plus a specified make-whole premium and accrued interest. The company is subject to certain affirmative and negative covenants under the indentures governing the senior notes, the most restrictive of which limits the ability of the company to pledge principal properties as security under borrowing arrangements. The company was in compliance with all covenants at December 31, 2020.

In 2019, the company refinanced certain of its debt by issuing new senior notes and using the proceeds to redeem some of its existing senior notes. In connection with these redemptions, the company incurred $184 million of losses on the early extinguishment of debt included in Other Expense, Net on the accompanying statement of income. Upon redemption of the senior notes, the company terminated the related fixed to floating rate interest rate swap arrangements and paid $17 million, included in other financing activities, net, in the accompanying statement of cash flows. The company also terminated related cross-currency interest rate swap arrangements and received $44 million, included in other investing activities, net, in the accompanying statement of cash flows.

Interest Rate Swap Arrangements

The company has entered into LIBOR-based interest rate swap arrangements with various banks. The aggregate amounts of the swaps are equal to the principal amount of the notes and the payment dates of the swaps coincide with the interest payment dates of the note. The swap contracts provide for the company to pay a variable interest rate and receive a fixed rate. The variable interest rates reset monthly. The swaps have been accounted for as fair value hedges of the notes. See Note 14 for additional information on the interest rate swap arrangements and related cross-currency interest rate swap arrangements. The following table summarizes the outstanding interest rate swap arrangements on the company's senior notes at December 31, 2020:

(Dollars in millions)	Aggregate Notional Amount	Pay Rate	Pay Rate as of December 31, 2020	Receive Rate
3.00% Senior Notes due 2023 (a)	$ 1,000	1-month LIBOR + 1.7640%	1.9226 %	3.00 %

(a) The payments on $900 million notional value of these interest rate swaps are offset in part by cross-currency interest rate swaps which effectively reduced the pay rate as of December 31, 2020 from 1.92% to a weighted average of 1.05%.

The company has entered into $900 million notional value of cross-currency interest rate swaps, which effectively convert a portion of the semi-annual payments related to the variable rate, U.S. dollar denominated, LIBOR-based interest rate swaps to payments on variable rate, euro denominated, EURIBOR-based cross-currency interest rate swaps.

Debt Redemptions

In December 2020, the company gave notice of its intention to redeem the following senior notes in January 2021:

(In millions)	Principal Value Redeemed
2.15% 7-Year Senior Notes, Due 7/21/2022 (euro-denominated)	€ 500
3.00% 7-Year Senior Notes, Due 4/15/2023	$ 1,000
4.15% 10-Year Senior Notes, Due 2/1/2024	$ 1,000

The redemptions were completed on January 15, 2021. In connection with the redemptions, the company received $22 million upon the termination of the fixed to floating rate swap arrangements on the redeemed senior notes.

The company incurred approximately $197 million of losses on the early extinguishment of debt in January 2021 due to these redemptions.

Note 11. Leases

As a lessee, the company leases certain logistics, office, and manufacturing facilities, as well as vehicles, copiers, and other equipment. These operating leases generally have remaining lease terms between 1 month and 30 years, and some include options to extend (generally for 1 to 10 years) or have options to terminate the arrangement within 1 year. The company’s finance leases are not material.

The company has guaranteed the residual value of three leased operating facilities with lease terms ending in 2023, 2024 and 2025. The company has agreed with the lessor to comply with certain financial covenants consistent with its other debt arrangements (Note 10). The aggregate maximum guarantee under these three lease arrangements is $147 million. Operating lease ROU assets and lease liabilities for these lease arrangements are recorded on the consolidated balance sheet as of December 31, 2020, but exclude any amounts for residual value guarantees.

As a lessee, the consolidated financial statements include the following:

(In millions)	2020	2019
Balance Sheet		
ROU assets	$ 775	$ 699
Operating lease liabilities - current	184	167
Operating lease liabilities - noncurrent	626	571
Statement of Income		
Operating lease costs	$ 224	$ 208
Variable lease costs	49	41
Statement of Cash Flows		
Cash used in operating activities for payments of amounts included in the measurement of operating lease liabilities	$ 222	$ 208
Operating lease ROU assets obtained in exchange for new operating lease liabilities	202	205
Weighted Average at End of Year		
Remaining operating lease term	6.3 years	6.2 years
Discount rate	3.4 %	4.0 %

ROU assets are classified in other assets in the consolidated balance sheet. Operating lease liabilities are classified in other accrued expenses and other long-term liabilities, respectively, in the consolidated balance sheet.

Lease costs arising from finance leases, short-term leases, and sublease income are not material.

As of December 31, 2020, future payments of operating lease liabilities are as follows:

(In millions)	
2021	$ 210
2022	180
2023	141
2024	96
2025	66
2026 and Thereafter	212
Total Lease Payments	905
Less: Imputed Interest	95
Total Operating Lease Liability	$ 810

As a lessor, operating leases, sales-type leases and direct financing leases are not material.

Under previous lease accounting guidance, net income includes expense from operating leases of $211 million in 2018.

Note 12. Commitments and Contingencies

Purchase Obligations

The company has entered into unconditional purchase obligations, in the ordinary course of business, that include agreements to purchase goods, services or fixed assets and to pay royalties that are enforceable and legally binding and that specify all significant terms including: fixed or minimum quantities to be purchased; fixed, minimum or variable price provisions; and the approximate timing of the transaction. Purchase obligations exclude agreements that are cancelable at any time without penalty. The aggregate amount of the company's unconditional purchase obligations totaled $1.80 billion at December 31, 2020 and the majority of these obligations are expected to be settled during 2021.

The Analytical Instruments segment recorded a charge to cost of product revenues for $108 million in 2020 related to an existing supply contract for components of electron microscopy instruments. The agreement requires the company to make future minimum purchases through 2025. The company has developed and launched an alternative product beginning in 2020 and based on the expected demand for the internally developed product vs. the third-party product, the company does not expect to use all of the product it will be required to buy, resulting in a loss on the purchase commitment.

Letters of Credit, Guarantees and Other Commitments

Outstanding letters of credit and bank guarantees totaled $350 million at December 31, 2020. Substantially all of these letters of credit and guarantees expire before 2026.

Outstanding surety bonds and other guarantees totaled $81 million at December 31, 2020. The expiration of these bonds and guarantees ranges through 2022.

The letters of credit, bank guarantees and surety bonds principally secure performance obligations, and allow the holder to draw funds up to the face amount of the letter of credit, bank guarantee or surety bond if the applicable business unit does not perform as contractually required.

The company is a guarantor of pension plan obligations of a divested business. The purchaser of the divested business has agreed to pay for the pension benefits, however the company was required to guarantee payment of these pension benefits should the purchaser fail to do so. The amount of the guarantee at December 31, 2020 was $42 million.

In connection with the sale of businesses of the company, the buyers have assumed certain contractual obligations of such businesses and have agreed to indemnify the company with respect to those assumed liabilities. In the event a third-party to a transferred contract does not recognize the transfer of obligations or a buyer defaults on its obligations under the transferred contract, the company could be liable to the third-party for such obligations. However, in such event, the company would be entitled to seek indemnification from the buyer.

Indemnifications

In conjunction with certain transactions, primarily divestitures, the company has agreed to indemnify the other parties with respect to certain liabilities related to the businesses that were sold or leased properties that were abandoned (e.g., retention of certain environmental, tax, employee and product liabilities). The scope and duration of such indemnity obligations vary from transaction to transaction. Where probable, an obligation for such indemnifications is recorded as a liability. Generally, a maximum obligation cannot be reasonably estimated. Other than obligations recorded as liabilities at the time of divestiture, historically the company has not made significant payments for these indemnifications.

In connection with the company's efforts to reduce the number of facilities that it occupies, the company has vacated some of its leased facilities or sublet them to third parties. When the company sublets a facility to a third-

party, it remains the primary obligor under the master lease agreement with the owner of the facility. As a result, if a third-party vacates the sublet facility, the company would be obligated to make lease or other payments under the master lease agreement. The company believes that the financial risk of default by sublessors is individually and in the aggregate not material to the company's financial position or results of operations.

In connection with the sale of products in the ordinary course of business, the company often makes representations affirming, among other things, that its products do not infringe on the intellectual property rights of others and agrees to indemnify customers against third-party claims for such infringement. The company has not been required to make material payments under such provisions.

Environmental Matters

The company is currently involved in various stages of investigation and remediation related to environmental matters. The company cannot predict all potential costs related to environmental remediation matters and the possible impact on future

operations given the uncertainties regarding the extent of the required cleanup, the complexity and interpretation of applicable laws and regulations, the varying costs of alternative cleanup methods and the extent of the company's responsibility. Expenses for environmental remediation matters related to the costs of installing, operating and maintaining groundwater-treatment systems and other remedial activities related to historical environmental contamination at the company's domestic and international facilities were not material in any period presented. The company records accruals for environmental remediation liabilities, based on current interpretations of environmental laws and regulations, when it is probable that a liability has been incurred and the amount of such liability can be reasonably estimated. The company calculates estimates based upon several factors, including input from environmental specialists and management's knowledge of and experience with these environmental matters. The company includes in these estimates potential costs for investigation, remediation and operation and maintenance of cleanup sites. At December 31, 2020, the company's total environmental liability was approximately $71 million. While management believes the accruals for environmental remediation are adequate based on current estimates of remediation costs, the company may be subject to additional remedial or compliance costs due to future events such as changes in existing laws and regulations, changes in agency direction or enforcement policies, developments in remediation technologies or changes in the conduct of the company's operations, which could have a material adverse effect on the company's financial position, results of operations or cash flows.

Litigation and Related Contingencies

The company is involved in various disputes, governmental and/or regulatory inspections, inquiries, investigations and proceedings, and litigation matters that arise from time to time in the ordinary course of business. The disputes and litigation matters include product liability, intellectual property, employment and commercial issues. The company determines the probability and range of possible loss based on the current status of each of these matters. A liability is recorded in the financial statements if it is believed to be probable that a loss has been incurred and the amount of the loss can be reasonably estimated. The company establishes a liability that is an estimate of amounts expected to be paid in the future for events that have already occurred. The company accrues the most likely amount or at least the minimum of the range of probable loss when a range of probable loss can be estimated. The accrued liabilities are based on management's judgment as to the probability of losses for asserted and unasserted claims and, where applicable, actuarially determined estimates. Accrual estimates are adjusted as additional information becomes known or payments are made. The amount of ultimate loss may differ from these estimates. Due to the inherent uncertainties associated with pending litigation or claims, the company cannot predict the outcome, nor, with respect to certain pending litigation or claims where no liability has been accrued, make a meaningful estimate of the reasonably possible loss or range of loss that could result from an unfavorable outcome. The company has no material accruals for pending litigation or claims for which accrual amounts are not disclosed below, nor are material losses deemed probable for such matters. It is reasonably possible, however, that an unfavorable outcome that exceeds the company's current accrual estimate, if any, for one or more of the matters described below could have a material adverse effect on the company's results of operations, financial position and cash flows.

Product Liability, Workers Compensation and Other Personal Injury Matters

The range of probable loss for product liability, workers compensation and other personal injury matters of the company's continuing operations at December 31, 2020, was approximately $209 million to $354 million on an undiscounted basis. The portion of these liabilities assumed in the 2006 merger with Fisher was recorded at its fair (present) value at the date of merger. The company's accrual for all such matters in total, including the discounted liabilities, was $202 million at December 31, 2020 (or $214 million undiscounted). The accrual includes estimated defense costs and is gross of estimated amounts due from insurers of $94 million at December 31, 2020 (or $103 million undiscounted) that are included in other assets in the accompanying balance sheet. The portion of these insurance assets assumed in the merger with Fisher was also recorded at its fair value at the date of merger. In addition to the above accrual, as of December 31, 2020, the company had a product liability accrual of $10 million (undiscounted) relating to divested businesses.

Although the company believes that the amounts accrued and estimated recoveries are probable and appropriate based on available information, including actuarial studies of loss estimates, the process of estimating losses and insurance recoveries involves a considerable degree of judgment by management and the ultimate amounts could vary materially. Insurance contracts do not relieve the company of its primary obligation with respect to any losses incurred. The collectability of amounts due from its insurers is subject to the solvency and willingness of the insurer to pay, as well as the legal sufficiency of the insurance claims. Management monitors the payment history as well as the financial condition and ratings of its insurers on an ongoing basis.

Note 13. Comprehensive Income and Shareholder's Equity

Comprehensive Income (Loss)

Comprehensive income combines net income and other comprehensive items. Other comprehensive items represent certain amounts that are reported as components of shareholders' equity in the accompanying balance sheet.

Changes in each component of accumulated other comprehensive items, net of tax are as follows:

(In millions)	Currency Translation Adjustment	Unrealized Losses on Hedging Instruments	Pension and Other Postretirement Benefit Liability Adjustment	Total
Balance at December 31, 2019	$ (2,320)	$ (71)	$ (288)	$ (2,679)
Other comprehensive items before reclassifications	(118)	(65)	(8)	(191)
Amounts reclassified from accumulated other comprehensive items	—	45	18	63
Net other comprehensive items	(118)	(20)	10	(128)
Balance at December 31, 2020	$ (2,438)	$ (91)	$ (278)	$ (2,807)

Shareholders' Equity

At December 31, 2020, the company had reserved 22 million unissued shares of its common stock for possible issuance under stock-based compensation plans.

Note 14. Fair Value Measurements and Fair Value of Financial Instruments

Fair Value Measurements

The company uses the market approach technique to value its financial instruments and there were no changes in valuation techniques during 2020. The company's financial assets and liabilities carried at fair value are primarily comprised of insurance contracts, investments in derivative contracts, mutual funds holding publicly traded securities and other investments in unit trusts held as assets to satisfy outstanding deferred compensation and retirement liabilities; and acquisition-related contingent consideration.

Assets and liabilities carried at fair value are classified and disclosed in one of the following three categories:

Level 1: Quoted market prices in active markets for identical assets or liabilities that the company has the ability to access.

Level 2: Observable market based inputs or unobservable inputs that are corroborated by market data such as quoted prices, interest rates and yield curves.

Level 3: Inputs are unobservable data points that are not corroborated by market data.

The following tables present information about the company's financial assets and liabilities measured at fair value on a recurring basis as of December 31, 2020 and December 31, 2019:

(In millions)	December 31, 2020	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets				
Cash equivalents	$ 8,971	$ 8,971	$ —	$ —
Investments in common stock, mutual funds and other similar instruments	21	21	—	—
Warrants	7	—	7	—
Insurance contracts	157	—	157	—
Derivative contracts	28	—	28	—
Total Assets	$ 9,184	$ 8,992	$ 192	$ —
Liabilities				
Derivative contracts	$ 132	$ —	$ 132	$ —
Contingent consideration	70	—	—	70
Total Liabilities	$ 202	$ —	$ 132	$ 70

(In millions)	December 31, 2019	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets				
Cash equivalents	$ 1,280	$ 1,280	$ —	$ —
Investments in common stock, mutual funds and other similar instruments	19	19	—	—
Warrants	6	—	6	—
Insurance contracts	131	—	131	—
Derivative contracts	37	—	37	—
Total Assets	$ 1,473	$ 1,299	$ 174	$ —
Liabilities				
Derivative contracts	$ 24	$ —	$ 24	$ —
Contingent consideration	55	—	—	55
Total Liabilities	$ 79	$ —	$ 24	$ 55

The company uses the Black-Scholes model to value its warrants. The company determines the fair value of its insurance contracts by obtaining the cash surrender value of the contracts from the issuer. The fair value of derivative

contracts is the estimated amount that the company would receive/pay upon liquidation of the contracts, taking into account the change in interest rates and currency exchange rates. The company determines the fair value of acquisition-related contingent consideration based on the probability-weighted discounted cash flows associated with such future payments. Changes to the fair value of contingent consideration are recorded in selling, general and administrative expense. The following table provides a rollforward of the fair value, as determined by level 3 inputs, of the contingent consideration.

(In millions)	2020	2019
Contingent Consideration		
Balance at Beginning of Year	$ 55	$ 37
Acquisitions (including assumed balances)	28	24
Payments	(4)	(3)
Changes in fair value included in earnings	(9)	(3)
Balance at End of Year	$ 70	$ 55

Derivative Contracts

The following table provides the aggregate notional value of outstanding derivative contracts.

(In millions)	December 31, 2020	December 31, 2019
Notional Amount		
Interest rate swaps - fair value hedges (described in Note 10)	$ 1,000	$ 1,000
Cross-currency interest rate swaps - designated as net investment hedges	900	900
Currency exchange contracts	5,206	2,846

While certain derivatives are subject to netting arrangements with counterparties, the company does not offset derivative assets and liabilities within the consolidated balance sheet. The following tables present the fair value of derivative instruments in the consolidated balance sheet and statement of income.

	Fair Value – Assets		Fair Value – Liabilities	
(In millions)	December 31, 2020	December 31, 2019	December 31, 2020	December 31, 2019
Derivatives Designated as Hedging Instruments				
Interest rate swaps (a)	$ 25	$ —	$ —	$ 13
Cross-currency interest rate swaps (a)	—	33	46	—
Derivatives Not Designated as Hedging Instruments				
Currency exchange contracts (b)	3	4	86	11
Total Derivatives	$ 28	$ 37	$ 132	$ 24

(a) The fair values of the interest rate swaps and cross-currency interest rate swaps are included in the consolidated balance sheet under the caption other assets or other long-term liabilities.

(b) The fair value of the currency exchange contracts is included in the consolidated balance sheet under the captions other current assets or other accrued expenses.

The following amounts related to cumulative basis adjustments for fair value hedges were included in the consolidated balance sheet under the caption long-term obligations:

(In millions)	Carrying Amount of the Hedged Liability		Cumulative Amount of Fair Value Hedging Adjustment - Increase (Decrease) Included in Carrying Amount of Liability	
	December 31, 2020	December 31, 2019	December 31, 2020	December 31, 2019
Long-term Obligations	$ 1,020	$ 980	$ 25	$ (13)

(In millions)	Gain (Loss) Recognized 2020	2019
Fair Value Hedging Relationships		
Interest rate swaps		
Hedged long-term obligations - included in other expense, net	$ (38)	$ (93)
Derivatives designated as hedging instruments - included in other expense, net	38	97
Derivatives Designated as Cash Flow Hedges		
Interest rate swaps		
Included in unrealized losses on hedging instruments within other comprehensive items	(85)	(50)
Amount reclassified from accumulated other comprehensive items to other expense, net	(59)	(25)
Financial Instruments Designated as Net Investment Hedges		
Foreign currency-denominated debt		
Included in currency translation adjustment within other comprehensive items	(873)	60
Cross-currency interest rate swaps		
Included in currency translation adjustment within other comprehensive items	(79)	49
Included in other expense, net	11	48
Derivatives Not Designated as Hedging Instruments		
Currency exchange contracts		
Included in cost of product revenues	(17)	1
Included in other expense, net	(81)	52
Cross-currency interest rate swaps		
Included in other expense, net	(9)	—

Gains and losses recognized on currency exchange contracts and the interest rate swaps designated as fair value hedges are included in the consolidated statement of income together with the corresponding, offsetting losses and gains on the underlying hedged transactions.

The company uses foreign currency-denominated debt and cross-currency interest rate swaps to partially hedge its net investments in foreign operations against adverse movements in exchange rates. The majority of the company’s euro-denominated senior notes and certain of its cross-currency interest rate swaps have been designated as, and are effective as, economic hedges of part of the net investment in a foreign operation. Accordingly, foreign currency transaction gains or losses due to spot rate fluctuations on the euro-denominated debt instruments and contract fair value changes on the cross-currency interest rate swaps, excluding interest accruals, are included in currency translation adjustment within other comprehensive items and shareholders’ equity.

In early 2020, the company entered into cross currency swaps in anticipation of using U.S. dollars to partially finance the euro purchase price of a then pending acquisition. The swaps were terminated later in the year in connection with the termination of the acquisition agreement. Gains and losses associated with these swaps were recorded in other expense, net. The company had a cash outflow of $9 million associated with the termination of the swaps, included in other investing activities, net, in the accompany statement of cash flows.

See Note 1 and Note 10 for additional information on the company's risk management objectives and strategies.

Cash Flow Hedge Arrangements

In 2020 and 2019, the company entered into interest rate swap arrangements to mitigate the risk of interest rates rising prior to completion of debt offerings. Based on the company's conclusion that the debt offerings were probable, the swaps hedged the cash flow risk for each of the interest payments on the planned fixed-rate debt issues. The aggregate fair value of the terminated hedges, net of tax, has been classified as a reduction to accumulated other comprehensive items and will be amortized to interest expense over the term of the related debt issuances. The company had cash outlays aggregating $85 million and $50 million in 2020 and 2019, respectively, associated with termination of the arrangements, included in other financing activities, net, in the accompanying statement of cash flows.

In late 2020, the company determined that the previously anticipated debt offerings were probable of not occurring and reclassified $42 million from accumulated other comprehensive items to other expense, net.

Fair Value of Other Financial Instruments

The carrying value and fair value of the company's debt obligations are as follows:

	December 31, 2020		December 31, 2019	
(In millions)	Carrying Value	Fair Value	Carrying Value	Fair Value
Debt Obligations:				
Senior notes	$ 21,723	$ 24,653	$ 17,736	$ 18,650
Other	12	12	16	16
	$ 21,735	$ 24,665	$ 17,752	$ 18,666

The fair value of debt obligations was determined based on quoted market prices and on borrowing rates available to the company at the respective period ends which represent level 2 measurements.

Note 15. Supplemental Cash Flow Information

(In millions)	2020	2019	2018
Cash Paid For:			
Interest	$ 471	$ 790	$ 687
Income Taxes	1,324	896	591
Non-cash Investing and Financing Activities			
Acquired but unpaid property, plant and equipment	347	150	95
Declared but unpaid dividends	89	77	69
Issuance of stock upon vesting of restricted stock units	217	182	170

Cash, cash equivalents and restricted cash is included in the consolidated balance sheet as follows:

(In millions)	December 31, 2020	December 31, 2019
Cash and Cash Equivalents	$ 10,325	$ 2,399
Restricted Cash Included in Other Current Assets	10	21
Restricted Cash Included in Other Assets	1	2
Cash, Cash Equivalents and Restricted Cash	$ 10,336	$ 2,422

Amounts included in restricted cash represent funds held as collateral for bank guarantees and incoming cash in China awaiting government administrative clearance.

Note 16. Restructuring and Other Costs (Income), Net

Restructuring and other costs in 2020 primarily included continuing charges for headcount reductions and facility consolidations in an effort to streamline operations, including the closure and consolidation of operations within several facilities in the U.S. and Europe, and charges for the write-off of acquired technology. Restructuring and other costs in 2020 also included transaction/integration costs (including reimbursement thereof) related to recent/terminated acquisitions. In 2020, severance actions associated with facility consolidations and cost reduction measures affected approximately 1% of the company's workforce.

Restructuring and other costs (income), net, in 2019 primarily included the gain on the sale of the company's Anatomical Pathology business, and, to a lesser extent, transaction/integration costs related to acquisitions and a divestiture; sales of inventory revalued at the date of acquisition; and continuing charges for headcount reductions and facility consolidations in an effort to streamline operations, including the closure and consolidation of operations within several facilities in the U.S. and Europe. In 2019, severance actions associated with facility consolidations and cost reduction measures affected approximately 1% of the company's workforce.

Restructuring and other costs in 2018 included continuing charges for headcount reductions and facility consolidations in an effort to streamline operations, including the closure and consolidation of operations within several facilities in the U.S. and Europe; third-party transaction/integration costs primarily related to recent acquisitions; sales of inventories revalued at the date of acquisition; and environmental remediation charges. These charges were partially offset by gains on sales of real estate and favorable results of litigation. In 2018, severance actions associated with facility consolidations and cost reduction measures affected approximately 1% of the company's workforce.

As of February 24, 2021, the company has identified restructuring actions that will result in additional charges of approximately $50 million, primarily in 2021, and expects to identify additional actions during 2021 which will be recorded when specified criteria are met, such as communication of benefit arrangements or when the costs have been incurred.

2020

During 2020, the company recorded net restructuring and other costs (income) by segment as follows:

(In millions)	Cost of Revenues	Selling, General and Administrative Expenses	Restructuring and Other Costs, Net	Total
Life Sciences Solutions	$ —	$ (8)	$ 34	$ 26
Analytical Instruments	—	—	26	26
Specialty Diagnostics	—	(12)	9	(3)
Laboratory Products and Services	6	5	23	34
Corporate	—	5	7	12
	$ 6	$ (10)	$ 99	$ 95

The principal components of net restructuring and other costs (income) by segment are as follows:

Life Sciences Solutions

In 2020, the Life Sciences Solutions segment recorded $26 million of net restructuring and other charges. The segment recorded $34 million of restructuring and other costs, net, primarily charges for the write-off of acquired

technology. The segment also recorded $8 million of credits to selling, general, and administrative expense for changes in estimates of contingent acquisition consideration.

Analytical Instruments

In 2020, the Analytical Instruments segment recorded $26 million of net restructuring and other charges, primarily for employee severance associated with headcount reductions in Europe, China, and the U.S., and, to a lesser extent, abandoned facility costs.

Specialty Diagnostics

In 2020, the Specialty Diagnostics segment recorded $3 million of net restructuring and other income, principally for third-party transaction costs (including reimbursement thereof) for a terminated acquisition, partially offset by charges for employee severance and environmental remediation at previously owned facilities.

Laboratory Products and Services

In 2020, the Laboratory Products and Services segment recorded $34 million of net restructuring and other charges, primarily for employee severance at businesses streamlining operations, write-downs of fixed assets to estimated disposal value in connection with the consolidation of commercial production operations in the U.S, and, to a lesser extent, transaction/acquisition related costs for a pending acquisition.

Corporate

In 2020, the company recorded $12 million of net restructuring and other costs primarily for severance at its corporate operations, and charges to selling, general, and administrative expense for product liability litigation.

2019

During 2019, the company recorded net restructuring and other costs by segment as follows:

(In millions)	Cost of Revenues	Selling, General and Administrative Expenses	Restructuring and Other Costs (Income), Net	Total
Life Sciences Solutions	$ 16	$ —	$ 24	$ 40
Analytical Instruments	—	24	14	38
Specialty Diagnostics	—	4	(471)	(467)
Laboratory Products and Services	1	35	17	53
Corporate	—	(1)	3	2
	$ 17	$ 62	$ (413)	$ (334)

The principal components of net restructuring and other costs by segment are as follows:

Life Sciences Solutions

In 2019, the Life Sciences Solutions segment recorded $40 million of net restructuring and other charges, including $16 million of charges to cost of revenues for the sales of inventory revalued at the date of acquisition. The segment also recorded $24 million of net restructuring and other charges for severance and other costs associated with facility consolidations in the U.S and Europe, the impairment of acquired technology in development, and pre-acquisition litigation-related matters.

Analytical Instruments

In 2019, the Analytical Instruments segment recorded $38 million of net restructuring and other charges, including $24 million of charges to selling, general, and administrative expense, principally third-party transaction costs for a terminated acquisition. The segment also recorded $14 million of restructuring and other costs, primarily for employee severance and other costs associated with facility consolidations in the U.S. and Europe.

Specialty Diagnostics

In 2019, the Specialty Diagnostics segment recorded $467 million of net restructuring and other income, primarily a gain on the divestiture of its Anatomical Pathology business (Note 2). The segment also recorded $4 million of charges to selling, general, and administrative expense, principally third-party transaction costs in connection with the sale of the Anatomical Pathology business.

Laboratory Products and Services

In 2019, the Laboratory Products and Services segment recorded $53 million of net restructuring and other charges. The segment recorded $35 million of charges to selling, general, and administrative expenses, principally third-party transaction/integration costs for recently completed acquisitions. The segment also recorded $17 million of restructuring and other costs, primarily charges for severance at businesses streamlining operations and employee compensation due at Brammer Bio on the date of acquisition.

2018

During 2018, the company recorded net restructuring and other costs by segment as follows:

(In millions)	Cost of Revenues	Selling, General and Administrative Expenses	Restructuring and Other Costs, Net	Total
Life Sciences Solutions	$ 4	$ 12	$ (17)	$ (1)
Analytical Instruments	3	8	28	39
Specialty Diagnostics	—	3	(1)	2
Laboratory Products and Services	5	16	31	52
Corporate	—	(10)	9	(1)
	$ 12	$ 29	$ 50	$ 91

The principal components of net restructuring and other costs by segment are as follows:

Life Sciences Solutions

In 2018, the Life Sciences Solutions segment recorded $1 million of net restructuring and other income. The segment recorded charges to cost of revenues of $4 million for the sales of inventory revalued at the date of acquisition, as well as $12 million of charges to selling, general, and administrative expenses, primarily third-party transaction/integration costs related to recent acquisitions. The segment also recorded $17 million of net restructuring and other income, principally for a $46 million net gain on the resolution of litigation, partially offset by charges for severance other costs associated with facility consolidations in the U.S.

Analytical Instruments

In 2018, the Analytical Instruments segment recorded $39 million of net restructuring and other charges. The segment recorded net charges to cost of revenues of $3 million for the sales of inventory revalued at the date of acquisition; $8 million of net charges to selling, general, and administrative expense, principally third-party transaction costs for a pending acquisition; and $28 million of restructuring and other costs, primarily for employee severance and other costs associated with facility consolidations in the U.S. and Europe, as well as abandoned facilities costs associated with the remediation and closure of a manufacturing facility in the U.S.

Specialty Diagnostics

In 2018, the Specialty Diagnostics segment recorded $2 million of net restructuring and other charges, including $3 million of net charges to selling, general, and administrative expense, principally third-party transaction costs in connection with the planned sale of the Anatomical Pathology business. The segment also recorded $1 million of net restructuring and other income, including a $6 million gain on the sale of real estate, mostly offset by cash charges for severance and other costs associated with facility consolidations in the U.S. and Europe.

Laboratory Products and Services

In 2018, the Laboratory Products and Services segment recorded $52 million of net restructuring and other charges. The segment recorded charges to cost of revenues of $5 million, principally for the sales of inventory revalued at the date of acquisition, and $16 million of charges to selling, general, and administrative expenses for third-party transaction/integration costs related to the acquisition of Patheon. The segment also recorded $31 million

of restructuring and other costs, primarily charges for environmental remediation associated with a Superfund site in the U.S., employee severance, and, to a lesser extent, hurricane response costs.

The following table summarizes the changes in the company's accrued restructuring balance. Other amounts reported as restructuring and other costs, net, in the accompanying statement of income have been summarized in the notes to the table. Accrued restructuring costs are included in other accrued expenses in the accompanying balance sheet.

(In millions)	Total (a)
Balance at December 31, 2017	$ 76
Net restructuring charges incurred in 2018 (b)	88
Payments	(83)
Currency translation	(1)
Balance at December 31, 2018	80
Cumulative effect of accounting change (c)	(28)
Net restructuring charges incurred in 2019 (d)	52
Payments	(69)
Currency translation	(1)
Balance at December 31, 2019	34
Net restructuring charges incurred in 2020 (e)	51
Payments	(57)
Currency translation and other	(7)
Balance at December 31, 2020	$ 21

(a) The movements in the restructuring liability principally consist of severance and other costs such as relocation and moving expenses associated with facility consolidations, as well as employee retention costs which are accrued ratably over the period through which employees must work to qualify for a payment; and in 2018, abandoned facility costs associated with facility consolidations in the U.S.
(b) Excludes $38 million of income, net, associated with litigation-related matters, gains on sales of real estate, charges for environmental remediation, and hurricane response costs.
(c) Impact of adopting new lease accounting guidance on January 1, 2019.
(d) Excludes $482 million of net gain on the sale of businesses, and $17 million of other restructuring charges, net, primarily for the write-off of acquired technology, pre-acquisition litigation-related matters, and compensation due to employees on the date of acquisition.
(e) Excludes $48 million of other restructuring charges, net, primarily for the write-off of acquired technology, fixed asset writedowns, and costs associated with environmental remediation at abandoned/previously owned facilities.

The company expects to pay accrued restructuring costs primarily through 2021.

Note 17. Subsequent Events

Acquisitions

On January 15, 2021, the company acquired, within the Laboratory Products and Services segment, the Belgium-based European viral vector manufacturing business of Groupe Novasep SAS for approximately $853 million in cash. The European viral vector manufacturing business provides contract manufacturing services for vaccines and therapies to biotechnology companies and large biopharma customers. The acquisition expands the segment's capabilities for cell and gene vaccines and therapies. The initial purchase price allocation for the acquisition is expected to be completed by the end of the first quarter of 2021.

On January 15, 2021, the company entered into a definitive agreement to acquire Mesa Biotech, Inc., a U.S.-based molecular diagnostic company, for approximately $450 million in cash and up to an additional $100 million in cash upon the completion of certain milestones following the close of the transaction. Mesa Biotech has developed and commercialized a PCR-based rapid point-of-care testing platform available for detecting infectious diseases including SARS-CoV-2, Influenza A and B, respiratory syncytial virus and Strep A. The acquisition will enable the company to accelerate the availability of reliable and accurate advanced molecular diagnostics at the point of care. The transaction is expected to be completed in the first quarter of 2021, subject to customary closing conditions. Upon completion, the business will become part of the Life Sciences Solutions segment.

UNITED STATES SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
FORM 10-K

☒ Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 for the fiscal year ended December 31, 2019 or

☐ Transition Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934

Commission file number 1-8002

THERMO FISHER SCIENTIFIC INC.

(Exact name of Registrant as specified in its charter)

Delaware

(State of incorporation)

168 Third Avenue
Waltham, Massachusetts 02451
(Address of principal executive offices) (Zip Code)

Registrant's telephone number, including area code: (781) 622-1000

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, $1.00 par value	TMO	New York Stock Exchange
Floating Rate Notes due 2020	TMO /20A	New York Stock Exchange
2.150% Notes due 2022	TMO 22A	New York Stock Exchange
0.750% Notes due 2024	TMO 24A	New York Stock Exchange
0.125% Notes due 2025	TMO 25B	New York Stock Exchange
2.000% Notes due 2025	TMO 25	New York Stock Exchange
1.400% Notes due 2026	TMO 26A	New York Stock Exchange
1.450% Notes due 2027	TMO 27	New York Stock Exchange
0.500% Notes due 2028	TMO 28A	New York Stock Exchange
1.375% Notes due 2028	TMO 28	New York Stock Exchange
1.950% Notes due 2029	TMO 29	New York Stock Exchange
0.875% Notes due 2031	TMO 31	New York Stock Exchange
2.875% Notes due 2037	TMO 37	New York Stock Exchange
1.500% Notes due 2039	TMO 39	New York Stock Exchange
1.875% Notes due 2049	TMO 49	New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. Yes ☐ No ☒

Indicate by check mark whether the Registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the Registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T during the preceding 12 months. Yes ☒ No ☐

Indicate by check mark whether the Registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act. Large accelerated filer ☒ Accelerated filer ☐ Non-accelerated filer ☐ Smaller reporting company ☐ Emerging growth company ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

As of June 28, 2019, the aggregate market value of the voting stock held by nonaffiliates of the Registrant was approximately $117,442,498,000 (based on the last reported sale of common stock on the New York Stock Exchange Composite Tape reporting system on June 28, 2019).

As of February 1, 2020, the Registrant had 398,828,389 shares of Common Stock outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Sections of Thermo Fisher's definitive Proxy Statement for the 2020 Annual Meeting of Shareholders are incorporated by reference into Parts II and III of this report.

THERMO FISHER SCIENTIFIC INC.

ANNUAL REPORT ON FORM 10-K
FOR THE FISCAL YEAR ENDED DECEMBER 31, 2019

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THERMO FISHER SCIENTIFIC INC.

PART I

Item 1. Business

General Development of Business

Thermo Fisher Scientific Inc. (also referred to in this document as "Thermo Fisher," "we," the "company," or the "registrant") is the world leader in serving science. Our Mission is to enable our customers to make the world healthier, cleaner and safer. We serve more than 400,000 customers working in pharmaceutical and biotech companies, hospitals and clinical diagnostic labs, universities, research institutions and government agencies, as well as environmental, industrial quality and process control settings. Our global team of more than 75,000 colleagues delivers a unique combination of innovative technologies, purchasing convenience and pharmaceutical services through our industry-leading brands, including Thermo Scientific, Applied Biosystems, Invitrogen, Fisher Scientific, Unity Lab Services and Patheon.

We continuously increase our depth of capabilities in technologies, software and services, and leverage our extensive global channels to address our customers' emerging needs. We do this through organic investments in research and development and through acquisitions. For example, in April 2019, we acquired, within the Laboratory Products and Services segment, Brammer Bio, expanding our contract manufacturing capabilities to include a full-range of viral vector development and manufacturing services. Our goal is to make our customers more productive in an increasingly competitive business environment, and to allow them to solve their challenges, from complex research to improved patient care, environmental and process monitoring, and consumer safety.

Thermo Fisher is a Delaware corporation and was incorporated in 1956. The company completed its initial public offering in 1967 and was listed on the New York Stock Exchange in 1980.

Forward-looking Statements

Forward-looking statements, within the meaning of Section 21E of the Securities Exchange Act of 1934 (the Exchange Act), are made throughout this Annual Report on Form 10-K. Any statements contained herein that are not statements of historical fact may be deemed to be forward-looking statements, including without limitation statements regarding: projections of revenue, expenses, earnings, margins, tax rates, tax provisions, cash flows, pension and benefit obligations and funding requirements, our liquidity position; cost reductions, restructuring activities, new product and service developments, competitive strengths or market position, acquisitions or divestitures; growth, declines and other trends in markets we sell into; new or modified laws, regulations and accounting pronouncements; outstanding claims, legal proceedings, tax audits and assessments and other contingent liabilities; foreign currency exchange rates and fluctuations in those rates; general economic and capital markets conditions; the timing of any of the foregoing; assumptions underlying any of the foregoing; and any other statements that address events or developments that Thermo Fisher intends or believes will or may occur in the future. Without limiting the foregoing, the words "believes," "anticipates," "plans," "expects," "seeks," "estimates," and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements are accompanied by such words. While the company may elect to update forward-looking statements in the future, it specifically disclaims any obligation to do so, even if the company's estimates change, and readers should not rely on those forward-looking statements as representing the company's views as of any date subsequent to the date of the filing of this report.

A number of important factors could cause the results of the company to differ materially from those indicated by such forward-looking statements, including those detailed under the heading, "Risk Factors" in Part I, Item 1A.

Business Segments and Products

We report our business in four segments – Life Sciences Solutions, Analytical Instruments, Specialty Diagnostics, and Laboratory Products and Services.

Life Sciences Solutions Segment

Through our Life Sciences Solutions segment, we provide an extensive portfolio of reagents, instruments and consumables used in biological and medical research, discovery and production of new drugs and vaccines as well as diagnosis of disease. These products and services are used by customers in pharmaceutical, biotechnology, agricultural, clinical, academic, and government markets. Life Sciences Solutions includes four primary businesses – Biosciences, Genetic Sciences, Clinical Next-Generation Sequencing, and BioProduction.

Biosciences

Our biosciences business includes reagents, instruments and consumables that help our customers conduct biological and medical research, discover new drugs and vaccines, and, in the case of some specific products, the diagnosis of disease.

Business (continued)

Our biosciences offerings include:

- Reagents, instruments, and consumables used for protein biology, molecular biology, sample preparation and cell imaging and analysis. The portfolio includes antibodies and products for protein purification, detection, modification, and analysis; and sequencing, detection and purification products used for high content analysis of nucleic acids. Many of these products are also used in applied markets, including agriculture, forensics, diagnostics product development, and toxicology research.
- Tools used for genetic engineering, amplification, quantification and analysis as well as RNA isolation, including stem cell reprogramming kits, transfection reagents, RNA interference reagents, along with gene editing tools and gene synthesis products.
- Cell culture media, reagents, and plastics for preserving and growing mammalian cells which are used in many life science research applications.
- Fluorescence-based technologies, which facilitate the labeling of molecules for biological research and drug discovery. These technologies include a wide range of cell analysis instruments, including flow cytometers and imaging platforms that enable fluorescence microscopy.
- Protein analysis products, including pre-cast electrophoresis gels for separating nucleic acids and proteins, and western blotting and staining tools.

Genetic Sciences

Our genetic sciences business combines a wide variety of instruments and related reagents used to provide high-value genomic solutions to assist customer decisions in the research, clinical and applied markets.

Our offerings include real-time PCR technology used to identify changes in gene expression, genotyping or proteins on an individual gene-by-gene basis; capillary electrophoresis (CE) sequencing, a core technology used in DNA sequencing and fragment analysis and forensic analysis applications; and microarray technology, used in gene expression, genotyping and reproductive health.

Our genetic analyzers served as the foundational platform used to sequence the first human genome. These systems are used in a variety of basic, commercial and clinical research applications.

Clinical Next-Generation Sequencing

Our clinical next-generation sequencing (NGS) business focuses on delivering simple, fast and cost-effective NGS technology for a range of applications. The business is focused on targeted sequencing solutions for research use and the application of NGS in oncology.

BioProduction

Our bioproduction business supports developers and manufacturers of biological-based therapeutics and vaccines with a portfolio of premium solutions and services focused on upstream cell culture, downstream purification, analytics for detection and quantitation of process/product impurities, and a suite of single-use solutions spanning the biologics workflow.

Our bioproduction offerings include:

- Single-use bioproduction solutions that provide our customers with faster turnaround and set-up times, minimal validation requirements, reduced investment and running costs, and increased flexibility of manufacturing capacity.
- Production cell culture media solutions, which are used by leading biotechnology and pharmaceutical companies to grow cells in controlled conditions and enable large scale cGMP (Current Good Manufacturing Practices) manufacturing of drugs and vaccines. We also provide our customers with the associated services to optimize the productivity of these production platforms.
- Chromatography products, which deliver superior capacity and resolution for process-scale bioseparations, and offer a broad set of scalable options for the purification of antibodies, antibody fragments and proteins.
- Rapid molecular products that deliver accurate results in less than four hours for contaminant detection, identification and quantitation.

- Scalable solutions for the manufacture of cell therapy based drugs.

Business (continued)

Our Doe & Ingalls offerings include chemical distribution and supply chain services that provide primarily life science manufacturers with reliable, secure supply chains for their chemical raw materials.

Analytical Instruments Segment

Through our Analytical Instruments segment, we provide a broad offering of instruments, consumables, software and services that are used for a range of applications in the laboratory, on the production line and in the field. These products and services are used by customers in pharmaceutical, biotechnology, academic, government, environmental and other research and industrial markets, as well as the clinical laboratory. This segment includes three primary businesses – Chromatography and Mass Spectrometry, Chemical Analysis, and Materials and Structural Analysis.

Chromatography and Mass Spectrometry

Our chromatography and mass spectrometry (MS) business provides analytical instrumentation for organic and inorganic sample analysis across both applied technologies and life science research. These products are complemented by laboratory information management systems (LIMS); chromatography data systems (CDS); database analytical tools; automation systems; a range of consumables, such as a full line of chromatography columns; and a range of sample preparation and separation products including auto-samplers and multiplexing systems.

Chromatography is a technique for separating, identifying and quantifying individual chemical components of substances based on their specific physical and chemical characteristics. Our chromatography product line includes high performance liquid chromatography, ion chromatography and gas chromatography systems, all of which are supported by our Chromeleon chromatography data system software.

- *Liquid Chromatography (LC) Systems* analyze complex sample matrices in liquids. Our high-pressure liquid chromatography (HPLC) and ultrahigh pressure liquid chromatography (UHPLC) systems offer high throughput and sensitivity and are sold either as stand-alone systems or integrated with our mass spectrometers (LC/MS and LC/MS/MS). These systems are used for a range of applications, from complex proteomic analyses to routine industrial quality assurance and quality control (QA/QC).
- *Ion Chromatography (IC) Systems* separate ionic (charged) or highly polar molecules (e.g., sugars and carbohydrates), usually found in water-based solutions, and typically detect them based on their electrical conductivity. Our IC products are used in a wide range of applications, including scientific research, and environmental testing, as well as quality control in pharmaceutical, food and beverage, and other industrial processes.
- *Gas Chromatography (GC) Systems* analyze complex sample matrices in gases, comprising both separation and detection technology. Separation technology is common to all gas chromatography analyzers, and is paired with either a conventional detector (GC) or with different types of mass spectrometers (GC/MS). Our GC/MS offering includes a triple stage quadrupole, a single stage quadrupole, an Orbitrap, and an ion trap, for a range of applications, including food safety testing, quantitative screening of environmental samples, and complex molecular analyses.
- *Elemental Analysis Spectrometers* use atomic spectroscopy techniques to identify trace concentrations of elements in liquid and solid samples primarily in environmental, petrochemical, food safety, metallurgical, geochemical and clinical/toxicology research applications. These products are widely used in growth markets such as China, India and Latin America to support compliance with increasingly stringent international environmental and consumer safety regulations.

Mass spectrometry is a technique for analyzing chemical compounds, individually or in complex mixtures, by forming charged ions that are then analyzed according to their mass-to-charge ratios. In addition to molecular information, each discrete chemical compound generates a pattern that provides structurally identifiable information. Our comprehensive offering includes life sciences mass spectrometry systems; and inorganic mass spectrometry systems; as well as a range of sample preparation and separation products including auto-samplers and multiplexing systems.

- *Life Sciences Mass Spectrometers* include triple quadrupole and Orbitrap technologies. Our triple quadrupole systems provide high performance quantitative analysis of chemicals in biological fluids,

environmental samples and food matrices. They are also used by the pharmaceutical industry for targeted quantitation during drug discovery. Our Orbitrap technologies provide high resolution and accurate mass capabilities for both research and applied markets and are well suited for drug metabolism, proteomics, environmental analysis, food safety, toxicology and clinical research applications. We also offer a comprehensive portfolio of instrument control and data analysis software to help customers simplify their workflows and obtain knowledge from often complex data.

Business (continued)

- *Inorganic Mass Spectrometers* include four product lines: isotope ratio mass spectrometry (IRMS); multi-collector isotope ratio mass spectrometry (MC/IRMS); inductively coupled plasma mass spectrometry (ICP/MS); and high resolution trace mass spectrometry (HR Trace/MS). These products are primarily used for qualitative and quantitative analysis of inorganic matter in a range of applications, including environmental analysis, materials science and earth sciences.

Chemical Analysis

Our chemical analysis products fall into three main categories: materials and minerals instruments; field safety instruments; and environmental and process instruments. Customers use these products to quickly and accurately analyze the composition of materials to optimize workflows primarily in industrial applications or to help them comply with governmental regulations and industry safety standards. Our product lines range from those used on production lines to improve quality and efficiency, to portable systems for rapid and real-time chemical identification in the field or to analyze, measure or respond to hazardous situations.

- *Materials and Minerals Instruments* include production line process monitoring, and control systems for a range of industrial applications. For example, we offer on-line instruments that analyze bulk materials non-invasively and in real time to improve quality control and ensure safe operation in a mine or cement manufacturing plant, as well as systems that enable high-speed weighing during bulk materials handling. We also offer gauging systems that employ ionizing and non-ionizing technologies to measure the total thickness, basis weight and coating thickness of flat-sheet materials, such as steel, plastics, foil, rubber and glass. We also offer on-line analyzers based on a variety of technologies such as X-ray imaging and ultra-trace chemical detection, to inspect packaged goods for physical contaminants, validate fill quantities, or check for missing or broken parts on-line and at high speeds in the food and beverage, pharmaceutical production and packaging industries to maintain safety and quality standards.
- *Field Safety Instruments* are rugged handheld products that provide rapid, precise, real-time analysis at the point of need. Our main product categories are elemental analyzers, optical analyzers and radiation detection instruments. Our portable elemental analyzers use X-ray fluorescence (XRF) technology for identifying metal alloys in scrap metal recycling; QA/QC; precious metals analysis; environmental analysis; and lead screening in a range of consumer products. Our portable optical analyzers utilize Raman, Fourier transform infrared (FTIR) and near-infrared (NIR) technologies for use in the field by first responders, and law enforcement and military personnel who need to quickly and accurately identify chemicals and explosives in critical safety and security situations. Other applications include QA/QC in pharmaceutical production and identification of counterfeit drugs. Our radiation measurement products are used to monitor, detect and identify specific forms of radiation in nuclear power, environmental, industrial, medical, and security applications. Our primary customers include national, regional, and local government agencies responsible for monitoring cargo, vehicles and people traveling across borders. These products are also used by first-responders in safety and security situations, and for worker safety in the nuclear power and other industrial markets.
- *Environmental and Process Instruments* include fixed and portable instrumentation that help our customers protect people and the environment as well as comply with government regulations and industry safety standards. Our products are used by environmental regulatory agencies and power plant operators to measure ambient air, and stack gas emissions for compliance with regulated emissions standards for criteria pollutant gases. Our products are also used in ambient particulate monitoring applications by customers in mining environments to provide continuous measurements and logging of real-time concentrations and median particle sizes of airborne dust, smoke, mist and fumes to improve efficiency and increase worker safety.

In addition to our broad product offerings, we offer a variety of specialized services to our customers, including equipment servicing, instrument calibration services, asset management and training.

Materials and Structural Analysis

Our materials and structural analysis business includes electron microscopy, molecular spectroscopy and laboratory elemental analysis instruments that are used by customers in life sciences, materials sciences and industrial markets to accelerate breakthrough discoveries.

- *Electron Microscopy Instruments* include transmission electron microscopes which provide imaging and characterization at the atomic scale, with applications in semiconductor development, materials science research and the characterization of protein structure and function. We also offer scanning electron microscopes which resolve features from the optical regime down to the nanometer length scale and are used for a wide variety of applications from materials characterization in science and engineering to applications in natural resources, manufacturing, and biological systems. Our DualBeam focused ion beam-scanning electron microscope systems are used for sample

preparation, 3D characterization, nanoprototyping, and industrial failure analysis. Our focused ion beam microscopes are used in a range of process control, failure analysis, and materials research applications. We also offer electrical failure analysis instruments which are used in root cause failure analysis and quality control, microCT instruments which are micro-computed tomography solutions for quantitative analysis of a broad range of materials, providing 3D visualization of large volumes non-destructively and 3D visualization software that turns the data and images generated by a broad range of instruments into 3D visualizations of the microscopic sample, allowing quantitative analysis of material properties.

- *Molecular Spectroscopy Instruments* are divided into four primary techniques: FTIR, Raman, NIR and ultraviolet/visible (UV/Vis) spectroscopy. These technologies are typically used in the laboratory to provide information on the structure of molecules to identify, verify and quantify organic materials in pharmaceutical, biotechnology, polymer, chemical, and forensic sciences. Our material characterization instruments include rheometers and extruders that measure viscosity, elasticity, processability, and temperature-related mechanical changes of various materials. We also provide a range of surface analysis instruments commonly used in the semiconductor, metals, coatings, and polymer industries as a product development and failure analysis tool.
- *Laboratory Elemental Analysis Instruments* and analyzers use X-ray fluorescence (XRF), X-ray diffraction (XRD), and arc spark optical emission (OES) techniques for accurate and precise analysis of bulk materials in the metals, cement, minerals, and petrochemicals industries.

Specialty Diagnostics Segment

Our Specialty Diagnostics segment offers a wide range of diagnostic test kits, reagents, culture media, instruments and associated products in order to serve customers in healthcare, clinical, pharmaceutical, industrial, and food safety laboratories. Our healthcare products are used to increase the speed and accuracy of diagnoses, which improves patient care in a more cost efficient manner. This segment has five primary businesses – Clinical Diagnostics, ImmunoDiagnostics, Microbiology, Transplant Diagnostics and our Healthcare Market Channel. In June 2019, the company sold its Anatomical Pathology business, previously reported in this segment. The business offered products primarily for cancer diagnosis and medical research in histology, cytology and hematology applications.

Clinical Diagnostics

Our clinical diagnostics products include a broad offering of liquid, ready-to-use and lyophilized immunodiagnostic reagent kits, calibrators, controls and calibration verification fluids. In particular, we provide products used for drugs-of-abuse testing; therapeutic drug monitoring, including immunosuppressant drug testing; thyroid hormone testing; serum toxicology; clinical chemistry; immunology; hematology; coagulation; glucose tolerance testing; first trimester screening; tumor markers testing; and biomarkers testing for sepsis, acute myocardial infarction and congestive heart failure. We also private label many of our reagents and controls for major *in vitro* diagnostics companies through OEM arrangements. In many instances, we will work with customers or partners to develop new products and applications for their instrument platforms.

We have developed one of the broadest menus for drugs-of-abuse immunoassays. We also provide a broad offering of immunosuppressant drug immunoassays that can be used on a variety of clinical chemistry analyzers.

Our clinical chemistry systems include analyzers and reagents to analyze and measure routine blood and urine chemistry, such as glucose and cholesterol; and advanced testing for specific proteins, therapeutic drug monitoring and drugs-of-abuse. Our diagnostic test range currently covers approximately 80 different validated methods. We also provide pre- and post-analytical automation for preparation of blood specimens before and after analysis, and specialty diagnostic tests based on patented biomarkers for sepsis, cardiovascular and pulmonary diseases, as well as intensive care treatments and prenatal screening.

ImmunoDiagnostics

Our immunodiagnostics offerings include developing, manufacturing and marketing complete blood-test systems to support the clinical diagnosis and monitoring of allergy, asthma and autoimmune diseases. In addition, we offer antibody tests for approximately 20 indications to help diagnose autoimmune diseases such as rheumatoid arthritis, celiac disease, lupus and scleroderma. Our products include ImmunoCAP for allergy and asthma tests and EliA for autoimmunity tests.

Microbiology

Our microbiology offerings include dehydrated and prepared culture media, collection and transport systems, instrumentation and consumables to detect pathogens in blood, diagnostic and rapid direct specimen tests, quality-control products and associated products for the microbiology laboratory. Our products help customers worldwide to diagnose

infectious disease; determine appropriate antimicrobial therapy; implement effective infection control programs; and detect microbial contamination of their products or manufacturing facilities.

Within the food and pharmaceutical industries, our products are used to assure the safety and quality of consumer products by monitoring production environments; raw materials and end products for bacterial contamination; and animal health in the dairy industry.

Transplant Diagnostics

Our transplant diagnostics products include human leukocyte antigen (HLA) typing and testing for the organ transplant market. Our diagnostic tests are used by transplant centers for tissue typing, primarily to determine the compatibility of donors and recipients pre-transplant, and to detect the presence of antibodies post-transplant that can lead to transplant rejection. These transplant diagnostic tests are widely used across the transplant-testing workflow to improve patient outcomes. Our transplant diagnostic offerings include several lines of HLA typing and antibody detection assays utilizing serological, molecular, enzyme-linked immunosorbent assays (ELISA), flow, and multiplexing technologies.

Healthcare Market Channel

Our healthcare market channel offerings include a broad array of consumables, diagnostic kits and reagents, equipment, instruments, solutions and services for hospitals, clinical laboratories, reference laboratories, physicians' offices and other clinical testing facilities. These products are manufactured by Thermo Fisher and third parties and are primarily used in clinical diagnosis.

Laboratory Products and Services Segment

Our Laboratory Products and Services segment offers virtually everything needed for the laboratory. Our unique combination of self-manufactured and sourced products and extensive service offering, enables our customers to focus on their core activities and helps them to be more efficient, productive and cost effective. The segment also includes a comprehensive offering of outsourced services used by the pharmaceutical and biotech industries for drug development, clinical trials logistics and commercial drug manufacturing. We serve the pharmaceutical, biotechnology, academic, government and other research and industrial markets, as well as the clinical laboratory through four key businesses: Laboratory Products, Laboratory Chemicals, Research and Safety Market Channel, and Pharma Services.

Laboratory Products

Our laboratory products are used primarily by pharmaceutical companies for drug discovery and development and by biotechnology companies and universities for life science research to advance the prevention and cure of diseases and enhance quality of life. This offering consists of equipment, accessories, and services for sample preparation, storage and protection, and analysis:

- *Laboratory Equipment Technologies* includes our leading laboratory refrigerators and freezers, ultralow-temperature freezers and cryopreservation storage tanks for maintaining samples in a cold environment to protect them from degradation. We also offer temperature control products such as heated bath circulators, immersion coolers, recirculating chillers, water baths, and dry baths in a range of sizes, temperatures and configurations for life science, analytical chemistry, manufacturing and quality-control applications. In addition, we offer sample preparation and preservation equipment, which protects our customers' chemical and biological samples and supports the growth of cells and organisms in optimal conditions such as temperature, carbon dioxide and humidity as well as incubators and related products. We also offer centrifugation products, which are used to separate biological matrices and inorganic materials, including microcentrifuges, general use bench-top centrifuges and floor models. Additionally, we offer biological safety cabinets, which enable technicians to handle samples without risk to themselves or their environment and without risk of cross-contamination of samples.
- *Water and Laboratory Products* include water analysis instruments such as meters, electrodes and solutions for the measurement of pH, ions, conductivity, dissolved oxygen, turbidity and other key parameters in the lab and production line. We also offer other laboratory equipment such as water purification systems, shakers, vacuum concentrators, microbiological incubators, ovens, furnaces, hotplates, stirrers, stirring hotplates, and other related products.

- *Laboratory Plastics Essentials* include a leading offering of laboratory pipette tips and a complementary range of handheld and automated pipetting systems, supporting low-through high-throughput activity. These products optimize productivity and ergonomics, and ensure accurate results. We also offer sample preparation and storage products such as centrifugation consumables as well as vials and organization systems for ultralow temperature and cryogenic storage, with specific products designed for low protein binding and low DNA binding and containers for packaging

life science and diagnostic reagents as well for the storage and transport of bulk intermediates and active pharmaceutical ingredients. Additionally, our offerings include a complete selection of clinical specimen collection products, drug-of-abuse collection kits and environmental and food-safety glass and plastic vials, bottles and containers, plastic transfer pipettes, general purpose clinical laboratory consumables and containers for breast milk collection, storage and feeding primarily used in neo-natal units and by lactation specialists. We also provide OEM and custom kit assembly services for clinical and drugs-of-abuse test kits.

Laboratory Chemicals

Our laboratory chemicals offering comprises a broad range of chemicals, solvents and reagents supporting virtually every laboratory application – from research to drug discovery and development and manufacturing. This portfolio includes organic chemicals used to synthesize new materials; essential laboratory chemicals used by scientists to purify, extract, separate, identify and manufacture products; high-purity analytical reagents, bioreagents used in many different applications, from cell growth to detailed protein analysis; novel chemical building blocks, reactive intermediates and screening libraries used to accelerate drug discovery; and precious metals, salts and solutions used in a broad range of applications where highly specific reactions are desired. We provide bulk volumes of many products for scale-up from research to development and customized services for chemical procurement, processing, production, testing, and packaging.

Research and Safety Market Channel

Our research and safety market channel serves academic, pharmaceutical, biotechnology, government and industrial customers. We go to market through our expert sales force, segment-relevant printed collateral and digital content in five languages, a state-of-the-art website, www.fishersci.com, containing full product content for more than 1.5 million products, and our global network of resellers and distributors.

We have an international network of warehouses in our primary markets through which we maintain inventory and coordinate product delivery. With specialized product vaults and warehouse management systems, we are able to handle the complete range of products we offer to our customers. Our transportation capabilities include our dedicated fleet of delivery vehicles as well as parcel shipping capabilities that are closely integrated with our third-party parcel carriers. Throughout the product delivery process, we provide our customers with convenient access to comprehensive electronic systems that offer automated catalog search, product order and invoicing, and payment capabilities.

Our channel offers a mix of products that are manufactured by Thermo Fisher, by third parties for us on a private-label basis, and by third parties under their brand but offered for sale exclusively through us. We also offer a broad range of third-party products representing leading industry brand names on a non-exclusive basis.

Our research products include a complete offering of laboratory products, ranging from capital equipment and instruments to chemicals to consumable products. Our safety products include clean-room and controlled-environment supplies, personal protective equipment, firefighting, military, and first responder equipment and supplies, and environmental monitoring and sampling equipment. Our education products include science-related and laboratory products for the K-12 and secondary education market.

In addition to our broad product offerings, we offer a variety of specialized services to our customers through our Unity Lab Services team, including training, equipment servicing and asset management, and dedicated supply management personnel. We also offer scientific support services including desktop delivery, coordination of instrument calibration and service, and on-site customer service.

Pharma Services

We provide the entire spectrum of development, manufacturing and clinical trials services for both small-molecule and large-molecule pharmaceuticals. This includes i) development of a suitable formulation and manufacturing process for the active pharmaceutical ingredient (API) or biologic; ii) technology transfer to scale up the manufacturing; iii) labeling, packaging, distribution and logistics for clinical trials; and iv) commercial scale manufacturing and packaging.

- *Drug Substance Services* - Our service offerings address small molecules, produced through chemical synthesis, and large molecules such as antibodies and proteins produced through mammalian cell culture. We provide development and manufacturing services for small molecule APIs and the biologically active

component of pharmaceutical products under current good manufacturing practice (cGMP) conditions from early development through commercial production.

- *Drug Product Services* - We manufacture both small-molecule and large-molecule products for customers in conventional and specialized dosage forms. We differentiate ourselves by our breadth of dosage forms and specialized

Business (continued)

capabilities in both oral solid and sterile dosage forms. We provide a wide spectrum of advanced formulation, production and technical services and scientific expertise and solutions, from the early stages of a product's development to regulatory approval and commercial scale production.

- *Clinical Trials Services* - We provide global services for pharmaceutical and biotechnology companies engaged in clinical trials, including comparator sourcing; specialized packaging; over-encapsulation; multi-lingual and specialized labeling and distribution for phase I through phase IV clinical trials; biological-specimen management and biobanking services; specialty pharmaceutical logistics; and clinical supply-chain planning and management.
- *Viral Vector Services* - We provide a full-range of viral vector development and manufacturing services for customers developing and commercializing gene and cell therapies, including process development, optimization, scale-up, analytical development and qualification of viral vectors for commercial manufacturing. Our breadth of vector platform includes the five most widely used virus types, providing extensive coverage across the gene and cell therapy landscape.

Sales and Marketing

We market and sell our products and services through a direct sales force, customer-service professionals, electronic commerce, third-party distributors and various catalogs.

We offer our products and services through leading brands including:

- The Thermo Scientific brand offers customers in research, diagnostics, industrial, and applied markets a complete range of high-end analytical instruments as well as laboratory equipment, software, services, consumables and reagents. Our portfolio of products includes innovative technologies for mass spectrometry, chromatography, elemental analysis, electron microscopy, molecular spectroscopy, sample preparation, informatics, chemical research and analysis, cell culture, bioprocess production, cellular, protein and molecular biology research, allergy testing, drugs-of-abuse testing, therapeutic drug monitoring testing, microbiology, as well as environmental monitoring and process control.
- The Applied Biosystems brand offers customers in research, clinical and applied markets integrated instrument systems, reagents, and software for genetic analysis. Our portfolio includes innovative technologies for genetic sequencing and real-time, digital and end point polymerase chain reaction (PCR), that are used to determine meaningful genetic information in applications such as cancer diagnostics, human identification testing, and animal health, as well as inherited and infectious disease.
- The Invitrogen brand offers life science customers a broad range of consumables and instruments that accelerate research and ensure consistency of results. Our portfolio of products includes innovative solutions for cellular analysis and biology, flow cytometry, cell culture, protein expression, synthetic biology, molecular biology and protein biology.
- Fisher Scientific is our channels brand, offering customers a complete portfolio of laboratory equipment and consumables, chemicals, supplies and services used in scientific research, healthcare, safety, and education markets. These products are offered through an extensive network of direct sales professionals, segment-relevant printed collateral and digital content, a state-of-the-art website, and supply-chain management services.
- Unity Lab Services is our instrument and equipment services brand, offering a complete portfolio of services from enterprise level engagements to individual instruments and laboratory equipment, regardless of the original manufacturer. Through our network of world-class service and support personnel, we provide services that are designed to help our customers improve productivity, reduce costs, and drive decisions with better data.
- Patheon is our contract development and manufacturing brand, representing the comprehensive offering of services that we provide to customers ranging from small biotech to large pharmaceutical companies. We support our customers' development of innovative medicines, including biologics, gene therapies and vaccines. By leveraging our expanding global network of facilities, we deliver high-quality services at all stages of the drug lifecycle, from discovery to development through clinical trials and commercial manufacturing.

We have approximately 13,000 sales personnel including highly trained technical specialists who enable us to better meet the needs of our more technical end-users. We also provide customers with product standardization and other supply-chain-management services to reduce procurement costs.

Business (continued)

New Products and Research and Development

Our business includes the development and introduction of new products and may include entry into new business segments. We anticipate that we will continue to make significant expenditures for research and development as we seek to provide a continuing flow of innovative products to maintain and improve our competitive position.

Raw Materials

Our management team believes that we have a readily available supply of raw materials for all of our significant products from various sources. We do not anticipate any difficulties obtaining the raw materials essential to our business.

Raw material and fuel prices are subject to fluctuations due to market conditions. We employ many strategies, including the use of alternative materials, to mitigate the effect of these fluctuations on our results.

Patents, Licenses and Trademarks

Patents are important in many aspects of our business. No particular patent, or related group of patents, is so important, however, that its loss would significantly affect our operations as a whole. Where appropriate, we seek patent protection for inventions and developments made by our personnel that are incorporated into our products or otherwise fall within our fields of interest. Patent rights resulting from work sponsored by outside parties do not always accrue exclusively to the company and may be limited by agreements or contracts.

We protect some of our technology as trade secrets and, where appropriate, we use trademarks or register trademarks used in connection with products. We also enter into license agreements with others to grant and/or receive rights to patents and know-how.

Seasonal Influences

Revenues in the fourth quarter are historically stronger than in other quarters due to the capital spending patterns of industrial, pharmaceutical and government customers. Sales of flu tests and related diagnostic products vary quarter to quarter and year to year based on the severity and duration of each period's flu season. Sales of allergy tests vary quarter to quarter and year to year based on the severity and duration of each period's airborne pollen allergens.

Working Capital Requirements

There are no special inventory requirements or credit terms extended to customers that would have a material adverse effect on our working capital.

Dependency on a Single Customer

There is no single customer the loss of which would have a material adverse effect on our business. No customer accounted for more than 5% of our total revenues in any of the past three years.

Backlog

Our backlog of firm orders at year-end 2019 and 2018 was as follows:

(In millions)	2019	2018
Life Sciences Solutions	$ 893	$ 647
Analytical Instruments	2,198	2,243
Specialty Diagnostics	172	187
Laboratory Products and Services	4,577	2,042
Eliminations	(72)	(32)
	$ 7,768	$ 5,087

We believe that approximately 63% of our backlog at the end of 2019 will be filled during 2020.

Government Contracts

Although the company transacts business with various government agencies, no government contract is of such magnitude that a renegotiation of profits or termination of the contract at the election of the government agency would have a material adverse effect on the company's financial results.

Business (continued)

Competition

The company encounters aggressive and able competition in virtually all of the markets we serve. Because of the diversity of our products and services, we face many different types of competitors and competition. Our competitors include a broad range of manufacturers and third-party distributors. Competitive climates in many of the markets we serve are characterized by changing technology and customer demands that require continuing research and development. Our success primarily depends on the following factors:

- technical performance and advances in technology that result in new products and improved price/performance ratios;
- product differentiation, availability and reliability;
- the depth of our capabilities;
- our reputation among customers as a quality provider of products and services;
- customer service and support;
- active research and application-development programs; and
- relative prices of our products and services.

Environmental Matters

We are subject to various laws and governmental regulations concerning environmental matters and employee safety and health in the United States and other countries. U.S. federal environmental legislation that affects us includes the Toxic Substances Control Act, the Resource Conservation and Recovery Act, the Clean Air Act, the Clean Water Act, the Safe Drinking Water Act, and the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). We are also subject to regulation by the Occupational Safety and Health Administration (OSHA) concerning employee safety and health matters. The United States Environmental Protection Agency (USEPA), OSHA, and other federal agencies have the authority to promulgate regulations that have an effect on our operations.

In addition to these federal activities, various states have been delegated certain authority under the aforementioned federal statutes as well as having authority over these matters under state laws. Many state and local governments have adopted environmental and employee safety and health laws and regulations, some of which are similar to federal requirements.

A number of our operations involve the handling, manufacturing, use or sale of substances that are or could be classified as toxic or hazardous materials within the meaning of applicable laws. Consequently, some risk of environmental harm is inherent in our operations and products, as it is with other companies engaged in similar businesses.

Our expenses for environmental requirements are incurred generally for ongoing compliance and historical remediation matters. Based on current information, we believe that these compliance costs are not material. For historical remediation obligations, our expenditures relate primarily to the cost of permitting, installing, and operating and maintaining groundwater-treatment systems and other remedial measures.

Our Fair Lawn and Somerville, New Jersey facilities entered into administrative consent orders with the New Jersey Department of Environmental Protection in 1984 to maintain groundwater-remediation activities at these sites, and are currently under the State's Licensed Site Remediation Professional Program. As the owner of the Fair Lawn facility, we are listed as a potentially responsible party for remediation within an area called the Fair Lawn Wellfields Superfund Site, and, in 2008, the company and certain other parties entered into a consent order with the USEPA to complete a Remedial Investigation/Feasibility Study. In 2018, the USEPA issued a Record of Decision, including the scope of required remediation work based on findings of this study. In 2019, the company and another responsible party signed a proposed consent decree that, once approved by the court, requires the parties to finance and perform the required remediation work with USEPA oversight. In 2011, our Life Technologies subsidiary entered into a consent decree with the USEPA and other responsible parties to implement a groundwater remedy at the former Davis Landfill Superfund site in Smithfield, Rhode Island.

We record accruals for environmental liabilities based on current interpretations of environmental laws and regulations when it is probable that a liability has been incurred and the amount of such liability can be reasonably estimated. We calculate estimates based upon several factors, including reports prepared by environmental specialists

and management's knowledge and experience with these environmental matters. We include in these estimates potential costs for investigation, remediation and operation and maintenance of cleanup sites. Accrued liabilities for environmental matters totaled $66 million at December 31, 2019.

These environmental liabilities do not include third-party recoveries to which we may be entitled. We believe that our accrual is adequate for the environmental liabilities we currently expect to incur. As a result we believe that our ultimate liability with respect to environmental matters will not have a material adverse effect on our financial position, results of

operations or cash flows. However, we may be subject to remedial or compliance costs due to future events, such as changes in existing laws and regulations, changes in agency direction or enforcement policies, developments in remediation technologies, changes in the conduct of our operations, and the effect of changes in accounting rules, which could have a material adverse effect on our financial position, results of operations or cash flows.

Regulatory Affairs

Our operations, and some of the products we offer, are subject to a number of complex and stringent laws and regulations governing the production, handling, transportation and distribution of chemicals, drugs and other similar products, including the operating and security standards of the Food and Drug Administration, the Drug Enforcement Administration, the Bureau of Alcohol, Tobacco, Firearms and Explosives, and various state boards of pharmacy as well as comparable state and foreign agencies. As Thermo Fisher's businesses also include export and import activities, we are subject to pertinent laws enforced by the U.S. Departments of Commerce, State and Treasury. In addition, our logistics activities must comply with the rules and regulations of the Department of Transportation, the Federal Aviation Administration and similar foreign agencies. While we believe we are in compliance in all material respects with such laws and regulations, any noncompliance could result in substantial fines or otherwise restrict our ability to provide competitive distribution services and thereby have an adverse effect on our financial condition. To date, none has had a material impact on our operations.

We are subject to laws and regulations governing government contracts, and failure to address these laws and regulations or comply with government contracts could harm our business by leading to a reduction in revenue associated with these customers. We have agreements relating to the sale of our products to government entities and, as a result, we are subject to various statutes and regulations that apply to companies doing business with the government. We are also subject to investigation for compliance with the regulations governing government contracts. A failure to comply with these regulations could result in suspension of these contracts, criminal, civil and administrative penalties or debarment.

Number of Employees

We have more than 75,000 employees.

Available Information

The company files annual, quarterly and current reports, proxy statements and other documents with the Securities and Exchange Commission (SEC) under the Exchange Act. The SEC maintains a website that contains reports, proxy and information statements and other information that issuers, including the company, file electronically with the SEC. The public can obtain any documents that we file with the SEC at www.sec.gov. We also make available free of charge on or through our own website at www.thermofisher.com our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and, if applicable, amendments to those reports filed or furnished pursuant to Section 13(a) of the Exchange Act as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC. In addition, paper copies of these documents may be obtained free of charge by writing to the company care of its Investor Relations Department at our principal executive office located at 168 Third Avenue, Waltham, Massachusetts 02451.

Business (continued)

Information about Our Executive Officers

Name	Age	Present Title (Fiscal Year First Became Executive Officer)	Other Positions Held
Marc N. Casper	51	Chairman, President and Chief Executive Officer (2001)	President and Chief Executive Officer (2009-2020) Chief Operating Officer (2008-2009) Executive Vice President (2006-2009)
Mark P. Stevenson	57	Executive Vice President and Chief Operating Officer (2014)	Executive Vice President and President, Life Sciences Solutions (2014-2017) President and Chief Operating Officer, Life Technologies Corporation (2008-2014)
Michel Lagarde	46	Executive Vice President (2017)	Senior Vice President and President, Pharma Services (2017-2019) President and Chief Operating Officer, Patheon N.V. (2016-2017) Managing Director, JLL Partners* (2008-2016)
Michael A. Boxer	58	Senior Vice President and General Counsel (2018)	Executive Vice President and Group General Counsel, Luxottica Group S.p.A. (2011-2017)
Syed A. Jafry	56	Senior Vice President and President, Regions (2019)	Senior Vice President, Asia-Pacific and Emerging Markets (2011-2017)
Stephen Williamson	53	Senior Vice President and Chief Financial Officer (2015)	Vice President, Financial Operations (2008-2015)
Peter E. Hornstra	60	Vice President and Chief Accounting Officer (2001)	Corporate Controller (1996-2007)

*JLL Partners is a private equity firm focused on healthcare.

Item 1A. Risk Factors

Set forth below are the risks that we believe are material to our investors. This section contains forward-looking statements. You should refer to the explanation of the qualifications and limitations on forward-looking statements in Item 1. Business under the caption “Forward-looking Statements”.

We must develop new products, adapt to rapid and significant technological change and respond to introductions of new products by competitors to remain competitive. Our growth strategy includes significant investment in and expenditures for product development. We sell our products in several industries that are characterized by rapid and significant technological changes, frequent new product and service introductions and enhancements and evolving industry standards. Competitive factors include technological innovation, price, service and delivery, breadth of product line, customer support, e-business capabilities and the ability to meet the special requirements of customers. Our competitors may adapt more quickly to new technologies and changes in customers’ requirements than we can. Without the timely introduction of new products, services and enhancements, our products and services will likely become technologically obsolete over time, in which case our revenue and operating results would suffer.

Many of our existing products and those under development are technologically innovative and require significant planning, design, development and testing at the technological, product and manufacturing-process levels. Our customers use many of our products to develop, test and manufacture their own products. As a result, we must anticipate industry trends and develop products in advance of the commercialization of our customers’ products. If we fail to adequately predict our customers’ needs and future activities, we may invest heavily in research and development of products and services that do not lead to significant revenue.

It may be difficult for us to implement our strategies for improving internal growth. Our growth depends in part on the growth of the markets which we serve. Any decline or lower than expected growth in our served markets could diminish demand for our products and services, which would adversely affect our results of operations and

financial condition. To address this issue, we are pursuing a number of strategies to improve our internal growth, including:

- strengthening our presence in selected geographic markets;
- allocating research and development funding to products with higher growth prospects;
- developing new applications for our technologies;
- expanding our service offerings;

- continuing key customer initiatives;
- combining sales and marketing operations in appropriate markets to compete more effectively;
- finding new markets for our products; and
- continuing the development of commercial tools and infrastructure to increase and support cross-selling opportunities of products and services to take advantage of our depth in product offerings.

We may not be able to successfully implement these strategies, and these strategies may not result in the expected growth of our business.

Our business is affected by general economic conditions and related uncertainties affecting markets in which we operate. Our business is affected by general economic conditions, both inside and outside the U.S. If the global economy and financial markets, or economic conditions in Europe, the U.S. or other key markets, are unstable, it could adversely affect the business, results of operations and financial condition of the company and its customers, distributors, and suppliers, having the effect of

- reducing demand for some of our products;
- increasing the rate of order cancellations or delays;
- increasing the risk of excess and obsolete inventories;
- increasing pressure on the prices for our products and services;
- causing supply interruptions which could disrupt our ability to produce our products; and
- creating longer sales cycles and greater difficulty in collecting sales proceeds.

Our growth could suffer if the markets into which we sell our products and services decline, do not grow as anticipated or experience cyclicality. Our growth depends in part on the growth of the markets which we serve. Any decline or lower than expected growth in our served markets could diminish demand for our products and services, which would adversely affect our financial statements. Certain of our businesses operate in industries that may experience periodic, cyclical downturns.

Demand for some of our products depends on capital spending policies of our customers and on government funding policies. Our customers include pharmaceutical and chemical companies, laboratories, universities, healthcare providers, government agencies and public and private research institutions. Many factors, including public policy spending priorities, available resources and product and economic cycles, have a significant effect on the capital spending policies of these entities.

Spending by some of these customers fluctuates based on budget allocations and the timely passage of the annual federal budget. An impasse in federal government budget decisions could lead to substantial delays or reductions in federal spending.

Economic, political, foreign currency and other risks associated with international sales and operations could adversely affect our results of operations. International markets contribute a substantial portion of our revenues, and we intend to continue expanding our presence in these regions. The exposure to fluctuations in currency exchange rates takes on different forms. International revenues and costs are subject to the risk that fluctuations in exchange rates could adversely affect our reported revenues and profitability when translated into U.S. dollars for financial reporting purposes. These fluctuations could also adversely affect the demand for products and services provided by us. As a multinational corporation, our businesses occasionally invoice third-party customers in currencies other than the one in which they primarily do business (the “functional currency”). Movements in the invoiced currency relative to the functional currency could adversely impact our cash flows and our results of operations. As our international sales grow, exposure to fluctuations in currency exchange rates could have a larger effect on our financial results. In 2019, currency translation had an unfavorable effect of $440 million on revenues due to the strengthening of the U.S. dollar relative to other currencies in which the company sells products and services.

In addition, many of our employees, contract manufacturers, suppliers, job functions, outsourcing activities and manufacturing facilities are located outside the United States. Accordingly, our future results could be harmed by a variety of factors, including:

- interruption to transportation flows for delivery of parts to us and finished goods to our customers;
- changes in a specific country's or region's political, economic or other conditions;
- changes in diplomatic and trade relationships, including new tariffs, trade protection measures, import or export licensing requirements, trade embargoes and sanctions and other trade barriers;

- tariffs imposed by the U.S. on goods from other countries and tariffs imposed by other countries on U.S. goods, including the tariffs recently adopted by the U.S. government on various imports from China and by the Chinese government on certain U.S. goods;
- the impact of public health epidemics on the global economy, such as the coronavirus currently impacting China;
- negative consequences from changes in tax laws;
- difficulty in staffing and managing widespread operations;
- differing labor regulations;
- differing protection of intellectual property;
- unexpected changes in regulatory requirements; and
- geopolitical uncertainty or turmoil, including terrorism and war.

For example, on January 31, 2020, the United Kingdom formally withdrew from the European Union, or EU and entered a transition period during which it will negotiate a trade deal with the EU. This withdrawal has created political and economic uncertainty, particularly in the United Kingdom and the EU, and this uncertainty may last for years. Our business could be affected during this period of uncertainty, and perhaps longer, by the impact of the United Kingdom's withdrawal from the EU. In addition, our business could be negatively affected by new trade agreements between the United Kingdom and other countries, including the United States, and by the possible imposition of trade or other regulatory barriers in the United Kingdom. These possible negative impacts, and others resulting from the United Kingdom's withdrawal from the EU, may adversely affect our operating results and our customers' businesses.

Our inability to protect our intellectual property could have a material adverse effect on our business. In addition, third parties may claim that we infringe their intellectual property, and we could suffer significant litigation or licensing expense as a result. We place considerable emphasis on obtaining patent and trade secret protection for significant new technologies, products and processes because of the length of time and expense associated with bringing new products through the development process and into the marketplace. Our success depends in part on our ability to develop patentable products and obtain and enforce patent protection for our products both in the United States and in other countries. We own numerous U.S. and foreign patents, and we intend to file additional applications, as appropriate, for patents covering our products. Patents may not be issued for any pending or future patent applications owned by or licensed to us, and the claims allowed under any issued patents may not be sufficiently broad to protect our technology. Any issued patents owned by or licensed to us may be challenged, invalidated or circumvented, and the rights under these patents may not provide us with competitive advantages. In addition, competitors may design around our technology or develop competing technologies. Intellectual property rights may also be unavailable or limited in some foreign countries, which could make it easier for competitors to capture increased market position. We could incur substantial costs to defend ourselves in suits brought against us or in suits in which we may assert our patent rights against others. An unfavorable outcome of any such litigation could materially adversely affect our business and results of operations.

We also rely on trade secrets and proprietary know-how with which we seek to protect our products, in part, by confidentiality agreements with our collaborators, employees and consultants. These agreements may be breached and we may not have adequate remedies for any breach. In addition, our trade secrets may otherwise become known or be independently developed by our competitors.

Third parties may assert claims against us to the effect that we are infringing on their intellectual property rights. In the event that a claim relating to intellectual property is asserted against us, or third parties not affiliated with us hold pending or issued patents that relate to our products or technology, we may seek licenses to such intellectual property or challenge those patents. However, we may be unable to obtain these licenses on commercially reasonable terms, if at all, and our challenge of the patents may be unsuccessful. Our failure to obtain the necessary licenses or other rights could prevent the sale, manufacture, or distribution of our products and, therefore, could have a material adverse effect on our business, financial condition and results of operations.

Changes in governmental regulations may reduce demand for our products or increase our expenses. We compete in many markets in which we and our customers must comply with federal, state, local and international

regulations, such as environmental, health and safety and food and drug regulations. We develop, configure and market our products to meet customer needs created by those regulations. Any significant change in regulations could reduce demand for our products or increase our expenses. For example, we manufacture pharmaceuticals and many of our instruments are marketed to the

pharmaceutical industry for use in discovering and developing drugs. Changes in the U.S. Food and Drug Administration's regulation of the drug discovery and development process could have an adverse effect on the demand for these products.

Our pharma services offerings are highly complex, and if we are unable to provide quality and timely offerings to our customers, our business could suffer. Our pharma services offerings are highly exacting and complex, due in part to strict quality and regulatory requirements. Our operating results in this business depend on our ability to execute and, when necessary, improve our quality management strategy and systems, and our ability to effectively train and maintain our employee base with respect to quality management. A failure of our quality control systems could result in problems with facility operations or preparation or provision of products. In each case, such problems could arise for a variety of reasons, including equipment malfunction, failure to follow specific protocols and procedures, problems with raw materials or environmental factors and damage to, or loss of, manufacturing operations. Such problems could affect production of a particular batch or series of batches of products, requiring the destruction of such products or a halt of facility production altogether.

In addition, our failure to meet required quality standards may result in our failure to timely deliver products to our customers, which in turn could damage our reputation for quality and service. Any such failure could, among other things, lead to increased costs, lost revenue, reimbursement to customers for lost drug product, registered intermediates, registered starting materials, and active pharmaceutical ingredients, other customer claims, damage to and possibly termination of existing customer relationships, time and expense spent investigating the cause and, depending on the cause, similar losses with respect to other batches or products. Production problems in our drug and biologic manufacturing operations could be particularly significant because the cost of raw materials for such manufacturing is often high. If problems in preparation or manufacture of a product or failures to meet required quality standards for that product are not discovered before such product is released to the market, we may be subject to adverse regulatory actions, including product recalls, product seizures, injunctions to halt manufacture and distribution, restrictions on our operations, civil sanctions, including monetary sanctions, and criminal actions. In addition, such problems or failures could subject us to litigation claims, including claims from our customers for reimbursement for the cost of lost or damaged active pharmaceutical ingredients, the cost of which could be significant.

We are subject to product and other liability risks for which we may not have adequate insurance coverage. We may be named as a defendant in product liability lawsuits, which may allege that products or services we have provided from our pharma services offerings have resulted or could result in an unsafe condition or injury to consumers. Additionally, products currently or previously sold by our environmental and process instruments and radiation measurement and security instruments businesses include fixed and portable instruments used for chemical, radiation and trace explosives detection. These products are used in airports, embassies, cargo facilities, border crossings and other high-threat facilities for the detection and prevention of terrorist acts. If any of these products were to malfunction, it is possible that explosive or radioactive material could fail to be detected by our product, which could lead to product liability claims. There are also many other factors beyond our control that could lead to liability claims, such as the reliability and competence of the customers' operators and the training of such operators.

Any such product liability claims brought against us could be significant and any adverse determination may result in liabilities in excess of our insurance coverage. Although we carry product liability insurance, we cannot be certain that our current insurance will be sufficient to cover these claims or that it can be maintained on acceptable terms, if at all.

Our inability to complete any pending acquisitions or to successfully integrate any new or previous acquisitions could have a material adverse effect on our business. Our business strategy includes the acquisition of technologies and businesses that complement or augment our existing products and services. Certain acquisitions may be difficult to complete for a number of reasons, including the need for antitrust and/or other regulatory approvals. Any acquisition we may complete may be made at a substantial premium over the fair value of the net identifiable assets of the acquired company. Further, we may not be able to integrate acquired businesses successfully into our existing businesses, make such businesses profitable, or realize anticipated cost savings or synergies, if any, from these acquisitions, which could adversely affect our business.

Moreover, we have acquired many companies and businesses. As a result of these acquisitions, we recorded significant goodwill and indefinite-lived intangible assets (primarily tradenames) on our balance sheet, which amount to approximately $25.71 billion and $1.25 billion, respectively, as of December 31, 2019. In addition, we have

definite-lived intangible assets totaling $12.76 billion as of December 31, 2019. We assess the realizability of goodwill and indefinite-lived intangible assets annually as well as whenever events or changes in circumstances indicate that these assets may be impaired. We assess the realizability of definite-lived intangible assets whenever events or changes in circumstances indicate that these assets may be impaired. These events or circumstances would generally include operating losses or a significant decline in earnings associated with the acquired business or asset. Our ability to realize the value of the goodwill and intangible assets will depend on the future cash flows of these businesses. These cash flows in turn depend in part on how well we have integrated these businesses.

If we are not able to realize the value of the goodwill and intangible assets, we may be required to incur material charges relating to the impairment of those assets.

We are subject to laws and regulations governing government contracts, and failure to address these laws and regulations or comply with government contracts could harm our business by leading to a reduction in revenue associated with these customers. We have agreements relating to the sale of our products to government entities and, as a result, we are subject to various statutes and regulations that apply to companies doing business with the government. The laws governing government contracts differ from the laws governing private contracts and government contracts may contain pricing terms and conditions that are not applicable to private contracts. We are also subject to investigation for compliance with the regulations governing government contracts. A failure to comply with these regulations could result in suspension of these contracts, criminal, civil and administrative penalties or debarment.

Because we compete directly with certain of our larger customers and product suppliers, our results of operations could be adversely affected in the short term if these customers or suppliers abruptly discontinue or significantly modify their relationship with us. Our largest customer in the laboratory products business is also a significant competitor. Our business may be harmed in the short term if our competitive relationship in the marketplace with certain of our large customers results in a discontinuation of their purchases from us. In addition, we manufacture products that compete directly with products that we source from third-party suppliers. We also source competitive products from multiple suppliers. Our business could be adversely affected in the short term if any of our large third-party suppliers abruptly discontinues selling products to us.

Because we rely heavily on third-party package-delivery services, a significant disruption in these services or significant increases in prices may disrupt our ability to ship products, increase our costs and lower our profitability. We ship a significant portion of our products to our customers through independent package delivery companies, such as Federal Express in the U.S. and DHL in Europe. We also maintain a small fleet of vehicles dedicated to the delivery of our products and ship our products through other carriers, including national and regional trucking firms, overnight carrier services and the U.S. Postal Service. If one or more of these third-party package-delivery providers were to experience a major work stoppage, preventing our products from being delivered in a timely fashion or causing us to incur additional shipping costs we could not pass on to our customers, our costs could increase and our relationships with certain of our customers could be adversely affected. In addition, if one or more of these third-party package-delivery providers were to increase prices, and we were not able to find comparable alternatives or make adjustments in our delivery network, our profitability could be adversely affected.

We are required to comply with a wide variety of laws and regulations, and are subject to regulation by various federal, state and foreign agencies. We are subject to various local, state, federal, foreign and transnational laws and regulations, which include the operating and security standards of the U.S. Federal Drug Administration (the FDA), the U.S. Drug Enforcement Agency (the DEA), various state boards of pharmacy, state health departments, the U.S. Department of Health and Human Services (the DHHS), the European Medicines Agency (the EMA), in Europe, the EU member states and other comparable agencies and, in the future, any changes to such laws and regulations could adversely affect us. In particular, we are subject to laws and regulations concerning current good manufacturing practices and drug safety. Our subsidiaries may be required to register for permits and/or licenses with, and may be required to comply with the laws and regulations of the DEA, the FDA, the DHHS, foreign agencies including the EMA, and other various state boards of pharmacy, state health departments and/or comparable state agencies as well as certain accrediting bodies depending upon the type of operations and location of product distribution, manufacturing and sale.

The manufacture, distribution and marketing of many of our products and services, including medical devices and pharma services, are subject to extensive ongoing regulation by the FDA, the DEA, the EMA, and other equivalent local, state, federal and non-U.S. regulatory authorities. In addition, we are subject to inspections by these regulatory authorities. Failure by us or by our customers to comply with the requirements of these regulatory authorities, including without limitation, remediating any inspectional observations to the satisfaction of these regulatory authorities, could result in warning letters, product recalls or seizures, monetary sanctions, injunctions to halt manufacture and distribution, restrictions on our operations, civil or criminal sanctions, or withdrawal of existing or denial of pending approvals, including those relating to products or facilities. In addition, such a failure could expose us to contractual or product liability claims, contractual claims from our customers, including claims for reimbursement for lost or damaged active pharmaceutical ingredients, as well as ongoing remediation and increased

compliance costs, any or all of which could be significant. We are the sole manufacturer of a number of pharmaceuticals for many of our customers and a negative regulatory event could impact our customers' ability to provide products to their customers.

We are also subject to a variety of federal, state, local and international laws and regulations that govern, among other things, the handling, transportation and manufacture of substances that could be classified as hazardous, and we are required to

comply with various import laws and export control and economic sanctions laws, which may affect our transactions with certain customers. In certain circumstances, export control and economic sanctions regulations may prohibit the export of certain products, services and technologies. In other circumstances, we may be required to obtain an export license before exporting the controlled item. Compliance with the various import laws that apply to our businesses can restrict our access to, and increase the cost of obtaining, certain products and at times can interrupt our supply of imported inventory. Any noncompliance by us with applicable laws and regulations or the failure to maintain, renew or obtain necessary permits and licenses could result in criminal, civil and administrative penalties and could have an adverse effect on our results of operations.

Our reputation, ability to do business and financial statements may be impaired by improper conduct by any of our employees, agents or business partners. We have internal controls and compliance systems to protect the company against acts committed by employees, agents or businesses that we acquire that would violate U.S. and/or non-U.S. laws, including the laws governing payments to government officials, bribery, fraud, kickbacks and false claims, pricing, sales and marketing practices, conflicts of interest, competition, employment practices and workplace behavior, export and import compliance, money laundering and data privacy, but we cannot provide assurance that these controls and systems will prevent every such wrongful act. In particular, the U.S. Foreign Corrupt Practices Act, the U.K. Bribery Act and similar anti-bribery laws in other jurisdictions generally prohibit companies and their intermediaries from making improper payments to government officials for the purpose of obtaining or retaining business, and we operate in many parts of the world that have experienced governmental corruption to some degree. Any such improper actions or allegations of such acts could damage our reputation and subject us to civil or criminal investigations in the United States and in other jurisdictions and related shareholder lawsuits, could lead to substantial civil and criminal, monetary and nonmonetary penalties and could cause us to incur significant legal and investigatory fees. In addition, the government may seek to hold us liable for violations committed by companies which we acquire. We also rely on our suppliers to adhere to our supplier standards of conduct, and material violations of such standards of conduct could occur that could have a material effect on our business, reputation and financial statements.

Natural disasters, public health crises, political crises, and other catastrophic events or other events outside of our control may disrupt our facilities or the facilities of third parties on which we depend, and could impact customer spending. We have significant operations in California, near major earthquake faults, which make us susceptible to earthquake risk. An earthquake or other natural disaster such as a fire or hurricane or power shortages or outages could disrupt our operations or impair our critical systems. Any of these disruptions or other events outside of our control, such as strikes or other labor unrest, could have an adverse effect on our results of operations. In addition, if any of our facilities, including our manufacturing or warehouse facilities, or the facilities of our suppliers, third-party service providers, or customers, is affected by natural disasters, such as earthquakes, tsunamis, power shortages or outages, floods or monsoons, public health crises, such as pandemics and epidemics, political crises, such as terrorism, war, political instability or other conflict, or other events outside of our control, such as strikes or other labor unrest, our results of operations could be adversely affected. Moreover, these types of events could negatively impact customer spending in the impacted regions or depending upon the severity, globally, which could also adversely impact our operating results. For example, in December 2019, a strain of coronavirus surfaced in Wuhan, China which could have a material adverse effect on our business and results of operations. The effects could include restrictions on our ability to travel to support our sites in China or our customers located there, disruptions in our ability to distribute products, and/or temporary closures of our facilities in China or the facilities of our suppliers or customers. Related disruption, inside or outside of China, to our operations or the operations of our suppliers or customers would likely impact our sales and operating results. At this point, the extent to which the coronavirus may impact our results of operations is uncertain.

Fluctuations in our effective tax rate may adversely affect our results of operations and cash flows. As a global company, we are subject to taxation in numerous countries, states and other jurisdictions. In preparing our financial statements, we record the amount of tax that is payable in each of the countries, states and other jurisdictions in which we operate. Our future effective tax rate, however, may be lower or higher than experienced in the past due to numerous factors, including a change in the mix of our profitability from country to country, changes in accounting for income taxes and recently enacted and future changes in tax laws in jurisdictions in which we operate. Any of these factors could cause us to experience an effective tax rate significantly different from previous periods or our current expectations, which could have an adverse effect on our business, results of operations and cash flows.

We may incur unexpected costs from increases in fuel and raw material prices, which could reduce our earnings and cash flow. Our primary commodity exposures are for fuel, petroleum-based resins and steel. While we may seek to minimize the impact of price increases through higher prices to customers and various cost-saving measures, our earnings and cash flows could be adversely affected in the event these measures are insufficient to cover our costs.

Our reliance upon sole or limited sources of supply for certain materials or components could cause production interruptions, delays and inefficiencies. Some of our businesses purchase certain materials from sole or limited source suppliers for reasons of quality assurance, regulatory requirements, cost effectiveness, availability or uniqueness of design. If

these or other suppliers encounter financial, operating or other difficulties or if our relationship with them changes, we might not be able to quickly establish or qualify replacement sources of supply. The supply chains for our businesses could also be disrupted by supplier capacity constraints, bankruptcy or exiting of the business for other reasons, decreased availability of key raw materials or commodities and external events such as natural disasters, pandemic health issues, war, terrorist actions, governmental actions and legislative or regulatory changes. Any of these factors could result in production interruptions, delays, extended lead times and inefficiencies.

A significant disruption in, or breach in security of, our information technology systems or violation of data privacy laws could adversely affect our business. As a part of our ongoing effort to upgrade our current information systems, we periodically implement new enterprise resource planning software and other software applications to manage certain of our business operations. As we implement and add functionality, problems could arise that we have not foreseen. Such problems could disrupt our ability to provide quotes, take customer orders and otherwise run our business in a timely manner. When we upgrade or change systems, we may suffer interruptions in service, loss of data or reduced functionality. In addition, if our new systems fail to provide accurate pricing and cost data our results of operations and cash flows could be adversely affected.

We also rely on our information technology systems to process, transmit and store electronic information (including sensitive data such as confidential business information and personally identifiable data relating to employees, customers and other business partners) and to manage or support a variety of critical business processes and activities (such as interacting with suppliers, selling our products and services, fulfilling orders and billing, collecting and making payments, shipping products, providing services and support to customers, tracking customer activity, fulfilling contractual obligations and otherwise conducting business). Our systems may be vulnerable to damage or interruption from natural disasters, power loss, telecommunication failures, terrorist attacks, computer hackers, computer viruses, ransomware, phishing, computer denial-of-service attacks, unauthorized access to customer or employee data or company trade secrets, and other attempts to harm our systems. Certain of our systems are not redundant, and our disaster recovery planning is not sufficient for every eventuality. Despite any precautions we may take, such problems could result in, among other consequences, interruptions in our services, which could harm our reputation and financial results. Any of the cyber-attacks, breaches or other disruptions or damage described above, if significant, could materially interrupt our operations, delay production and shipments, result in theft of our and our customers' intellectual property and trade secrets, damage customer, business partner and employee relationships and our reputation or result in defective products or services, legal claims and proceedings, liability and penalties under privacy laws and increased cost for security and remediation, each of which could adversely affect our business and financial results.

If we are unable to maintain reliable information technology systems and appropriate controls with respect to global data privacy and security requirements and prevent data breaches, we may suffer regulatory consequences in addition to business consequences. As a global organization, we are subject to data privacy and security laws, regulations, and customer-imposed controls in numerous jurisdictions as a result of having access to and processing confidential, personal and/or sensitive data in the course of our business. For example, in the United States, individual states regulate data breach and security requirements and multiple governmental bodies assert authority over aspects of the protection of personal privacy. European laws require us to have an approved legal mechanism to transfer personal data out of Europe, and the EU General Data Protection Regulation imposes significantly stricter requirements in how we collect and process personal data. Several countries, such as China and Russia, have passed laws that require personal data relating to their citizens to be maintained on local servers and impose additional data transfer restrictions. Government enforcement actions can be costly and interrupt the regular operation of our business, and data breaches or violations of data privacy laws can result in fines, reputational damage and civil lawsuits, any of which may adversely affect our business, reputation and financial statements.

Our debt may restrict our investment opportunities or limit our activities. As of December 31, 2019, we had approximately $17.75 billion in outstanding indebtedness. In addition, we have availability to borrow under a revolving credit facility that provides for up to $2.50 billion of unsecured multi-currency revolving credit. We may also obtain additional long-term debt and lines of credit to meet future financing needs, which would have the effect of increasing our total leverage.

Our leverage could have negative consequences, including increasing our vulnerability to adverse economic and industry conditions, limiting our ability to obtain additional financing and limiting our ability to acquire new products and technologies through strategic acquisitions.

Our ability to make scheduled payments, refinance our obligations or obtain additional financing will depend on our future operating performance and on economic, financial, competitive and other factors beyond our control. Our business may not generate sufficient cash flow to meet our obligations. If we are unable to service our debt, refinance our existing debt or obtain additional financing, we may be forced to delay strategic acquisitions, capital expenditures or research and development expenditures.

Risk Factors (continued)

Additionally, the agreements governing our debt require that we maintain certain financial ratios, and contain affirmative and negative covenants that restrict our activities by, among other limitations, limiting our ability to incur additional indebtedness, merge or consolidate with other entities, make investments, create liens, sell assets and enter into transactions with affiliates. The covenants in our revolving credit facility (the Facility) include a Consolidated Leverage Ratio (total debt-to-Consolidated EBITDA) and a Consolidated Interest Coverage Ratio (Consolidated EBITDA to Consolidated Interest Expense), as such terms are defined in the Facility. Specifically, the company has agreed that, so long as any lender has any commitment under the Facility, any letter of credit is outstanding under the Facility, or any loan or other obligation is outstanding under the Facility, it will maintain a maximum Consolidated Leverage Ratio of 3.5:1.0. The company has also agreed that so long as any lender has any commitment under the Facility or any letter of credit is outstanding under the Facility, or any loan or other obligation is outstanding under the Facility, it will maintain a minimum Consolidated Interest Coverage Ratio of 3.0:1.0 as of the last day of any fiscal quarter.

Our ability to comply with these financial restrictions and covenants is dependent on our future performance, which is subject to prevailing economic conditions and other factors, including factors that are beyond our control such as foreign exchange rates and interest rates. Our failure to comply with any of these restrictions or covenants may result in an event of default under the applicable debt instrument, which could permit acceleration of the debt under that instrument and require us to prepay that debt before its scheduled due date. Also, an acceleration of the debt under certain of our debt instruments would trigger an event of default under other of our debt instruments.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

The company owns and leases office, engineering, laboratory, production and warehouse space throughout the world.

Item 3. Legal Proceedings

There are various lawsuits and claims against the company involving product liability, intellectual property, employment and commercial issues. See “Note 12 to our Consolidated Financial Statements – Commitments and Contingencies.”

Item 4. Mine Safety Disclosures

Not applicable.

PART II

Item 5. Market for the Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities

Market Price of Common Stock

Our common stock is traded on the New York Stock Exchange under the symbol TMO.

Holders of Common Stock

As of February 1, 2020, the company had 3,154 holders of record of its common stock. This does not include holdings in street or nominee names.

Issuer Purchases of Equity Securities

A summary of the share repurchase activity for the company's fourth quarter of 2019 follows:

Period	Total Number of Shares Purchased	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs (1)	Maximum Dollar Amount of Shares That May Yet Be Purchased Under the Plans or Programs (1) (in millions)
Fiscal October (Sep. 29 - Nov. 2)	2,636,305	$ 284.49	2,636,305	$ 500
Fiscal November (Nov. 3 - Nov. 30)	—		—	2,500
Fiscal December (Dec. 1 - Dec. 31)	—		—	2,500
Total Fourth Quarter	2,636,305	$ 284.49	2,636,305	$ 2,500

(1) On September 7, 2018, the Board of Directors authorized the repurchase of up to $2.00 billion of the company's common stock. All of the shares of common stock repurchased by the company during the fourth quarter of 2019 were purchased under this program. On November 8, 2019, the Board of Directors replaced the existing authorization to repurchase the company's common stock, of which $500 million was remaining, with a new authorization to repurchase up to $2.50 billion of the company's common stock. At February 26, 2020, authorization remained for $1.00 billion of future repurchases of the company's common stock.

Item 6. Selected Financial Data

(In millions except per share amounts)	2019 (a)	2018 (b)	2017 (c)	2016 (d)	2015 (e)
Statement of Income Data					
Revenues	$ 25,542	$ 24,358	$ 20,918	$ 18,274	$ 16,965
Income from Continuing Operations	3,696	2,938	2,228	2,025	1,980
Net Income	3,696	2,938	2,225	2,022	1,975
Earnings per Share from Continuing Operations:					
Basic	9.24	7.31	5.65	5.13	4.97
Diluted	9.17	7.24	5.60	5.10	4.93
Earnings per Share:					
Basic	9.24	7.31	5.64	5.12	4.96
Diluted	9.17	7.24	5.59	5.09	4.92
Balance Sheet Data					
Total Assets	$ 58,381	$ 56,232	$ 56,669	$ 45,908	$ 40,834
Long-term Obligations	17,076	17,719	18,873	15,372	11,420
Cash Dividend Declared per Common Share	$ 0.76	$ 0.68	$ 0.60	$ 0.60	$ 0.60

The caption "restructuring and other costs/income" in the notes below includes amounts charged to cost of revenues, primarily for the sale of inventories revalued at the date of acquisition, and charges/credits to selling, general and administrative expense primarily for significant acquisition transaction costs.

(a) Reflects $334 million of pre-tax income from gains on sale of businesses, net of restructuring and other costs and $184 million of pre-tax losses on the early extinguishment of debt.

(b) Reflects $91 million of pre-tax charges for restructuring and other costs.

(c) Reflects $298 million of pre-tax charges for restructuring and other costs. Also reflects the acquisition of Patheon N.V. in August 2017.

(d) Reflects $395 million of pre-tax charges for restructuring and other costs. Also reflects the acquisitions of Affymetrix, Inc. in March 2016 and FEI Company in September 2016.

(e) Reflects $171 million of pre-tax charges for restructuring and other costs.

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

Reference is made throughout this Management's Discussion and Analysis of Financial Condition and Results of Operations to Notes to the Consolidated Financial Statements, which begin on page F-1 of this report. Management's discussion and analysis of financial condition and results of operations for 2017 is included in Item 7 of the company's 2018 Annual Report on Form 10-K filed with the Securities and Exchange Commission.

Overview

The company develops, manufactures and sells a broad range of products that are sold worldwide. The company expands the product lines and services it offers by developing and commercializing its own technologies and by making strategic acquisitions of complementary businesses. The company's operations fall into four segments (see Note 4): Life Sciences Solutions, Analytical Instruments, Specialty Diagnostics and Laboratory Products and Services.

Recent Acquisitions and Divestiture

The company's strategy is to augment internal growth at existing businesses with complementary acquisitions. The company's principal recent acquisitions and divestiture are described below.

On October 25, 2018, the company acquired, within the Life Sciences Solutions segment, Becton Dickinson and Company's Advanced Bioprocessing business for $477 million in cash. This North America-based business adds complementary cell culture products that expand the segment's bioproduction offerings to help customers increase yield during production of biologic drugs. The Advanced Bioprocessing business reported revenues of $100 million in 2017.

On April 30, 2019, the company acquired, within the Laboratory Products and Services segment, Brammer Bio for approximately $1.67 billion in cash. Brammer Bio is a leading viral vector contract development and manufacturing organization for gene and cell therapies. The acquisition expands the segment's contract manufacturing capabilities. Brammer Bio reported revenues of approximately $140 million in 2018.

On June 28, 2019, the company sold its Anatomical Pathology business to PHC Holdings Corporation for $1.13 billion, net of cash divested. The business was part of the Specialty Diagnostics segment. The sale of this business resulted in a pre-tax gain of approximately $478 million, included in restructuring and other (income) costs, net. Revenues in 2019, through the date of sale, and the full year 2018 of the business sold were approximately $115 million and $238 million, respectively, net of retained sales through the company's healthcare market and research and safety market channel businesses.

Overview of Results of Operations and Liquidity

(Dollars in millions)	2019		2018	
Revenues				
Life Sciences Solutions	$ 6,856	26.8 %	$ 6,269	25.7 %
Analytical Instruments	5,522	21.6 %	5,469	22.5 %
Specialty Diagnostics	3,718	14.6 %	3,724	15.3 %
Laboratory Products and Services	10,599	41.5 %	10,035	41.2 %
Eliminations	(1,153)	(4.5)%	(1,139)	(4.7)%
	$ 25,542	100 %	$ 24,358	100 %

Sales in 2019 were $25.54 billion, an increase of $1.18 billion from 2018. Sales increased $153 million due to acquisitions, net of a divestiture. The unfavorable effects of currency translation resulted in a decrease in revenues of $440 million in 2019. Aside from the effects of acquisitions/divestitures and currency translation, revenues increased $1.47 billion (6%) primarily due to increased demand. Sales to customers in each of the company's primary end markets grew with particular strength in sales to customers in the biotech and pharmaceutical industry. Sales growth was strong in each of the company's primary geographic areas in 2019. In the fourth quarter of 2019, sales to industrial customers declined and sales growth in Asia was modest due to weaker end market conditions off of a strong fourth quarter in 2018.

Overview of Results of Operations and Liquidity (continued)

In 2019, total company operating income and operating income margin were $4.59 billion and 18.0%, respectively, compared with $3.78 billion and 15.5%, respectively, in 2018. The increase in operating income was primarily due to profit on higher sales, the gain on the sale of the Anatomical Pathology business and, to a lesser extent, productivity improvements, net of inflationary cost increases. These increases were offset in part by strategic growth investments, sales mix and unfavorable foreign currency exchange. The company's references to strategic growth investments generally refer to targeted spending for enhancing commercial capabilities, including expansion of geographic sales reach and e-commerce platforms, marketing initiatives, expanded service and operational infrastructure, focused research projects and other expenditures to enhance the customer experience. The company's references throughout this discussion to productivity improvements generally refer to improved cost efficiencies from its Practical Process Improvement (PPI) business system, reduced costs resulting from global sourcing initiatives, a lower cost structure following restructuring actions, including headcount reductions and consolidation of facilities, and low cost region manufacturing.

The company recorded a $374 million provision for income taxes in 2019 including $191 million related to the gain on the sale of the Anatomical Pathology business. In 2019, the company recorded a $62 million income tax benefit related to a foreign exchange loss for tax purposes on certain intercompany financing arrangements, implemented foreign tax credit planning in Sweden which resulted in $75 million of foreign tax credits, with no related incremental U.S. income tax expense, and recorded a $79 million income tax benefit related to the deferred tax implications of intra-entity transactions which included a tax benefit to release a valuation allowance against net operating losses previously determined to be unrealizable.

The company recorded a $324 million provision for income taxes in 2018 including a net provision of $68 million to adjust the estimated initial effects of the Tax Cuts and Jobs Act of 2017 (the Tax Act) recorded in 2017, consisting of an incremental provision of $117 million offset in part by a $49 million reduction of related unrecognized tax benefits established in 2017. These adjustments were required based on new U.S. Treasury guidance and further analysis of available tax accounting methods and elections, legislative updates, regulations, earnings and profit computations and foreign taxes. In 2018, the provision for income taxes also included a $71 million charge to establish a valuation allowance against net operating losses that will not be utilized as a result of the 2019 sale of the Anatomical Pathology business.

The effective tax rate in both 2019 and 2018 was also affected by relatively significant earnings in lower tax jurisdictions. Due primarily to the non-deductibility of intangible asset amortization for tax purposes, the company's cash payments for income taxes were higher than its income tax expense for financial reporting purposes and totaled $896 million and $591 million in 2019 and 2018, respectively.

The company expects its effective tax rate in 2020 will be between 8% and 10% based on currently forecasted rates of profitability in the countries in which the company conducts business and expected generation of foreign tax credits. The effective tax rate can vary significantly from period to period as a result of discrete income tax factors and events.

Income from continuing operations increased to $3.70 billion in 2019, from $2.94 billion in 2018 principally due to increase in operating income in 2019 (discussed above) offset in part by $184 million of losses on the early extinguishment of debt in 2019 (Note 10).

During 2019, the company's cash flow from operations totaled $4.97 billion compared with $4.54 billion for 2018. The increase primarily resulted from higher income before amortization and depreciation and lower investment in working capital in the 2019 period.

As of December 31, 2019, the company's short-term debt totaled $676 million, including $672 million of senior notes due within the next twelve months. The company has a revolving credit facility with a bank group that provides up to $2.50 billion of unsecured multi-currency revolving credit. If the company borrows under this facility, it intends to leave undrawn an amount equivalent to outstanding commercial paper to provide a source of funds in the event that commercial paper markets are not available. As of December 31, 2019, no borrowings were outstanding under the company's revolving credit facility, although available capacity was reduced by approximately $72 million as a result of outstanding letters of credit.

The company believes that its existing cash and cash equivalents of $2.40 billion as of December 31, 2019 and its future cash flow from operations together with available borrowing capacity under its revolving credit agreement will be sufficient to meet the cash requirements of its existing businesses for the foreseeable future, including at least the next 24 months.

Critical Accounting Policies and Estimates

The company's discussion and analysis of its financial condition and results of operations is based upon its financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States of America. The preparation of these financial statements requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenue and expenses and related disclosure of contingent liabilities. On an on-going basis, management evaluates its estimates, including those related to intangible assets and goodwill, income taxes and contingencies and litigation. Management believes the most complex and sensitive judgments, because of their significance to the consolidated financial statements, result primarily from the need to make estimates about the effects of matters that are inherently uncertain. Management bases its estimates on historical experience, current market and economic conditions and other assumptions that management believes are reasonable. The results of these estimates form the basis for judgments about the carrying value of assets and liabilities where the values are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

The company believes the following represent its critical accounting policies and estimates used in the preparation of its financial statements:

(a) *Intangible Assets and Goodwill*

The company uses assumptions and estimates in determining the fair value of assets acquired and liabilities assumed in a business combination. The determination of the fair value of intangible assets, which represent a significant portion of the purchase price in many of the company's acquisitions, requires the use of significant judgment with regard to (i) the fair value; and (ii) whether such intangibles are amortizable or non-amortizable and, if the former, the period and the method by which the intangible asset will be amortized. The company estimates the fair value of acquisition-related intangible assets principally based on projections of cash flows that will arise from identifiable intangible assets of acquired businesses. The projected cash flows are discounted to determine the present value of the assets at the dates of acquisition. Definite-lived intangible assets totaled $12.76 billion at December 31, 2019. The company reviews definite-lived intangible assets for impairment when indication of potential impairment exists, such as a significant reduction in cash flows associated with the assets. Actual cash flows arising from a particular intangible asset could vary from projected cash flows which could imply different carrying values from those established at the dates of acquisition and which could result in impairment of such asset.

The company evaluates goodwill and indefinite-lived intangible assets for impairment annually and when events occur or circumstances change that would more-likely-than-not reduce the fair value of the asset below its carrying amount. Events or circumstances that might require an interim evaluation include unexpected adverse business conditions, economic factors, unanticipated technological changes or competitive activities, loss of key personnel and acts by governments and courts. Goodwill and indefinite-lived intangible assets totaled $25.71 billion and $1.25 billion, respectively, at December 31, 2019. Estimates of discounted future cash flows require assumptions related to revenue and operating income growth rates, discount rates and other factors. For the goodwill impairment tests, the company considers (i) peer revenues and earnings trading multiples from companies that have operational and financial characteristics that are similar to the respective reporting units and (ii) estimated weighted average costs of capital. Different assumptions from those made in the company's analysis could materially affect projected cash flows and the company's evaluation of goodwill and indefinite-lived intangible assets for impairment.

For reporting units where the company performed the quantitative goodwill impairment test, indications of fair value based on projections of profitability and on peer revenues and earnings trading multiples were sufficient to conclude that no impairment of goodwill or indefinite-lived intangible assets existed at the end of the tenth fiscal month of 2019, the date of the company's annual impairment testing. There can be no assurance, however, that an economic downturn will not materially adversely affect peer trading multiples and the company's businesses such that they do not achieve their forecasted profitability and these assets become impaired. Should the fair value of the company's goodwill or indefinite-lived intangible assets decline because of reduced operating performance, market declines, or other indicators of impairment, or as a result of changes in the discount rate, charges for impairment may be necessary.

(b) Income Taxes

In the ordinary course of business there is inherent uncertainty in quantifying the company's income tax positions. The company assesses income tax positions and records tax benefits for all years subject to examination based upon management's evaluation of the facts, circumstances and information available at the reporting date. For those tax

Critical Accounting Policies and Estimates (continued)

positions where it is more likely than not that a tax benefit will be sustained, the company has recorded the largest amount of tax benefit with a greater than 50 percent likelihood of being realized upon ultimate settlement with a taxing authority that has full knowledge of all relevant information. For those income tax positions where it is not more likely than not that a tax benefit will be sustained, no tax benefit has been recognized in the financial statements. Should tax return positions that the company expects are sustainable not be sustained upon audit, the company could be required to record an incremental tax provision for such taxes. The company's liability for these unrecognized tax benefits totaled $1.55 billion at December 31, 2019.

The company operates in numerous countries under many legal forms and, as a result, is subject to the jurisdiction of numerous domestic and non-U.S. tax authorities, as well as to tax agreements and treaties among these governments. Determination of taxable income in any jurisdiction requires the company to interpret the related tax laws and regulations and the use of estimates and assumptions regarding significant future events, such as the amount, timing and character of deductions, permissible revenue recognition methods under the tax law and the sources and character of income and tax credits. Changes in tax laws, regulations, agreements and treaties, currency exchange restrictions or the company's level of operations or profitability in each taxing jurisdiction could have an impact upon the amount of current and deferred tax balances and hence the company's net income.

The company estimates the degree to which tax assets will result in a benefit, after consideration of all positive and negative evidence, and provides a valuation allowance for tax assets that it believes will more likely than not go unused. In situations in which the company has been able to determine that its deferred tax assets will be realized, that determination generally relies on future reversals of taxable temporary differences and expected future taxable income. If it becomes more likely than not that a tax asset will be used, the company reverses the related valuation allowance. Any such reversals are recorded as a reduction of the company's tax provision. The company's tax valuation allowance totaled $408 million at December 31, 2019. Should the company's actual future taxable income by tax jurisdiction vary from estimates, additional allowances or reversals thereof may be necessary.

The company has not provided U.S. state income taxes or additional non-U.S. taxes on certain of its non-U.S. subsidiaries' undistributed earnings, as such amounts are intended to be reinvested outside the United States indefinitely in the respective jurisdictions based on specific business plans and tax strategies. These business plans and tax strategies consider: short-term and long-term forecasts and budgets of the U.S. parent and non-U.S. subsidiaries; working capital and other needs in locations where earnings are generated; the company's past practices regarding non-U.S. subsidiary dividends; sources of financing by the U.S. parent, such as issuing debt or equity; and uses of cash by the U.S. parent that are more discretionary in nature, such as business combinations and share repurchase programs. However, should the company change its business plans and tax strategies in the future and decide to repatriate a portion of these earnings to one of its U.S. subsidiaries, including cash maintained by these non-U.S. subsidiaries, the company would recognize additional tax liabilities. It is not practicable to estimate the amount of additional U.S. state income tax and non-U.S. tax liabilities that the company would incur. The company's intent is to only make distributions from non-U.S. subsidiaries in the future when they can be made at no net tax costs.

(c) Contingencies and Litigation

The company records accruals for various contingencies, including legal proceedings, environmental, workers' compensation, product, general and auto liabilities, and other claims that arise in the normal course of business. The accruals are based on management's judgment, historical claims experience, the probability of losses and, where applicable, the consideration of opinions of internal and/or external legal counsel and actuarial estimates. Accruals of acquired businesses, including product liability and environmental accruals, are initially recorded at fair value and discounted to their net present value. Additionally, the company records receivables from third-party insurers when recovery has been determined to be probable.

Results of Operations

2019 Compared With 2018

(In millions)	2019	2018	Total Change	Currency Translation / Other *	Acquisitions/ Divestitures	Operations
Revenues						
Life Sciences Solutions	$ 6,856	$ 6,269	$ 587	$ (122)	$ 89	$ 620
Analytical Instruments	5,522	5,469	53	(96)	—	149
Specialty Diagnostics	3,718	3,724	(6)	(66)	(126)	186
Laboratory Products and Services	10,599	10,035	564	(227)	187	604
Eliminations	(1,153)	(1,139)	(14)	71	3	(88)
Consolidated Revenues	$ 25,542	$ 24,358	$ 1,184	$ (440)	$ 153	$ 1,471

* Currency Translation/Other for the Laboratory Products and Services segment includes a reduction of revenue of $60 million for the impact of a change in the method of reporting certain intersegment sales with no impact on consolidated results.

Sales in 2019 were $25.54 billion, an increase of $1.18 billion from 2018. Sales increased $153 million due to acquisitions. The unfavorable effects of currency translation resulted in a decrease in revenues of $440 million in 2019. Aside from the effects of acquisitions and currency translation, revenues increased $1.47 billion (6%) primarily due to increased demand. Sales to customers in each of the company's primary end markets grew with particular strength in sales to customers in the biotech and pharmaceutical industry. Sales growth was strong in each of the company's primary geographic areas in 2019. In the fourth quarter of 2019, sales to industrial customers declined and sales growth in Asia was modest due to weaker end market conditions off of a strong fourth quarter in 2018.

In 2019, total company operating income and operating income margin were $4.59 billion and 18.0%, respectively, compared with $3.78 billion and 15.5%, respectively, in 2018. The increase in operating income was primarily due to profit on higher sales, the gain on the sale of the Anatomical Pathology business and, to a lesser extent, productivity improvements, net of inflationary cost increases. These increases were offset in part by strategic growth investments, sales mix and unfavorable foreign currency exchange.

In 2019, the company recorded restructuring and other income, net, of $334 million, including $482 million of net gains on the sale of businesses, principally the Anatomical Pathology business (see Note 2). The company also recorded $17 million of charges to cost of revenues primarily for the sale of inventories revalued at the date of acquisition, and $62 million of net charges to selling, general and administrative expenses, principally transaction and integration-related costs related to acquisitions and a divestiture. In addition, the company recorded $52 million of cash restructuring charges, net, primarily for employee severance and abandoned facilities costs associated with the closure and consolidation of facilities in the U.S. and Europe (see Note 16).

In 2018, the company recorded restructuring and other costs, net, of $91 million, including $12 million of charges to cost of revenues primarily for the sale of inventories revalued at the date of acquisition. The company recorded $29 million of net charges to selling, general and administrative expenses, primarily for third-party transaction and integration costs associated with recent and pending acquisitions, offset in part by income from favorable results of product liability litigation. In addition, the company recorded $88 million of cash restructuring costs, in its continued effort to streamline operations, including severance at several businesses and abandoned facility expenses at businesses that have been or are being consolidated in the U.S. and Europe. The company also recorded $38 million of other income, net, principally for resolution of a litigation matter.

As of February 26, 2020, the company has identified restructuring actions that will result in additional charges of approximately $65 million, primarily in 2020, and expects to identify additional actions during 2020 which will be

recorded when specified criteria are met, such as communication of benefit arrangements or when the costs have been incurred. Approximately 25% of the additional charges will be incurred in the Life Sciences Solutions segment, 30% in the Analytical Instruments segment, 35% in the Laboratory Products and Services segment, and 10% in the Specialty Diagnostics segment. The restructuring projects for which charges were incurred in 2019 are expected to result in annual cost savings of approximately $60 million beginning in part in 2019 and, to a greater extent, in 2020, including $20 million in the Life Sciences Solutions segment, $15 million in the Analytical Instruments segment, $5 million in the Specialty Diagnostics segment and $20

Results of Operations (continued)

million in the Laboratory Products and Services segment. The restructuring actions for which charges were incurred in 2018 resulted in annual cost savings of approximately $65 million beginning in part in 2018 and to a greater extent in 2019, including $20 million in the Life Sciences Solutions segment, $10 million in the Analytical Instruments segment, $5 million in the Specialty Diagnostics segment and $30 million in the Laboratory Products and Services segment.

Segment Results

The company's management evaluates segment operating performance using operating income before certain charges/credits to cost of revenues and selling, general and administrative expenses, principally associated with acquisition-related activities; restructuring and other costs/income including costs arising from facility consolidations such as severance and abandoned lease expense and gains and losses from the sale of real estate and product lines; and amortization of acquisition-related intangible assets. The company uses this measure because it helps management understand and evaluate the segments' core operating results and facilitate comparison of performance for determining compensation (Note 4). Accordingly, the following segment data is reported on this basis.

(Dollars in millions)	2019	2018	Change
Revenues			
Life Sciences Solutions	$ 6,856	$ 6,269	9 %
Analytical Instruments	5,522	5,469	1 %
Specialty Diagnostics	3,718	3,724	— %
Laboratory Products and Services	10,599	10,035	6 %
Eliminations	(1,153)	(1,139)	1 %
Consolidated Revenues	$ 25,542	$ 24,358	5 %
Segment Income			
Life Sciences Solutions	$ 2,446	$ 2,158	13 %
Analytical Instruments	1,273	1,247	2 %
Specialty Diagnostics	930	952	(2)%
Laboratory Products and Services	1,324	1,258	5 %
Subtotal Reportable Segments	5,973	5,615	6 %
Cost of Revenues Charges	(17)	(12)	
Selling, General and Administrative Charges, Net	(62)	(29)	
Restructuring and Other (Costs) Income, Net	413	(50)	
Amortization of Acquisition-related Intangible Assets	(1,713)	(1,741)	
Consolidated Operating Income	$ 4,594	$ 3,783	21 %
Reportable Segments Operating Income Margin	23.4 %	23.1 %	
Consolidated Operating Income Margin	18.0 %	15.5 %	

Income from the company's reportable segments increased 6% to $5.97 billion in 2019 due primarily to profit on higher sales and, to a lesser extent, productivity improvements, net of inflationary cost increases, offset in part by strategic growth investments, sales mix and unfavorable foreign currency exchange.

Life Sciences Solutions

(Dollars in millions)	2019	2018	Change
Revenues	$ 6,856	$ 6,269	9 %
Operating Income Margin	35.7 %	34.4 %	1.3 pt

Results of Operations (continued)

Sales in the Life Sciences Solutions segment increased $587 million to $6.86 billion in 2019. Sales increased $620 million (10%) due to higher revenues at existing businesses and $89 million due to an acquisition. The unfavorable effects of currency translation resulted in a decrease in revenues of $122 million. The increase in revenue at existing businesses was primarily due to increased demand in each of the segment's principal businesses with particular strength in sales of bioproduction and biosciences products.

Operating income margin was 35.7% in 2019 compared to 34.4% in 2018. The increase in operating margin resulted primarily from profit on higher sales offset in part by strategic growth investments and, to a lesser extent, sales mix and unfavorable foreign currency exchange.

Analytical Instruments

(Dollars in millions)	2019	2018	Change
Revenues	$ 5,522	$ 5,469	1 %
Operating Income Margin	23.1 %	22.8 %	0.3 pt

Sales in the Analytical Instruments segment increased $53 million to $5.52 billion in 2019. Sales increased $149 million (3%) due to higher revenues at existing businesses. The unfavorable effects of currency translation resulted in a decrease in revenues of $96 million. The increase in revenue at existing businesses was due to increased demand for products sold by each of the segment's primary businesses with particular strength in chromatography and mass spectrometry instruments. Sales decreased in the fourth quarter of 2019 due to industrial end market conditions off of a strong fourth quarter of 2018.

Operating income margin was 23.1% in 2019 compared to 22.8% in 2018. The increase resulted primarily from profit on higher sales and productivity improvements, net of inflationary cost increases. These increases were offset in part by sales mix and strategic growth investments.

Specialty Diagnostics

(Dollars in millions)	2019	2018	Change
Revenues	$ 3,718	$ 3,724	— %
Operating Income Margin	25.0 %	25.6 %	-0.6 pt

Sales in the Specialty Diagnostics segment remained flat at $3.72 billion in 2019. Sales increased $186 million (5%) due to higher revenues at existing businesses. The unfavorable effects of currency translation resulted in a decrease in revenues of $66 million and the divestiture of the Anatomical Pathology business decreased revenues by $126 million. The increase in revenue at existing businesses was due to increased demand for products sold through the segment's healthcare market channel as well as clinical diagnostic and immunodiagnostic products.

Operating income margin was 25.0% in 2019 and 25.6% in 2018. The decrease was primarily due to strategic growth investments and, to a lesser extent, sales mix and the divestiture of the Anatomical Pathology business. These decreases were offset in part by profit on higher sales and, to a lesser extent, productivity improvements, net of inflationary cost increases. Following multi-year extensions of several expiring licensing arrangements with commercial partners, segment revenues and operating income in 2020 will both be unfavorably affected by approximately $30 million.

Laboratory Products and Services

(Dollars in millions)	2019	2018	Change
Revenues	$ 10,599	$ 10,035	6 %
Operating Income Margin	12.5 %	12.5 %	0 pt

Sales in the Laboratory Products and Services segment increased $564 million to $10.60 billion in 2019. Sales increased $604 million (6%) due to higher revenues at existing businesses and $187 million due to acquisitions. The unfavorable effects of currency translation resulted in a decrease in revenues of $167 million. A change in the method of reporting certain intersegment sales reduced segment revenues by $60 million with no impact to consolidated results. The increase in revenue at

Results of Operations (continued)

existing businesses was primarily due to increased demand in each of the segment's principal businesses with particular strength in service offerings of its pharma services business and products sold through its research and safety market channel business.

Operating income margin was 12.5% in both 2019 and 2018. Increases from profit on higher sales and productivity improvements, net of inflationary cost increases, were offset by strategic growth investments and, to a lesser extent, sales mix.

Other Expense/Income, Net

In 2019, the company recorded $184 million of losses on the early extinguishment of debt, offset in part by $44 million of net gains on investments. The investment gains include a $28 million gain on the sale of a joint venture for net proceeds of $42 million. In 2018, the company recorded $15 million of net losses on investments.

Provision for Income Taxes

The company recorded a $374 million provision for income taxes in 2019 including $191 million related to the gain on the sale of the Anatomical Pathology business. In 2019, the company recorded a $62 million income tax benefit related to a foreign exchange loss for tax purposes on certain intercompany financing arrangements, implemented foreign tax credit planning in Sweden which resulted in $75 million of foreign tax credits, with no related incremental U.S. income tax expense, and recorded a $79 million income tax benefit related to the deferred tax implications of intra-entity transactions which included a tax benefit to release a valuation allowance against net operating losses previously determined to be unrealizable.

The company recorded a $324 million provision for income taxes in 2018 including a net provision of $68 million to adjust the estimated initial effects of the Tax Cuts and Jobs Act of 2017 recorded in 2017, consisting of an incremental provision of $117 million offset in part by a $49 million reduction of related unrecognized tax benefits established in 2017. These adjustments were required based on new U.S. Treasury guidance and further analysis of available tax accounting methods and elections, legislative updates, regulations, earnings and profit computations and foreign taxes. In 2018, the provision for income taxes also included a $71 million charge to establish a valuation allowance against net operating losses that will not be utilized as a result of the 2019 sale of the Anatomical Pathology business.

The effective tax rate in both 2019 and 2018 was also affected by relatively significant earnings in lower tax jurisdictions. Due primarily to the non-deductibility of intangible asset amortization for tax purposes, the company’s cash payments for income taxes were higher than its income tax expense for financial reporting purposes and totaled $896 million and $591 million in 2019 and 2018, respectively.

The company expects its effective tax rate in 2020 will be between 8% and 10% based on currently forecasted rates of profitability in the countries in which the company conducts business and expected generation of foreign tax credits. The effective tax rate can vary significantly from period to period as a result of discrete income tax factors and events.

The company has operations and a taxable presence in approximately 50 countries outside the U.S. Some of these countries have lower tax rates than the U.S. The company’s ability to obtain a benefit from lower tax rates outside the U.S. is dependent on its relative levels of income in countries outside the U.S. and on the statutory tax rates in those countries. Based on the dispersion of the company’s non-U.S. income tax provision among many countries, the company believes that a change in the statutory tax rate in any individual country is not likely to materially affect the company’s income tax provision or net income, aside from any resulting one-time adjustment to the company’s deferred tax balances to reflect a new rate.

Recent Accounting Pronouncements

A description of recently issued accounting standards is included under the heading “*Recent Accounting Pronouncements*” in Note 1.

Contingent Liabilities

The company is contingently liable with respect to certain legal proceedings and related matters. An unfavorable outcome that differs materially from current accrual estimates, if any, for one or more of the matters described under the headings "*Product Liability, Workers Compensation and Other Personal Injury Matters*," and "*Intellectual Property Matters*" in Note 12 could have a material adverse effect on the company's financial position as well as its results of operations and cash flows.

Liquidity and Capital Resources

Consolidated working capital (current assets less current liabilities) was $5.70 billion at December 31, 2019, compared with $4.48 billion at December 31, 2018, primarily due to lower short-term debt and higher cash balances. Included in working capital were cash and cash equivalents of $2.40 billion at December 31, 2019 and $2.10 billion at December 31, 2018.

2019

Cash provided by operating activities was $4.97 billion during 2019. Cash provided by income was offset in part by increased investments in working capital. Increases in accounts receivable and inventories used cash of $225 million and $458 million, respectively, primarily to support growth in sales. An increase in other assets used cash of $408 million primarily due to the timing of customer billings and tax refunds. Other liabilities increased by $210 million primarily due to advance payments from customers. Cash payments for income taxes increased to $896 million during 2019, compared with $591 million in 2018. The company made cash contributions to its pension and postretirement benefit plans totaling $50 million during 2019. Payments for restructuring actions, principally severance costs and lease and other expenses of real estate consolidation, used cash of $69 million during 2019.

During 2019, the company's investing activities used $1.49 billion of cash. Acquisitions used cash of $1.84 billion. Proceeds from the sale of the Anatomical Pathology business provided $1.13 billion. The company's investing activities also included the purchase of $926 million of property, plant and equipment.

The company's financing activities used $3.12 billion of cash during 2019. Repayment of senior notes used cash of $6.36 billion. New long-term borrowings provided cash of $5.64 billion. A net decrease in commercial paper obligations used cash of $683 million. The company's financing activities also included the repurchase of $1.50 billion of the company's common stock and the payment of $297 million in cash dividends, offset in part by $153 million of net proceeds from employee stock option exercises. On November 8, 2019, the Board of Directors replaced the existing authorization to repurchase the company's common stock, of which $500 million was remaining, with a new authorization to repurchase up to $2.50 billion of the company's common stock. At February 26, 2020, authorization remained for $1.00 billion of future repurchases of the company's common stock.

As of December 31, 2019, the company's short-term debt totaled $676 million, including $672 million of senior notes due within the next twelve months. The company has a revolving credit facility with a bank group that provides up to $2.50 billion of unsecured multi-currency revolving credit. If the company borrows under this facility, it intends to leave undrawn an amount equivalent to outstanding commercial paper to provide a source of funds in the event that commercial paper markets are not available. As of December 31, 2019, no borrowings were outstanding under the company's revolving credit facility, although available capacity was reduced by approximately $72 million as a result of outstanding letters of credit.

Approximately half of the company's cash balances and cash flows from operations are from outside the U.S. The company uses its non-U.S. cash for needs outside of the U.S. including acquisitions and repayment of acquisition-related intercompany debt to the U.S. In addition, the company also transfers cash to the U.S. using non-taxable returns of capital as well as dividends where the related U.S. dividend received deduction or foreign tax credit equals any tax cost arising from the dividends. As a result of using such means of transferring cash to the U.S., the company does not expect any material adverse liquidity effects from its significant non-U.S. cash balances for the foreseeable future.

The company believes that its existing cash and cash equivalents of $2.40 billion as of December 31, 2019 and its future cash flow from operations together with available borrowing capacity under its revolving credit agreement will be sufficient to meet the cash requirements of its existing businesses for the foreseeable future, including at least the next 24 months.

2018

Cash provided by operating activities was $4.54 billion during 2018. Cash provided by income was offset in part by investments in working capital. Increases in accounts receivable and inventories used cash of $366 million and $324 million, respectively, primarily to support growth in sales. Cash payments for income taxes increased to $591 million during 2018, compared with $479 million in 2017. The company made cash contributions to its pension and

postretirement benefit plans totaling $93 million during 2018. Payments for restructuring actions, principally severance costs and lease and other expenses of real estate consolidation, used cash of $83 million during 2018.

During 2018, the company's investing activities used $1.25 billion of cash. Acquisitions used cash of $536 million. The company's investing activities also included the purchase of $758 million of property, plant and equipment.

Liquidity and Capital Resources (continued)

The company's financing activities used $2.24 billion of cash during 2018. Repayment of senior notes used cash of $2.05 billion. New long-term borrowings provided cash of $690 million. A net decrease in commercial paper obligations used cash of $194 million. The company's financing activities also included the repurchase of $500 million of the company's common stock and the payment of $266 million in cash dividends, offset in part by $136 million of net proceeds from employee stock option exercises.

Off-Balance Sheet Arrangements

The company did not use special purpose entities or other off-balance-sheet financing arrangements in 2017, 2018 or 2019, except for letters of credit, bank guarantees, residual value guarantees under three lease agreements, surety bonds and other guarantees disclosed in the table or discussed below. The amounts disclosed in the table below for letters of credit, bank guarantees, surety bonds and other guarantees relate to guarantees of the company's performance, primarily in the ordinary course of business.

Contractual Obligations and Other Commercial Commitments

The table below summarizes, by period due or expiration of commitment, the company's contractual obligations and other commercial commitments as of December 31, 2019.

	Payments due by Period or Expiration of Commitment				
(In millions)	2020	2021 and 2022	2023 and 2024	2025 and Thereafter	Total
Contractual Obligations and Other Commercial Commitments					
Debt principal, including short-term debt (a)	$ 673	$ 562	$ 3,122	$ 13,593	$ 17,950
Finance lease obligations	3	6	1	—	10
Interest	371	742	652	2,694	4,459
Operating lease obligations	197	282	160	197	836
Unconditional purchase obligations (b)	830	283	86	4	1,203
Letters of credit and bank guarantees	232	23	9	8	272
Surety bonds and other guarantees	45	16	—	—	61
Pension obligations on balance sheet	42	91	100	336	569
Asset retirement obligations accrued on balance sheet	7	14	5	15	41
Acquisition-related contingent consideration accrued on balance sheet	11	20	8	16	55
	$ 2,411	$ 2,039	$ 4,143	$ 16,863	$ 25,456

(a) Amounts represent the expected cash payments for debt and do not include any deferred issuance costs.

(b) Unconditional purchase obligations include agreements to purchase goods, services or fixed assets that are enforceable and legally binding and that specify all significant terms, including: fixed or minimum quantities to be purchased; fixed, minimum or variable price provisions; and the approximate timing of the transaction. Purchase obligations exclude agreements that are cancelable at any time without penalty.

Reserves for unrecognized tax benefits of $1.55 billion have not been included in the above table due to the inability to predict the timing of tax audit resolutions.

The company has no material commitments for purchases of property, plant and equipment, other than those included in the above table, but expects that for 2020, such expenditures will be between $1 and $1.1 billion.

Guarantees of residual value under lease arrangements for three facilities have not been included in the above table due to the inability to predict if and when the guarantees may require payment (see Note 11). The residual value

guarantees become operative at the end of the leases for up to a maximum of $147 million. The terms of these leases end in 2020, 2023 and 2024.

A guarantee of pension plan obligations of a divested business has not been included in the preceding table due to the inability to predict if and when the guarantee may require payment. The purchaser of the divested business has agreed to pay for the pension benefits, however the company was required to guarantee payment of these pension benefits should the purchaser fail to do so. The amount of the guarantee at December 31, 2019 was $41 million.

Liquidity and Capital Resources (continued)

In disposing of assets or businesses, the company often provides representations, warranties and/or indemnities to cover various risks including, for example, unknown damage to the assets, environmental risks involved in the sale of real estate, liability to investigate and remediate environmental contamination at waste facilities, and unidentified tax liabilities and related legal fees. The company does not have the ability to estimate the potential liability from such indemnities because they relate to unknown conditions. However, the company has no reason to believe that these uncertainties would have a material adverse effect on its financial position, annual results of operations or cash flows.

The company has recorded liabilities for known indemnifications included as part of environmental liabilities. See Item 1. Business – Environmental Matters for a discussion of these liabilities.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

The company is exposed to market risk from changes in interest rates and currency exchange rates, which could affect its future results of operations and financial condition. The company manages its exposure to these risks through its regular operating and financing activities. The company has periodically hedged interest rate risks of fixed-rate instruments with offsetting interest rate swaps. Additionally, the company uses short-term forward and option contracts primarily to hedge certain balance sheet and operational exposures resulting from changes in currency exchange rates. Such exposures result from purchases, sales, cash and intercompany loans that are denominated in currencies other than the functional currencies of the respective operations. The currency-exchange contracts principally hedge transactions denominated in Swiss franc, euro, Canadian dollars, Swedish kronor, British pounds sterling, Japanese yen and Czech koruna. Income and losses arising from these derivative contracts are recognized as offsets to losses and income resulting from the underlying exposure being hedged. The company does not enter into speculative derivative agreements.

Interest Rates

The company is exposed to changes in interest rates while conducting normal business operations as a result of ongoing investing and financing activities, which affect the company's debt as well as cash and cash equivalents. As of December 31, 2019, the company's debt portfolio was comprised primarily of fixed rate borrowings. The fair market value of the company's fixed interest rate debt is subject to interest rate risk. Generally, the fair market value of fixed interest rate debt will increase as interest rates fall and decrease as interest rates rise. The total estimated fair value of the company's debt at December 31, 2019 was $18.67 billion (see Note 14). Fair values were determined from available market prices using current interest rates and terms to maturity. If interest rates were to decrease by 100 basis points, the fair value of the company's debt at December 31, 2019 would increase by approximately $1.49 billion. If interest rates were to increase by 100 basis points, the fair value of the company's debt at December 31, 2019 would decrease by approximately $1.50 billion.

In addition, interest rate changes would result in a change in the company's interest expense due to variable-rate debt instruments including swap arrangements. In 2019, a 100 basis point increase in interest rates on the swap arrangements and variable-rate debt would have increased the company's annual pre-tax interest expense by approximately $16 million.

Currency Exchange Rates

The company views its investment in international subsidiaries with a functional currency other than the U.S. dollar as permanent. The company's investment in international subsidiaries is sensitive to fluctuations in currency exchange rates. The functional currencies of the company's international subsidiaries are principally denominated in British pounds sterling, Swedish kronor, euro, Canadian dollars, Swiss franc, Norwegian kroner and Danish kroner. The effect of a change in the period ending currency exchange rates on the company's net investment in international subsidiaries is reflected in the "accumulated other comprehensive items" component of shareholders' equity. The company also uses foreign currency-denominated debt to partially hedge its net investments in foreign operations against adverse movements in exchange rates. A 10% depreciation in year-end 2019 functional currencies, relative to the U.S. dollar, would result in a reduction of shareholders' equity of $1.14 billion.

The fair value of forward currency-exchange contracts is sensitive to changes in currency exchange rates. The fair value of forward currency-exchange contracts is the estimated amount that the company would pay or receive upon termination of the contract, taking into account the change in currency exchange rates. A 10% depreciation in year-end 2019 non-functional currency exchange rates related to the company's contracts would result in an additional unrealized loss on forward currency-exchange contracts of $243 million. A 10% appreciation in year-end 2019 non-functional currency exchange rates related to the company's contracts would result in an unrealized gain on forward currency-exchange contracts of $203 million. The

Quantitative and Qualitative Disclosures About Market Risk (continued)

unrealized gains or losses on forward currency-exchange contracts resulting from changes in currency exchange rates are expected to approximately offset losses or gains on the exposures being hedged.

Certain of the company's cash and cash equivalents are denominated in currencies other than the functional currency of the depositor and are sensitive to changes in currency exchange rates. A 10% depreciation in the related year-end 2019 non-functional currency exchange rates applied to such cash balances would result in a negative impact of $32 million on the company's net income.

Item 8. Financial Statements and Supplementary Data

This data is submitted as a separate section to this report. See Item 15 "Exhibits and Financial Statement Schedules."

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

Not applicable.

Item 9A. Controls and Procedures

Management's Evaluation of Disclosure Controls and Procedures

The company's management, with the participation of the company's chief executive officer and chief financial officer, has evaluated the effectiveness of the company's disclosure controls and procedures (as such term is defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act) as of the end of the period covered by this report. Based on such evaluation, the company's chief executive officer and chief financial officer concluded that, as of the end of such period, the company's disclosure controls and procedures were effective at the reasonable assurance level.

Changes in Internal Control over Financial Reporting

There have been no changes in the company's internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) during the fiscal quarter ended December 31, 2019, that have materially affected or are reasonably likely to materially affect the company's internal control over financial reporting.

Management's Annual Report on Internal Control Over Financial Reporting

The company's management, including the company's chief executive officer and chief financial officer, is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the company. Internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. The company's management conducted an assessment of the effectiveness of the company's internal control over financial reporting as of December 31, 2019 based on criteria established in "Internal Control - Integrated Framework" (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on this assessment, the company's management concluded that, as of December 31, 2019, the company's internal control over financial reporting was effective.

The company's independent registered public accounting firm, PricewaterhouseCoopers LLP, has audited the effectiveness of the company's internal control over financial reporting as of December 31, 2019, as stated in their report that appears on page F-2 of this Annual Report on Form 10-K.

Item 9B. Other Information

Not applicable.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

The information with respect to directors required by this Item will be contained in our definitive proxy statement to be filed with the SEC not later than 120 days after the close of business of the fiscal year (2020 Definitive Proxy Statement) and is incorporated in this report by reference.

The information with respect to executive officers required by this Item is included in Item 1 of Part I of this report.

The other information required by this Item will be contained in our 2020 Definitive Proxy Statement and is incorporated in this report by reference.

Item 11. Executive Compensation

The information required by this Item will be contained in our 2020 Definitive Proxy Statement and is incorporated in this report by reference.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

The information required by this Item will be contained in our 2020 Definitive Proxy Statement and is incorporated in this report by reference.

Item 13. Certain Relationships and Related Transactions, and Director Independence

The information required by this Item will be contained in our 2020 Definitive Proxy Statement and is incorporated in this report by reference.

Item 14. Principal Accountant Fees and Services

The information required by this Item will be contained in our 2020 Definitive Proxy Statement and is incorporated in this report by reference.

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a) The following documents are filed as part of this report:

(1) Consolidated Financial Statements (see Index on page F-1 of this report)

(2) All schedules are omitted because they are not applicable or not required, or because the required information is included either in the consolidated financial statements or in the notes thereto.

(b) Exhibits

See the Exhibit Index on page 37.

Item 16. Form 10-K Summary

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this Report to be signed on its behalf by the undersigned, thereunto duly authorized.

Date: February 26, 2020

THERMO FISHER SCIENTIFIC INC.

By: /s/ Marc N. Casper

Marc N. Casper

Chairman, President and Chief Executive Officer

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the Registrant and in the capacities indicated, as of February 26, 2020.

By: /s/ Marc N. Casper
Marc N. Casper
Chairman, President and Chief Executive Officer
(Principal Executive Officer)

By: /s/ Stephen Williamson
Stephen Williamson
Senior Vice President and Chief Financial Officer
(Principal Financial Officer)

By: /s/ Peter E. Hornstra
Peter E. Hornstra
Vice President and Chief Accounting Officer
(Principal Accounting Officer)

By: /s/ Nelson J. Chai
Nelson J. Chai
Director

By: /s/ C. Martin Harris
C. Martin Harris
Director

By: /s/ Tyler E. Jacks
Tyler E. Jacks
Director

By: /s/ Judy C. Lewent
Judy C. Lewent
Director

By: /s/ Thomas J. Lynch
Thomas J. Lynch
Director

By: /s/ Jim P. Manzi
Jim P. Manzi
Director

By: /s/ James C. Mullen
James C. Mullen
Director

By: /s/ Lars R. Sørensen
Lars R. Sørensen
Director

By: /s/ Debora L. Spar
Debora L. Spar
Director

By: /s/ Scott M. Sperling
Scott M. Sperling
Director

By: /s/ Elaine S. Ullian
Elaine S. Ullian
Director

By: /s/ Dion J. Weisler
Dion J. Weisler
Director

THERMO FISHER SCIENTIFIC INC.

EXHIBIT INDEX

Exhibit Number	Description of Exhibit
3.1	Amended and Restated Certificate of Incorporation of the Registrant (filed as Exhibit 3.1 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2005 [File No. 1-8002] and incorporated in this document by reference).
3.2	Amendment to Thermo Fisher Scientific Inc.'s Third Amended and Restated Certificate of Incorporation (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed November 14, 2006 [File No. 1-8002] and incorporated in this document by reference).
3.3	Certificate of Elimination of the Series B Junior Participating Preferred Stock of the Company, dated November 13, 2015 (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed November 16, 2015 [File No. 1-8002] and incorporated in this document by reference).
3.4	By-Laws of the Registrant, as amended and effective as of March 1, 2017 (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed March 2, 2017 [File No. 1-8002] and incorporated in this document by reference).
	The Registrant agrees, pursuant to Item 601(b)(4)(iii)(A) of Regulation S-K, to furnish to the Commission, upon request, a copy of each instrument with respect to long-term debt of the Registrant or its consolidated subsidiaries.
4.1	Indenture dated as of November 20, 2009 between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 99.1 to the Registrant's Current Report on Form 8-K filed November 20, 2009 [File No. 1-8002] and incorporated in this document by reference).
4.2	Sixth Supplemental Indenture, dated as of December 11, 2013, between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 99.2 to the Registrant's Current Report on Form 8-K filed December 11, 2013 [File No. 1-8002] and incorporated in this document by reference).
4.3	Eighth Supplemental Indenture, dated as of November 24, 2014, among the Company, The Bank of New York Mellon Trust Company, N.A., as trustee, and The Bank of New York Mellon, London Branch, as paying agent (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed November 24, 2014 [File No. 1-8002] and incorporated in this document by reference).
4.4	Ninth Supplemental Indenture, dated as of July 21, 2015, among the Company, The Bank of New York Mellon Trust Company, N.A., as trustee, and The Bank of New York Mellon, London Branch, as paying agent (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed July 21, 2015 [File No. 1-8002] and incorporated in this document by reference).
4.5	Eleventh Supplemental Indenture, dated as of December 9, 2015, between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed December 9, 2015 [File No. 1-8002] and incorporated in this document by reference).
4.6	Twelfth Supplemental Indenture, dated as of April 13, 2016, between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed April 13, 2016 [File No. 1-8002] and incorporated in this document by reference).
4.7	Thirteenth Supplemental Indenture, dated as of September 12, 2016, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed September 12, 2016 [File No. 1-8002] and incorporated in this document by reference).
4.8	Fourteenth Supplemental Indenture, dated as of September 19, 2016, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed September 19, 2016 [File No. 1-8002] and incorporated in this document by reference).
4.9	Fifteenth Supplemental Indenture, dated as of March 16, 2017, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed March 16, 2017 [File No. 1-8002] and incorporated in this document by reference).
4.10	Sixteenth Supplemental Indenture, dated as of July 24, 2017, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed July 24, 2017 [File No. 1-8002] and incorporated in this document by reference).
4.11	Seventeenth Supplemental Indenture, dated as of August 14, 2017, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed August 14, 2017 [File No. 1-8002] and incorporated in this document by reference).
4.12	Eighteenth Supplemental Indenture, dated as of September 30, 2019, between the Company, as issuer, and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed September 30, 2019 [File No. 1-8002] and incorporated in this document by reference).
4.13	Nineteenth Supplemental Indenture, dated as of October 8, 2019, between the Company, as issuer, and the Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed October 8, 2019 [File No. 1-8002] and incorporated in this document by reference).
4.14	Indenture, dated as of August 9, 2016, among Thermo Fisher Scientific (Finance I) B.V., as issuer, the Company, as

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EXHIBIT INDEX

Exhibit Number	Description of Exhibit
4.16	Description of the Registrant's Securities.
10.1	Thermo Fisher Scientific Inc. Deferred Compensation Plan for Directors of the Registrant, as amended and restated on September 12, 2007 (filed as Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 29, 2007 [File No. 1-8002] and incorporated in this document by reference).*
10.2	Thermo Electron Corporation Deferred Compensation Plan, effective November 1, 2001 (filed as Exhibit 10.13 to the Registrant's Annual Report on Form 10-K for the fiscal year ended December 29, 2001 [File No. 1-8002] and incorporated in this document by reference).*
10.3	Form of Amended and Restated Indemnification Agreement between the Registrant and its directors and officers (filed as Exhibit 10.2 to the Registrant's Registration Statement on Form S-4 [Reg. No. 333-90661] and incorporated in this document by reference).*
10.4	Summary of Thermo Fisher Scientific Inc. Annual Director Compensation.*
10.5	Summary of 2019 Annual Cash Incentive Plan Matters (set forth in Item 5.02 to the Registrant's Current Report on Form 8-K filed February 28, 2019 [File No.1-8002] under the heading "Compensatory Arrangements of Certain Officers" and incorporated in this document by reference).*
10.6	Form of Noncompetition Agreement between the Registrant and certain key employees and executive officers (filed as Exhibit 10.25 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.7	Retirement Plan for Non-Employee Directors of Fisher Scientific International Inc. (filed as Exhibit 10.12 to Fisher Scientific International Inc.'s Annual Report on Form 10-K for the year ended December 31, 1992 [File No. 1-10920] and incorporated in this document by reference).*
10.8	First Amendment to the Fisher Scientific International Inc. Retirement Plan for Non-Employee Directors (filed as Exhibit 10.04 to Fisher Scientific International Inc.'s Quarterly Report on Form 10-Q for the quarter ended March 31, 2005 [File No. 1-10920] and incorporated in this document by reference).*
10.9	Amendment to Retirement Plan for Non-Employee Directors of Fisher Scientific International Inc. (filed as Exhibit 10.02 to Fisher Scientific International Inc.'s Current Report on Form 8-K filed March 7, 2006 [File No. 1-10920] and incorporated in this document by reference).*
10.10	Thermo Fisher Scientific Inc. Amended and Restated 2005 Deferred Compensation Plan, effective January 1, 2009 (filed as Exhibit 10.43 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2008 [File No. 1-8002] and incorporated in this document by reference).*
10.11	Thermo Fisher Scientific Inc. 2008 Stock Incentive Plan (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed May 22, 2008 [File No. 1-8002] and incorporated in this document by reference).*
10.12	Amendment No. 1 to Thermo Fisher Scientific Inc. Amended and Restated 2005 Deferred Compensation Plan (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 27, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.13	2009 Restatement of Executive Severance Agreement, between Marc Casper and the Registrant, dated November 21, 2009 (filed as Exhibit 10.5 to the Registrant's Current Report on Form 8-K filed November 25, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.14	Executive Change In Control Retention Agreement, between Marc Casper and the Registrant, dated November 21, 2009 (filed as Exhibit 10.6 to the Registrant's Current Report on Form 8-K filed November 25, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.15	Noncompetition Agreement, between Marc Casper and the Registrant, dated November 21, 2009 (filed as Exhibit 10.7 to the Registrant's Current Report on Form 8-K filed November 25, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.16	Amendment No. 1 to 2009 Restatement of Executive Severance Agreement, dated February 25, 2010, between the Registrant and Marc N. Casper (filed as Exhibit 10.2 to the Registrant's Current Report on Form 8-K filed February 25, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.17	Amendment No. 2 to 2009 Restatement of Executive Severance Agreement, dated November 30, 2010, between the Registrant and Marc N. Casper (filed as Exhibit 10.55 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.18	Amendment No. 1 to Executive Change In Control Retention Agreement, dated November 30, 2010, between Marc N. Casper and the Registrant (filed as Exhibit 10.56 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.19	Amendment No. 2 to Executive Change in Control Retention Agreement, dated March 16, 2018, between Marc N. Casper and the Registrant (filed as Exhibit 10.3 to the Registrant's Quarterly Report on Form 10-Q for the quarter

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EXHIBIT INDEX

Exhibit Number	Description of Exhibit
10.22	Form of Thermo Fisher Scientific Inc.'s Restricted Stock Unit Agreement for Directors (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended April 2, 2011 [File No. 1-8002] and incorporated in this document by reference).*
10.23	Form of Thermo Fisher Scientific Inc.'s Performance Restricted Stock Unit Agreement (filed as Exhibit 10.4 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.24	Form of Thermo Fisher Scientific Inc.'s Restricted Stock Unit Agreement (filed as Exhibit 10.2 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.25	Form of Performance Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc Casper (filed as Exhibit 10.3 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.26	Form of Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc Casper (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.27	Form of Stock Option Agreement between Thermo Fisher Scientific Inc. and Marc Casper (filed as Exhibit 10.5 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.28	Thermo Fisher Scientific Inc. 2013 Stock Incentive Plan (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed May 23, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.29	Supplemental Executive Retirement Plan effective as of December 31, 2005, as amended and restated as of August 28, 2006 (filed as Exhibit 10.3 to Applera Corporation's Quarterly Report on Form 10-Q for the quarter ended September 30, 2006 [File No. 1-04389] and incorporated in this document by reference).*
10.30	Amendment to Supplemental Executive Retirement Plan, effective as of January 1, 2010 (filed as Exhibit 10.1 to Life Technologies Corporation's Current Report on Form 8-K filed December 18, 2009 [File No. 000-25317] and incorporated in this document by reference).*
10.31	Noncompetition Agreement between the Registrant and Mark Stevenson, dated September 10, 2015 (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 26, 2015 [File No. 1-8002] and incorporated in this document by reference).*
10.32	Form of Thermo Fisher Scientific Inc.'s Stock Option Agreement for Officers (filed as Exhibit 10.44 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2016 [File No. 1-8002] and incorporated in this document by reference).*
10.33	Patheon N.V. 2016 Omnibus Incentive Plan (filed as Exhibit 10.2 to the Current Report on Form 8-K filed by Patheon N.V. on July 26, 2016 [File No. 001-37837] and incorporated in this document by reference).*
10.34	Amendment to Patheon N.V. 2016 Omnibus Incentive Plan, dated March 7, 2017 (filed as exhibit 4.5 to the Registrant's Registration Statement on Form S-8 filed August 29, 2017 [File No. 1-8002] and incorporated in this document by reference).*
10.35	Amendment to Patheon N.V. 2016 Omnibus Incentive Plan, dated August 23, 2017 (filed as exhibit 4.6 to the Registrant's Registration Statement on Form S-8 filed August 29, 2017 [File No. 1-8002] and incorporated in this document by reference).*
10.36	Credit Agreement, dated July 1, 2016, among the Company, certain Subsidiaries of the Company from time to time party thereto, each lender from time to time party thereto, and Bank of America, N.A. (filed as Exhibit 10.3 to the Registrant's Current Report on Form 8-K filed July 1, 2016 [File No. 1-8002] and incorporated in this document by reference).
10.37	Form of Performance Restricted Stock Unit Agreement effective February 26, 2019 (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 30, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.38	Form of Performance Restricted Stock Unit Agreement for Marc Casper effective February 26, 2019 (filed as Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 30, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.39	Letter Agreement between the Registrant and Michel Lagarde dated August 28, 2017.*
10.40	Option Agreement Under the Patheon N.V. 2016 Omnibus Incentive Plan between Patheon N.V. and Michel Lagarde dated July 20, 2016.*

THERMO FISHER SCIENTIFIC INC.

EXHIBIT INDEX

Exhibit Number	Description of Exhibit
10.45	Form of Thermo Fisher Scientific Inc.'s Performance Restricted Stock Unit Agreement.*
10.46	Form of Thermo Fisher Scientific Inc.'s Restricted Stock Unit Agreement.*
10.47	Form of Thermo Fisher Scientific Inc.'s Stock Option Agreement for Officers.*
10.48	Form of Performance Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc Casper.*
10.49	Form of Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc Casper.*
10.50	Form of Stock Option Agreement between Thermo Fisher Scientific Inc. and Marc Casper.*
21	Subsidiaries of the Registrant.
23.1	Consent of PricewaterhouseCoopers LLP, an Independent Registered Public Accounting Firm.
31.1	Certification of Chief Executive Officer required by Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification of Chief Financial Officer required by Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1	Certification of Chief Executive Officer required by Exchange Act Rules 13a-14(b) and 15d-14(b), as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.**
32.2	Certification of Chief Financial Officer required by Exchange Act Rules 13a-14(b) and 15d-14(b), as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.**
101.INS	XBRL Instance Document - the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.
101.SCH	XBRL Taxonomy Extension Schema Document.
101.CAL	XBRL Taxonomy Calculation Linkbase Document.
101.DEF	XBRL Taxonomy Definition Linkbase Document.
101.LAB	XBRL Taxonomy Label Linkbase Document.
101.PRE	XBRL Taxonomy Presentation Linkbase Document.
104	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101).

*Indicates management contract or compensatory plan, contract or arrangement.

** Certification is not deemed "filed" for purposes of Section 18 of the Exchange Act or otherwise subject to the liability of that section. Such certification is not deemed to be incorporated by reference into any filing under the Securities Act or the Exchange Act except to the extent that the registrant specifically incorporates it by reference.

THERMO FISHER SCIENTIFIC INC.

INDEX OF CONSOLIDATED FINANCIAL STATEMENTS

The following Consolidated Financial Statements of the Registrant and its subsidiaries are required to be included in Item 15:

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Shareholders of Thermo Fisher Scientific Inc.

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheet of Thermo Fisher Scientific Inc. and its subsidiaries (the "Company") as of December 31, 2019 and 2018, and the related consolidated statements of income, of comprehensive income, of shareholders' equity and of cash flows for each of the three years in the period ended December 31, 2019, including the related notes (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 2019, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2019 and 2018, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2019 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2019, based on criteria established in Internal Control - Integrated Framework (2013) issued by the COSO.

Change in Accounting Principle

As discussed in Note 1 to the consolidated financial statements, the Company changed the manner in which it accounts for leases in 2019.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in Management's Annual Report on Internal Control Over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a

material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current period audit of the consolidated financial statements that were communicated or required to be communicated to the audit committee and that (i) relate to accounts or disclosures that are material to the consolidated financial statements and (ii) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Goodwill impairment assessment

As described in Note 1 to the consolidated financial statements, the Company's consolidated goodwill balance was $25,714 million as of December 31, 2019. Management evaluates goodwill impairment at the reporting unit level annually and when events occur or circumstances change that would more-likely-than-not reduce the fair value of the reporting unit below its carrying amount. In performing the assessment, management estimates the fair values of its reporting units by using forecasts of discounted future cash flows and peer market multiples. As disclosed by management, estimates of discounted future cash flows require management to make assumptions related to revenue and operating income growth rates, discount rates and other factors. Management also considers peer revenues and earnings trading multiples from companies that have operational and financial characteristics that are similar to the respective reporting units and estimates weighted average costs of capital.

The principal considerations for our determination that performing procedures relating to the goodwill impairment assessment is a critical audit matter are there was significant judgment by management when estimating the fair value of the reporting units. This in turn led to a high degree of auditor judgment, subjectivity and effort in performing procedures to evaluate management's cash flow projections and significant assumptions, including revenue and operating income growth rates, discount rates and peer market multiples. In addition, the audit

effort involved the use of professionals with specialized skill and knowledge to assist in performing these procedures and evaluating the audit evidence obtained from these procedures.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to the goodwill impairment assessment, including controls over the development of assumptions used by management to estimate the fair values of the Company's reporting units. These procedures also included, among others, testing management's process for developing the fair value estimates; evaluating the appropriateness of the discounted cash flow models; testing the completeness, accuracy, and relevance of underlying data used in the models; and evaluating the reasonableness of the assumptions used, including revenue and operating income growth rates, discount rates and peer market multiples. Evaluating the reasonableness of management's assumptions related to revenue and operating income growth rates involved evaluating whether the assumptions used were reasonable considering (i) the current and past performance of the reporting units and (ii) whether the assumptions were consistent with evidence obtained in other areas of the audit. Evaluating the reasonableness of the peer market multiples assumption involved evaluating the population of peer companies used in the analyses and testing selected market data used by management to determine the multiples by comparison to publicly available information. Professionals with specialized skill and knowledge were used to assist in evaluating the appropriateness of the Company's discounted cash flow model and certain significant assumptions, including the discount rates.

Income taxes

As described in Notes 1 and 8 to the consolidated financial statements, the Company's total income tax expense for the period ended December 31, 2019 was $374 million. The Company has deferred income tax liabilities, net, of $1,619 million (including a valuation allowance of $408 million) and unrecognized income tax benefits of $1,552 million as of December 31, 2019. As disclosed by management, the Company operates in numerous countries under many legal forms and, as a result, is subject to the jurisdiction of numerous domestic and non-U.S. tax authorities, as well as to tax agreements and treaties among these governments. Determination of taxable income in any jurisdiction requires management to interpret the related tax laws and regulations and to use estimates and assumptions regarding significant future events, such as the amount, timing and character of deductions, permissible revenue recognition methods under the tax law and the sources and character of income and tax credits. Management assesses income tax positions and records tax benefits for all years subject to examination based upon evaluation of the facts, circumstances and information available at the reporting date. For those tax positions where it is more likely than not that a tax benefit will be sustained, management has recorded the largest amount of tax benefit with a greater than 50 percent likelihood of being realized upon ultimate settlement with a taxing authority that has full knowledge of all relevant information. For those income tax positions where it is not more likely than not that a tax benefit will be sustained, no tax benefit has been recognized in the financial statements. Management estimates the degree to which tax assets will result in a benefit, after consideration of all positive and negative evidence, and provides a valuation allowance for tax assets that it believes will more likely than not go unused. In situations in which management has been able to determine that the Company's deferred tax assets will be realized, that determination generally relies on future reversals of taxable temporary differences and expected future taxable income. If it becomes more likely than not that a tax asset will be used, management reverses the related valuation allowance. The principal considerations for our determination that performing procedures relating to income taxes is a critical audit matter are there was significant judgment by management when determining the provision for income taxes, deferred tax assets and liabilities, and liabilities for unrecognized tax benefits due to numerous and complex tax laws, the frequency of tax filings, as well as judgments regarding the realizability of deferred tax assets. This in turn led to a high degree of auditor judgment, subjectivity, and effort in performing procedures and evaluating audit evidence related to the provision for income taxes, deferred tax assets and liabilities, and

liabilities for unrecognized tax benefits. In addition, the audit effort involved the use of professionals with specialized skill and knowledge to assist in performing these procedures and evaluating the audit evidence obtained from these procedures.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the financial statements. These procedures included testing the effectiveness of controls relating to the provision for income taxes, deferred tax assets and liabilities, and liabilities for unrecognized tax benefits, including controls over management's assessment of the realizability of deferred tax assets. These procedures also included, among others, (i) testing the accuracy of the income tax provision, including the rate reconciliation and permanent and temporary differences, (ii) evaluating whether the data utilized in the calculation of the provision for income taxes was appropriate and consistent with evidence obtained in other areas of the audit, (iii) evaluating management's assessment of the realizability of deferred tax assets on a jurisdictional basis, (iv) evaluating the identification of reserves for unrecognized tax benefits and the reasonableness of the "more likely than not" determination in consideration of jurisdictions, court decisions, legislative actions, statutes of limitations, and developments in tax examinations, (v) testing the calculation of the liability for unrecognized tax benefits by jurisdiction, including estimates of the amount of tax benefit expected to be sustained, and (vi) evaluating the adequacy of the Company's disclosures. Professionals with specialized skill and knowledge were used to assist in evaluating the reasonableness of management's judgments and estimates, including application of foreign and domestic tax laws and regulations.

/s/ PricewaterhouseCoopers LLP
Boston, Massachusetts
February 26, 2020

We have served as the Company's auditor since 2002.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED BALANCE SHEET

(In millions except share and per share amounts)	December 31, 2019	December 31, 2018
Assets		
Current Assets:		
Cash and cash equivalents	$ 2,399	$ 2,103
Accounts receivable, less allowances of $102 and $117	4,349	4,136
Inventories	3,370	3,005
Contract assets, net	603	459
Other current assets	1,172	922
Total current assets	11,893	10,625
Property, Plant and Equipment, Net	4,749	4,165
Acquisition-related Intangible Assets, Net	14,014	14,978
Other Assets	2,011	1,117
Goodwill	25,714	25,347
Total Assets	$ 58,381	$ 56,232
Liabilities and Shareholders' Equity		
Current Liabilities:		
Short-term obligations and current maturities of long-term obligations	$ 676	$ 1,271
Accounts payable	1,920	1,615
Accrued payroll and employee benefits	1,010	982
Contract liabilities	916	809
Other accrued expenses	1,675	1,470
Total current liabilities	6,197	6,147
Deferred Income Taxes	2,192	2,265
Other Long-term Liabilities	3,241	2,515
Long-term Obligations	17,076	17,719
Commitments and Contingencies (Note 12)		
Shareholders' Equity:		
Preferred stock, $100 par value, 50,000 shares authorized; none issued		
Common stock, $1 par value, 1,200,000,000 shares authorized; 434,416,804 and 431,566,561 shares issued	434	432
Capital in excess of par value	15,064	14,621
Retained earnings	22,092	18,696
Treasury stock at cost, 35,676,421 and 29,444,882 shares	(5,236)	(3,665)
Accumulated other comprehensive items	(2,679)	(2,498)
Total shareholders' equity	29,675	27,586
Total Liabilities and Shareholders' Equity	$ 58,381	$ 56,232

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF INCOME

(In millions except per share amounts)	Year Ended December 31, 2019	December 31, 2018	December 31, 2017
Revenues			
Product revenues	$ 19,496	$ 18,868	$ 17,374
Service revenues	6,046	5,490	3,544
Total revenues	25,542	24,358	20,918
Costs and Operating Expenses:			
Cost of product revenues	10,037	9,682	8,975
Cost of service revenues	4,177	3,819	2,495
Selling, general and administrative expenses	6,144	6,057	5,504
Research and development expenses	1,003	967	887
Restructuring and other (income) costs, net	(413)	50	97
Total costs and operating expenses	20,948	20,575	17,958
Operating Income	4,594	3,783	2,960
Interest Income	224	137	81
Interest Expense	(676)	(667)	(592)
Other (Expense) Income, Net	(72)	9	(20)
Income from Continuing Operations Before Income Taxes	4,070	3,262	2,429
Provision for Income Taxes	(374)	(324)	(201)
Income from Continuing Operations	3,696	2,938	2,228
Loss from Discontinued Operations (net of income tax benefit of $0, $0 and $2)	—	—	(3)
Net Income	$ 3,696	$ 2,938	$ 2,225
Earnings per Share from Continuing Operations			
Basic	$ 9.24	$ 7.31	$ 5.65
Diluted	$ 9.17	$ 7.24	$ 5.60
Earnings per Share			
Basic	$ 9.24	$ 7.31	$ 5.64
Diluted	$ 9.17	$ 7.24	$ 5.59
Weighted Average Shares			
Basic	400	402	395
Diluted	403	406	398

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF COMPREHENSIVE INCOME

(In millions)	Year Ended December 31, 2019	December 31, 2018	December 31, 2017
Comprehensive Income			
Net Income	$ 3,696	$ 2,938	$ 2,225
Other Comprehensive Items:			
Currency translation adjustment:			
Currency translation adjustment (net of tax provision (benefit) of $25, $84 and $(145))	(107)	(434)	588
Reclassification adjustment for losses included in net income	30	—	—
Unrealized gains and losses on available-for-sale investments:			
Unrealized holding losses arising during the period (net of tax benefit of $0, $0 and $0)	—	—	(1)
Reclassification adjustment for gains included in net income (net of tax provision of $0, $0 and $1)	—	—	(1)
Unrealized gains and losses on hedging instruments:			
Unrealized losses on hedging instruments (net of tax benefit of $12, $0 and $0)	(38)	—	—
Reclassification adjustment for losses included in net income (net of tax benefit of $6, $3 and $5)	19	9	7
Pension and other postretirement benefit liability adjustments:			
Pension and other postretirement benefit liability adjustments arising during the period (net of tax (benefit) provision of $ (31), $2 and $7)	(93)	3	23
Amortization of net loss and prior service benefit included in net periodic pension cost (net of tax benefit of $2, $5 and $5)	8	15	17
Total other comprehensive items	(181)	(407)	633
Comprehensive Income	$ 3,515	$ 2,531	$ 2,858

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF CASH FLOWS

(In millions)	Year Ended December 31, 2019	December 31, 2018	December 31, 2017
Operating Activities			
Net income	$ 3,696	$ 2,938	$ 2,225
Loss from discontinued operations	—	—	3
Income from continuing operations	3,696	2,938	2,228
Adjustments to reconcile income from continuing operations to net cash provided by operating activities:			
Depreciation of property, plant and equipment	564	526	439
Amortization of acquisition-related intangible assets	1,713	1,741	1,594
Change in deferred income taxes	(302)	(379)	(1,098)
Gain on sales of businesses	(482)	—	—
Non-cash stock-based compensation	181	181	159
Loss on early extinguishment of debt	184	3	4
Other non-cash expenses, net	84	103	186
Changes in assets and liabilities, excluding the effects of acquisitions and disposition:			
Accounts receivable	(225)	(366)	(362)
Inventories	(458)	(324)	(81)
Other assets	(408)	54	(153)
Accounts payable	266	201	274
Other liabilities	210	(42)	1,016
Contributions to retirement plans	(50)	(93)	(200)
Net cash provided by continuing operations	4,973	4,543	4,006
Net cash used in discontinued operations	—	—	(1)
Net cash provided by operating activities	4,973	4,543	4,005
Investing Activities			
Acquisitions, net of cash acquired	(1,843)	(536)	(7,226)
Proceeds from sale of business, net of cash divested	1,128	—	—
Purchase of property, plant and equipment	(926)	(758)	(508)
Proceeds from sale of property, plant and equipment	36	50	7
Other investing activities, net	118	(9)	(2)
Net cash used in investing activities	(1,487)	(1,253)	(7,729)
Financing Activities			
Net proceeds from issuance of debt	5,638	690	6,459
Repayment of debt	(6,360)	(2,052)	(3,299)
Proceeds from issuance of commercial paper	2,781	5,060	8,380
Repayments of commercial paper	(3,464)	(5,254)	(8,514)
Purchases of company common stock	(1,500)	(500)	(750)
Dividends paid	(297)	(266)	(237)
Net proceeds from issuance of company common stock	—	—	1,690
Net proceeds from issuance of company common stock under employee stock plans	153	136	128
Other financing activities, net	(69)	(51)	(3)
Net cash (used in) provided by financing activities	(3,118)	(2,237)	3,854
Exchange Rate Effect on Cash	(63)	(297)	420

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF SHAREHOLDERS' EQUITY

(In millions)	Common Stock Shares	Common Stock Amount	Capital in Excess of Par Value	Retained Earnings	Treasury Stock Shares	Treasury Stock Amount	Accumulated Other Comprehensive Items	Total Shareholders' Equity
Balance at December 31, 2016	415	$ 415	$ 12,140	$ 13,927	22	$ (2,306)	$ (2,636)	$ 21,540
Issuance of shares under employees' and directors' stock plans	3	3	196	—	—	(47)	—	152
Issuance of shares	10	10	1,680	—	—	—	—	1,690
Stock-based compensation	—	—	159	—	—	—	—	159
Purchases of company common stock	—	—	—	—	5	(750)	—	(750)
Dividends declared ($0.60 per share)	—	—	—	(238)	—	—	—	(238)
Net income	—	—	—	2,225	—	—	—	2,225
Other comprehensive items	—	—	—	—	—	—	633	633
Other	—	—	2	—	—	—	—	2
Balance at December 31, 2017	428	428	14,177	15,914	27	(3,103)	(2,003)	25,413
Cumulative effect of accounting changes	—	—	—	118	—	—	(88)	30
Issuance of shares under employees' and directors' stock plans	4	4	236	—	—	(62)	—	178
Stock-based compensation	—	—	181	—	—	—	—	181
Purchases of company common stock	—	—	—	—	2	(500)	—	(500)
Dividends declared ($0.68 per share)	—	—	—	(274)	—	—	—	(274)
Net income	—	—	—	2,938	—	—	—	2,938
Other comprehensive items	—	—	—	—	—	—	(407)	(407)
Other	—	—	27	—	—	—	—	27
Balance at December 31, 2018	432	432	14,621	18,696	29	(3,665)	(2,498)	27,586
Cumulative effect of accounting change	—	—	—	4	—	—	—	4
Issuance of shares under employees' and directors' stock plans	2	2	262	—	1	(71)	—	193
Stock-based compensation	—	—	181	—	—	—	—	181
Purchases of company common stock	—	—	—	—	6	(1,500)	—	(1,500)
Dividends declared ($0.76 per share)	—	—	—	(304)	—	—	—	(304)
Net income	—	—	—	3,696	—	—	—	3,696
Other comprehensive items	—	—	—	—	—	—	(181)	(181)
Balance at December 31, 2019	434	$ 434	$ 15,064	$ 22,092	36	$ (5,236)	$ (2,679)	$ 29,675

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Note 1. Nature of Operations and Summary of Significant Accounting Policies

Nature of Operations

Thermo Fisher Scientific Inc. (the company or Thermo Fisher) enables customers to make the world healthier, cleaner and safer by helping them accelerate life sciences research, solve complex analytical challenges, improve patient diagnostics, deliver medicines to market and increase laboratory productivity. Markets served include pharmaceutical and biotech, academic and government, industrial and applied, as well as healthcare and diagnostics.

Principles of Consolidation

The accompanying financial statements include the accounts of the company and its wholly and majority-owned subsidiaries. All material intercompany accounts and transactions have been eliminated. The company accounts for investments in businesses using the equity method when it has the ability to exercise significant influence but not control (generally between 20% and 50% ownership) and is not the primary beneficiary.

Presentation

Certain reclassifications of prior year amounts have been made to conform to the current year presentation.

Revenue Recognition

Prior to 2018, the company recognized revenue after all significant obligations had been met, collectability was probable and title had passed, which typically occurred upon shipment, delivery, completion of services, or ratably over the contract period. Beginning in 2018, the company recognizes revenue as performance obligations are satisfied by transferring control of promised goods or services to customers in an amount that reflects the consideration to which the company expects to be entitled in exchange for those goods or services. See *Recent Accounting Pronouncements* below for a discussion of the change in revenue recognition accounting that became effective in 2018.

Consumables revenues consist of single-use products and are recognized at a point in time following the transfer of control of such products to the customer, which generally occurs upon shipment. Instruments revenues typically consist of longer-lived assets that, for the substantial majority of sales, are recognized at a point in time in a manner similar to consumables. Service revenues (clinical trial logistics, pharmaceutical development and manufacturing services, asset management, diagnostic testing, training, service contracts, and field services including related time and materials) are recognized over time as customers receive and consume the benefits of such services. For revenues recognized over time, the company generally uses costs accumulated relative to total estimated costs to measure progress as this method approximates satisfaction of the performance obligation. For contracts that contain multiple performance obligations, the company allocates the consideration to which it expects to be entitled to each performance obligation based on relative standalone selling prices and recognizes the related revenue when or as control of each individual performance obligation is transferred to customers. The company exercises judgment in determining the timing of revenue by analyzing the point in time or the period over which the customer has the ability to direct the use of and obtain substantially all of the remaining benefits of the asset. The company immediately expenses contract costs that would otherwise be capitalized and amortized over a period of less than one year.

Payments from customers for most instruments, consumables and services are typically due in a fixed number of days after shipment or delivery of the product. Service arrangements commonly call for payments in advance of performing the work (e.g. extended service contracts), upon completion of the service (e.g. pharmaceutical development and manufacturing) or a mix of both.

See Note 3 for revenue disaggregated by type and by geographic region as well as further information about remaining performance obligations.

Contract-related Balances

Accounts receivable include amounts that have been billed and are currently due from customers. They are recorded at the invoiced amount and do not bear interest. The company maintains allowances for doubtful accounts for estimated losses resulting from the inability of its customers to pay amounts due. The allowance for doubtful accounts is the company’s best estimate of the amount of probable credit losses in existing accounts receivable. The company determines the allowance based on the age of the receivable, the creditworthiness of the customer and any

other information that is relevant to the judgment. Account balances are charged off against the allowance when the company believes it is probable the receivable will not be recovered. The company does not have any off-balance-sheet credit exposure related to customers.

The changes in the allowance for doubtful accounts are as follows:

(In millions)	Year Ended December 31, 2019	2018	2017
Beginning Balance	$ 117	$ 109	$ 77
Provision charged to expense	20	18	32
Accounts written off	(32)	(12)	(10)
Acquisitions, currency translation and other	(3)	2	10
Ending Balance	$ 102	$ 117	$ 109

Contract assets include revenues recognized in advance of billings and are recorded net of estimated losses resulting from the inability to invoice customers. Contract assets are classified as current or noncurrent based on the amount of time expected to lapse until the company's right to consideration becomes unconditional. Noncurrent contract assets are included within other assets in the accompanying balance sheet.

Contract liabilities include billings in excess of revenues recognized, such as those resulting from customer advances and deposits and unearned revenue on service contracts. Contract liabilities are classified as current or noncurrent based on the periods over which remaining performance obligations are expected to be transferred to customers. Noncurrent contract liabilities are included within other long-term liabilities in the accompanying balance sheet. Contract assets and liabilities are presented on a net basis in the consolidated balance sheet if they arise from different performance obligations in the same contract. Contract asset and liability balances are as follows:

(In millions)	December 31, 2019	December 31, 2018
Current Contract Assets, Net	$ 603	$ 459
Noncurrent Contract Assets, Net	17	15
Current Contract Liabilities	916	809
Noncurrent Contract Liabilities	594	355

Substantially all of the current contract liabilities balance at December 31, 2018 and January 1 2018, was recognized in revenue during 2019 and 2018, respectively. Contract assets increased in 2019 primarily due to growth in pharmaceutical development and manufacturing services. Contract liabilities increased during 2019 primarily due to an advance payment from a customer and an acquisition.

Warranty Obligations

The company provides for the estimated cost of standard product warranties, primarily from historical information, in cost of product revenues at the time product revenue is recognized. While the company engages in extensive product quality programs and processes, including actively monitoring and evaluating the quality of its component supplies, the company’s warranty obligation is affected by product failure rates, utilization levels, material usage, service delivery costs incurred in correcting a product failure and supplier warranties on parts delivered to the company. Should actual product failure rates, utilization levels, material usage, service delivery costs or supplier warranties on parts differ from the company’s estimates, revisions to the estimated warranty liability would be required. The liability for warranties is included in other accrued expenses in the accompanying balance sheet. Extended warranty agreements are considered service contracts, which are discussed above. Costs of service contracts are recognized as incurred. The changes in the carrying amount of standard product warranty obligations are as follows:

(In millions)	Year Ended December 31, 2019	Year Ended December 31, 2018
Beginning Balance	$ 92	$ 87
Provision charged to income	115	121
Usage	(112)	(109)
Adjustments to previously provided warranties, net	(2)	(4)
Currency translation	—	(3)
Ending Balance	$ 93	$ 92

Leases

The company determines whether an arrangement is, or contains, a lease at inception. Prior to 2019, the company did not account for operating leases on the balance sheet. Beginning in 2019, as discussed below under Recent Accounting Pronouncements, operating leases that have commenced are included in other assets, other accrued expenses and other long-term liabilities in the consolidated balance sheet. Classification of operating lease liabilities as either current or noncurrent is based on the expected timing of payments due under the company's obligations.

Right-of-use (ROU) assets represent the company's right to use an underlying asset for the lease term and lease liabilities represent the company's obligation to make lease payments arising from the lease. Operating lease ROU assets and liabilities are recognized at the lease commencement date based on the present value of lease payments over the lease term. Leases with an initial term of 12 months or less are not recorded on the consolidated balance sheet. The company recognizes lease expense for these leases on a straight-line basis over the lease term.

Because most of the company's leases do not provide an implicit rate, the company estimates incremental borrowing rates based on the information available at the commencement date in determining the present value of lease payments. The company uses the implicit rate when readily determinable. Lease terms may include the effect of options to extend or terminate the lease when it is reasonably certain that the company will exercise that option. Operating lease expense is recognized on a straight-line basis over the lease term.

As a lessee, the company accounts for the lease and non-lease components as a single lease component.

See Note 11 additional information about the company's leases.

Research and Development

The company conducts research and development activities to increase its depth of capabilities in technologies, software and services. Research and development costs include employee compensation and benefits, consultants, facilities related costs, material costs, depreciation and travel. Research and development costs are expensed as incurred.

Restructuring Costs

Accounting for the timing and amount of termination benefits provided by the company to employees is determined based on whether: (a) the company has a substantive plan to provide such benefits, (b) the company has a written employment contract with the affected employees that includes a provision for such benefits, (c) the termination benefits are due to the occurrence of an event specified in an existing plan or agreement, or (d) the termination benefits are a one-time benefit. In certain circumstances, employee termination benefits may meet more than one of the characteristics listed above and therefore, may have individual elements that are subject to different accounting models.

From time to time when executing a restructuring or exit plan, the company also incurs costs other than termination benefits, such as lease termination costs, that are not associated with or will not be incurred to generate revenues. These include costs that represent amounts under contractual obligations that exist prior to the restructuring

plan communication date and will either continue after the restructuring plan is completed with no economic benefit or result in a penalty to cancel a contractual obligation. Such costs are recognized when incurred, which generally occurs at the contract termination or over the period from when a plan to abandon a leased facility is approved through the cease-use date but charges may continue over the remainder of the original contractual period.

Income Taxes

The company recognizes deferred income taxes based on the expected future tax consequences of differences between the financial statement basis and the tax basis of assets and liabilities, calculated using enacted tax rates in effect for the year in which the differences are expected to be reflected in the tax return.

The financial statements reflect expected future tax consequences of uncertain tax positions that the company has taken or expects to take on a tax return presuming the taxing authorities' full knowledge of the positions and all relevant facts, but without discounting for the time value of money (Note 8).

Earnings per Share

Basic earnings per share has been computed by dividing net income by the weighted average number of shares outstanding during the year. Except where the result would be antidilutive to income from continuing operations, diluted earnings per share has been computed using the treasury stock method for outstanding stock options and restricted units (Note 9).

Cash and Cash Equivalents

Cash equivalents consists principally of money market funds, commercial paper and other marketable securities purchased with an original maturity of three months or less. These investments are carried at cost, which approximates market value.

Inventories

Inventories are valued at the lower of cost or net realizable value, cost being determined principally by the first-in, first-out (FIFO) method with certain of the company's businesses utilizing the last-in, first-out (LIFO) method. The company periodically reviews quantities of inventories on hand and compares these amounts to the expected use of each product or product line. In addition, the company has certain inventory that is subject to fluctuating market pricing. The company assesses the carrying value of this inventory based on a lower of cost or net realizable value analysis. The company records a charge to cost of sales for the amount required to reduce the carrying value of inventory to net realizable value. Costs associated with the procurement of inventories, such as inbound freight charges, purchasing and receiving costs, and internal transfer costs, are included in cost of revenues in the accompanying statement of income. The components of inventories are as follows:

(In millions)	December 31, 2019	December 31, 2018
Raw Materials	$ 971	$ 812
Work in Process	517	430
Finished Goods	1,882	1,763
Inventories	$ 3,370	$ 3,005

The value of inventories maintained using the LIFO method was $268 million and $244 million at December 31, 2019 and 2018, respectively, which was below estimated replacement cost by $39 million and $34 million, respectively. Reductions to cost of revenues as a result of the liquidation of LIFO inventories were nominal during the three years ended December 31, 2019.

Property, Plant and Equipment

Property, plant and equipment are recorded at cost. The costs of additions and improvements are capitalized, while maintenance and repairs are charged to expense as incurred. The company provides for depreciation and amortization using the straight-line method over the estimated useful lives of the property as follows: buildings and improvements, 25 to 40 years; machinery and equipment (including software), 3 to 10 years; and leasehold improvements, the shorter of the term of the lease or the life of the asset. When assets are retired or otherwise disposed of, the assets and related accumulated depreciation are eliminated from the accounts and the resulting gain

or loss is reflected in the accompanying statement of income. Property, plant and equipment consists of the following:

(In millions)	December 31, 2019	December 31, 2018
Land	$ 396	$ 397
Buildings and Improvements	1,873	1,729
Machinery, Equipment and Leasehold Improvements	5,495	4,694
Property, Plant and Equipment, at Cost	7,764	6,820
Less: Accumulated Depreciation and Amortization	3,015	2,655
Property, Plant and Equipment, Net	$ 4,749	$ 4,165

Depreciation and amortization expense of property, plant and equipment was $564 million, $526 million and $439 million in 2019, 2018 and 2017, respectively.

Acquisition-related Intangible Assets

Acquisition-related intangible assets include the costs of acquired customer relationships, product technology, tradenames and other specifically identifiable intangible assets, and are being amortized using the straight-line method over their estimated useful lives, which range from 2 to 20 years. In addition, the company has tradenames and in-process research and development that have indefinite lives and which are not amortized. The company reviews intangible assets for impairment when indication of potential impairment exists, such as a significant reduction in cash flows associated with the assets. Intangible assets with indefinite lives are reviewed for impairment annually or whenever events or changes in circumstances indicate they may be impaired. Acquisition-related intangible assets are as follows:

	Balance at December 31, 2019			Balance at December 31, 2018		
(In millions)	Gross	Accumulated Amortization	Net	Gross	Accumulated Amortization	Net
Definite Lived:						
Customer relationships	$ 16,906	$ (6,997)	$ 9,909	$ 17,120	$ (6,833)	$ 10,287
Product technology	5,544	(3,121)	2,423	6,036	(3,178)	2,858
Tradenames	1,300	(869)	431	1,495	(929)	566
Other	9	(9)	—	33	(33)	—
	23,759	(10,996)	12,763	24,684	(10,973)	13,711
Indefinite Lived:						
Tradenames	1,235	N/A	1,235	1,235	N/A	1,235
In-process research and development	16	N/A	16	32	N/A	32
	1,251	N/A	1,251	1,267	N/A	1,267
Acquisition-related Intangible Assets	$ 25,010	$ (10,996)	$ 14,014	$ 25,951	$ (10,973)	$ 14,978

The estimated future amortization expense of acquisition-related intangible assets with definite lives is as follows:

(In millions)	
2020	$ 1,660
2021	1,552
2022	1,406
2023	1,329
2024	1,168
2025 and Thereafter	5,648
Estimated Future Amortization Expense of Definite-lived Intangible Assets	$ 12,763

Amortization of acquisition-related intangible assets was $1.71 billion, $1.74 billion and $1.59 billion in 2019, 2018 and 2017, respectively.

Other Assets

Other assets in the accompanying balance sheet include operating lease right-of-use assets, deferred tax assets, pension assets, cash surrender value of life insurance, insurance recovery receivables related to product liability matters, investments and other assets.

Prior to January 1, 2018, investments for which there are not readily determinable market values were accounted for under the cost method of accounting. The company periodically evaluated the carrying value of its investments accounted for under the cost method of accounting, which provided that they are recorded at the lower of cost or estimated net realizable value. Effective January 1, 2018, equity investments that do not have readily determinable fair values are measured at cost minus impairment, if any, plus or minus changes resulting from observable price changes in orderly transactions for the identical or similar investments of the same issuer. The company performs qualitative assessments to identify impairments of these investments. At December 31, 2019 and 2018, the company had such investments with carrying amounts of $34 million and $36 million, respectively, which are included in other assets.

Goodwill

The company assesses goodwill for impairment at the reporting unit level annually and whenever events occur or circumstances change that would more-likely-than-not reduce the fair value of a reporting unit below its carrying amount. Such events or circumstances generally include the occurrence of operating losses or a significant decline in earnings associated with one or more of the company's reporting units. The company is permitted to first assess qualitative factors to determine whether the goodwill impairment test is necessary. If the qualitative assessment results in a determination that the fair value of a reporting unit is more-likely-than-not less than its carrying amount, the company performs a quantitative goodwill impairment test. The company may bypass the qualitative assessment for the reporting unit in any period and proceed directly to the goodwill impairment test. The company estimates the fair value of its reporting units by using forecasts of discounted future cash flows and peer market multiples. The company would record an impairment charge based on the excess of a reporting unit's carrying amount over its fair value (limited to the amount of goodwill). The company determined that no impairments existed in 2019, 2018 or 2017.

The changes in the carrying amount of goodwill by segment are as follows:

(In millions)	Life Sciences Solutions	Analytical Instruments	Specialty Diagnostics	Laboratory Products and Services	Total
Balance at December 31, 2017	$ 8,391	$ 5,027	$ 3,856	$ 8,016	$ 25,290
Acquisitions	161	—	—	—	161
Finalization of purchase price allocations for 2017 acquisitions	—	1	—	20	21
Currency translation	(5)	(77)	(121)	79	(124)
Other	1	(1)	—	(1)	(1)
Balance at December 31, 2018	8,548	4,950	3,735	8,114	25,347
Acquisitions	—	9	—	938	947
Finalization of purchase price allocations for 2018 acquisitions	(2)	—	—	—	(2)
Sale of business	—	—	(478)	—	(478)
Currency translation	(3)	(38)	(72)	11	(102)
Other	1	7	(1)	(5)	2
Balance at December 31, 2019	$ 8,544	$ 4,928	$ 3,184	$ 9,058	$ 25,714

Loss Contingencies

Accruals are recorded for various contingencies, including legal proceedings, environmental, workers' compensation, product, general and auto liabilities, self-insurance and other claims that arise in the normal course of business. The accruals are based on management's judgment, historical claims experience, the probability of losses and, where applicable, the consideration of opinions of internal and/or external legal counsel and actuarial estimates. Additionally, the company records

receivables from third-party insurers up to the amount of the loss when recovery has been determined to be probable. Liabilities acquired in acquisitions have been recorded at fair value and, as such, were discounted to present value at the dates of acquisition.

Currency Translation

All assets and liabilities of the company's non-U.S. subsidiaries are translated at period-end exchange rates. Resulting translation adjustments are reflected in the "accumulated other comprehensive items" component of shareholders' equity. Revenues and expenses are translated at average exchange rates for the period. Currency transaction gains (losses) are included in the accompanying statement of income and in aggregate were $52 million, $19 million and $(31) million in 2019, 2018 and 2017, respectively.

Derivative Contracts

The company is exposed to certain risks relating to its ongoing business operations including changes to interest rates and currency exchange rates. The company uses derivative instruments primarily to manage currency exchange and interest rate risks. The company recognizes derivative instruments as either assets or liabilities and measures those instruments at fair value. If a derivative is a hedge, depending on the nature of the hedge, changes in the fair value of the derivative are either offset against the change in fair value of the hedged item through earnings or recognized in other comprehensive items until the hedged item is recognized in earnings. Derivatives that are not designated as hedges are recorded at fair value through earnings.

The company uses short-term forward and option currency exchange contracts primarily to hedge certain balance sheet and operational exposures resulting from changes in currency exchange rates, predominantly intercompany loans and cash balances that are denominated in currencies other than the functional currencies of the respective operations. The currency-exchange contracts principally hedge transactions denominated in Swiss franc, euro, Canadian dollars, Swedish kronor, British pounds sterling, Japanese yen and Czech koruna. The company does not hold or engage in transactions involving derivative instruments for purposes other than risk management.

Cash flow hedges. For derivative instruments that are designated and qualify as a cash flow hedge, the gain or loss on the derivative is reported as a component of other comprehensive items and reclassified into earnings in the same period or periods during which the hedged transaction affects earnings and is presented in the same income statement line item as the earnings effect of the hedged item.

Fair value hedges. For derivative instruments that are designated and qualify as a fair value hedge, the gain or loss on the derivative, as well as the offsetting loss or gain on the hedged item attributable to the hedged risk, are recognized in earnings.

Net investment hedges. The company also uses foreign currency-denominated debt and cross-currency interest rate swaps to partially hedge its net investments in foreign operations against adverse movements in exchange rates. The majority of the company's euro-denominated senior notes and cross-currency interest rate swaps have been designated as, and are effective as, economic hedges of part of the net investment in a foreign operation. Accordingly, foreign currency transaction gains or losses due to spot rate fluctuations on the euro-denominated debt instruments and contract fair value changes on the cross-currency interest rate swaps, excluding interest accruals, are included in currency translation adjustment within other comprehensive items and shareholders' equity.

Use of Estimates

The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

Recent Accounting Pronouncements

In January 2020, the FASB issued new guidance to clarify the interaction of the accounting for certain equity securities, equity method investments, and certain forward contracts and purchased options. Among other things, the new guidance clarifies that an entity should consider observable transactions that require it to either apply or discontinue the equity method of accounting for the purposes of applying measurement principles for certain equity securities immediately before applying or discontinuing the equity method. The company expects to adopt this

guidance in 2020 using a prospective method. The adoption of this guidance is not expected to have a material impact on the company's consolidated financial statements.

In December 2019, the FASB issued new guidance to simplify the accounting for income taxes. Among other things, the new guidance requires the effects of enacted changes in tax laws or rates to be reflected in the annual effective tax rate

computation in the interim period that includes the enactment date. The company expects to adopt this guidance when it is effective in 2021 using a prospective method. The adoption of this guidance is not expected to have a material impact on the company's consolidated financial statements; however, the impact in future periods will be dependent on the extent of future events or conditions that would be affected such as enacted changes in tax laws or rates.

In August 2018, the FASB issued new guidance to modify the disclosure requirements for employers that sponsor defined benefit pension or other postretirement plans. The company will adopt the guidance in 2020 using a retrospective method. The adoption of this guidance is not expected to have a material impact on the company's disclosures.

In August 2018, the FASB issued new guidance to modify the disclosure requirements on fair value measurements. The company will adopt the guidance in 2020 with some items requiring a prospective method and others requiring a retrospective method. The adoption of this guidance is not expected to have a material impact on the company's disclosures.

In February 2018, the FASB issued new guidance to allow reclassifications from accumulated other comprehensive items (AOCI) to retained earnings for certain tax effects on items within AOCI resulting from the Tax Cuts and Jobs Act of 2017 (the Tax Act). The company adopted this guidance in January 2018 and recorded the reclassifications in the period of adoption. The balance sheet impact of adopting this guidance is included in the table below. This guidance only relates to the effects of the Tax Act. For all other tax law changes that have occurred or may occur in the future, the company reclassifies the tax effects to the consolidated statement of income on an item-by-item basis when the pre-tax item in AOCI is reclassified to income.

In December 2017, the SEC staff issued guidance to address the application of accounting guidance in situations when a registrant does not have the necessary information available, prepared, or analyzed (including computations) in reasonable detail to complete the accounting for certain income tax effects of the Tax Act enacted on December 22, 2017. The company reported provisional amounts in its 2017 financial statements for certain income tax effects of the Tax Act for which a reasonable estimate could be determined. Adjustments to provisional amounts identified during the measurement period, which ended December 22, 2018, are included as adjustments to Provision for Income Taxes in 2018 (Note 8).

In August 2017, the FASB issued new guidance to simplify the application of hedge accounting guidance. Among other things, the new guidance will permit more hedging strategies to qualify for hedge accounting, allow for additional time to perform an initial assessment of a hedge's effectiveness, and permit a qualitative effectiveness test for certain hedges after initial qualification. The company adopted this guidance in January 2018. The balance sheet impact of adopting this guidance is included in the table below.

In October 2016, the FASB issued new guidance eliminating the deferral of the tax effects of intra-entity asset transfers. The impact of this guidance in future periods will be dependent on the extent of future asset transfers which usually occur in connection with planning around acquisitions and other business structuring activities. The balance sheet impact of adopting this guidance as of January 1, 2018 is included in the table below.

In June 2016, the FASB issued new guidance to require a financial asset measured at amortized cost basis, such as accounts receivable, to be presented at the net amount expected to be collected based on relevant information about past events, including historical experience, current conditions, and reasonable and supportable forecasts that affect the collectability of the reported amount. During 2018 and 2019, the FASB issued additional guidance and clarification. The company will adopt the guidance in 2020 using a modified retrospective method. The adoption of this guidance is not expected to have a material impact on the company's consolidated financial statements.

In February 2016, the FASB issued new guidance which requires lessees to record most leases on their balance sheets as lease liabilities, initially measured at the present value of the future lease payments, with corresponding right-of-use assets. The new guidance also sets forth new disclosure requirements related to leases. During 2017 - 2019, the FASB issued additional guidance and clarification. The company adopted this guidance in January 2019. The company elected to adopt the guidance using a modified retrospective method, by applying the transition approach as of the beginning of the period of adoption. Comparative periods have not been restated. As permitted upon transition, the company did not reassess whether any expired or existing contracts were or contained embedded leases, the lease classification for any expired or existing leases, initial direct costs for any leases, or whether land

easements met the definition of a lease if they were not accounted for as leases under the prior guidance. Adoption of the new guidance impacted the company's Consolidated Balance Sheet as follows:

(In millions)	December 31, 2018 as Reported	Impact of Adopting New Lease Guidance	January 1, 2019 As Adopted
Other Assets	$ 1,117	$ 641	$ 1,758
Other Accrued Expenses	1,470	132	1,602
Other Long-term Liabilities	2,515	505	3,020
Retained Earnings	18,696	4	18,700

In January 2016, the FASB issued new guidance which affects the accounting for equity investments, financial liabilities under the fair value option, and the presentation and disclosure requirements for financial instruments. This guidance requires equity investments to be measured at fair value with subsequent changes recognized in net income, except for those accounted for under the equity method or requiring consolidation. The guidance also changes the accounting for investments without a readily determinable fair value and that do not qualify for the practical expedient permitted by the guidance to estimate fair value. The balance sheet impact of adopting this guidance as of January 1, 2018 is included in the table below.

In May 2014, the FASB issued new revenue recognition guidance which provides a single comprehensive model for entities to use in accounting for revenue arising from contracts with customers and supersedes most previous revenue recognition guidance. The new standard also requires significantly expanded disclosures regarding the qualitative and quantitative information of an entity's nature, amount, timing, and uncertainty of revenue and cash flows arising from contracts with customers. During 2016 and 2017, the FASB issued additional guidance and clarification, including the elimination of certain SEC Staff Guidance. The guidance is effective for the company in 2018. The company elected to adopt this guidance through application of the modified retrospective method by applying it to contracts that were not completed as of December 31, 2017 (in addition to new contracts in 2018).

Adoption of new guidance that became effective on January 1, 2018, impacted the company's Consolidated Balance Sheet as follows:

(In millions)	December 31, 2017 as Reported	Impact of Adopting New Revenue Guidance	Impact of Adopting New Equity Investment Guidance	Impact of Adopting New Intra-entity Tax Guidance	Impact of Adopting New Hedge Accounting Guidance	Impact of Adopting New Tax Effects on Items in AOCI Guidance	January 1, 2018 as Adopted
Accounts Receivable, Less Allowances	$ 3,879	$ (8)	$ —	$ —	$ —	$ —	$ 3,871
Inventories	2,971	(252)	—	—	—	—	2,719
Other Current Assets	1,236	229	—	—	—	—	1,465
Other Assets	1,227	18	—	(77)	—	—	1,168
Deferred Revenue	719	(719)	—	—	—	—	—
Contract Liabilities	—	736	—	—	—	—	736
Other Accrued Expenses	1,848	(153)	—	—	—	—	1,695
Deferred Income Taxes	2,766	—	—	(57)	—	2	2,711
Other Long-term Liabilities	2,569	74	—	—	—	—	2,643
Long-term Obligations	18,873	—	—	—	(3)	—	18,870
Retained Earnings	15,914	49	(1)	(20)	3	87	16,032
Accumulated Other Comprehensive Items	(2,003)	—	1	—	—	(89)	(2,091)

Had the company continued to use the revenue recognition guidance in effect prior to 2018, no material changes would have resulted to the consolidated statements of income, comprehensive income, or cash flows for the year ended December 31, 2018 from amounts reported therein. However, inventories would have been $357 million higher and other current assets would have been $359 million lower as of December 31, 2018, primarily as a result of differences in the accounting for pharmaceutical development and manufacturing services under the new revenue guidance. Under the prior guidance, costs of these services were recorded in inventory and revenues were recognized generally when the products were delivered to customers. Under the new guidance, costs are expensed and revenues are recognized as the manufacturing service is performed and the company's rights to consideration are recorded as contract assets.

Note 2. Acquisitions and Dispositions

The company's acquisitions have historically been made at prices above the determined fair value of the acquired identifiable net assets, resulting in goodwill, due to expectations of the synergies that will be realized by combining the businesses. These synergies include the elimination of redundant facilities, functions and staffing; use of the company's existing commercial infrastructure to expand sales of the acquired businesses' products; and use of the commercial infrastructure of the acquired businesses to cost-effectively expand sales of company products.

Acquisitions have been accounted for using the acquisition method of accounting, and the acquired companies' results have been included in the accompanying financial statements from their respective dates of acquisition. Acquisition transaction costs are recorded in selling, general and administrative expenses as incurred.

2019

On April 30, 2019, the company acquired, within the Laboratory Products and Services segment, Brammer Bio for approximately $1.67 billion in cash. Brammer Bio is a leading viral vector contract development and manufacturing organization for gene and cell therapies. The acquisition expands the segment's contract manufacturing capabilities. Brammer Bio reported revenues of approximately $140 million in 2018. The purchase price exceeded the fair value of the identifiable net assets and, accordingly, $938 million was allocated to goodwill, $405 million of which is tax deductible.

In addition, in 2019 the company acquired, within the Analytical Instruments segment, a Slovakia-based provider of mass spectrometry software used for identification of compounds, and, within the Laboratory Products and Services segment, an active pharmaceutical ingredient (API) manufacturing facility in Cork, Ireland, for an aggregate purchase price of $169 million.

The components of the purchase price and net assets acquired for 2019 acquisitions are as follows:

(In millions)	Brammer Bio	Other	Total
Purchase Price			
Cash paid	$ 1,710	$ 169	$ 1,879
Cash acquired	(36)	—	(36)
	$ 1,674	$ 169	$ 1,843
Net Assets Acquired			
Current assets	$ 52	$ 58	$ 110
Property, plant and equipment	147	102	249
Definite-lived intangible assets:			
Customer relationships	744	—	744
Product technology	65	7	72
Tradenames	7	—	7
Goodwill	938	9	947
Other assets	49	—	49
Contract liabilities	(110)	—	(110)
Deferred tax liabilities	(110)	(6)	(116)
Other liabilities assumed	(108)	(1)	(109)
	$ 1,674	$ 169	$ 1,843

The weighted-average amortization periods for definite-lived intangible assets acquired in 2019 are 14 years for customer relationships, 13 years for product technology and 2 years for tradenames. The weighted average amortization period for all definite-lived intangible assets acquired in 2019 is 14 years.

2018

On October 25, 2018, the company acquired, within the Life Sciences Solutions segment, Becton Dickinson and Company's Advanced Bioprocessing business for $477 million in cash. This North America-based business adds complementary cell culture products that expand the segment’s bioproduction offerings to help customers increase yield during production of biologic drugs. The Advanced Bioprocessing business reported revenues of $100 million in 2017. The purchase price exceeded the fair value of the identifiable net assets and, accordingly, $146 million was allocated to goodwill, all of which is tax deductible.

In 2018, the company acquired, within the Life Sciences Solutions segment, a North America-based provider of a rapid DNA platform for use in forensics and law enforcement applications, for an aggregate purchase price of $65 million.

The components of the purchase price and net assets acquired for 2018 acquisitions are as follows:

(In millions)	Advanced Bioprocessing business	Other	Total
Purchase Price			
Cash paid	$ 477	$ 55	$ 532
Fair value of contingent consideration	—	11	11
Cash acquired	—	(1)	(1)
	$ 477	$ 65	$ 542
Net Assets Acquired			
Current assets	$ 53	$ 4	$ 57
Property, plant and equipment	42	—	42
Definite-lived intangible assets:			
Customer relationships	108	—	108
Product technology	132	31	163
Tradenames	8	—	8
Indefinite-lived intangible assets:			
In-process research and development	—	10	10
Goodwill	146	15	161
Other assets	—	14	14
Deferred tax liabilities	(7)	—	(7)
Other liabilities assumed	(5)	(9)	(14)
	$ 477	$ 65	$ 542

The weighted-average amortization periods for definite-lived intangible assets acquired in 2018 are 14 years for customer relationships, 13 years for product technology and 6 years for tradenames. The weighted average amortization period for all definite-lived intangible assets acquired in 2018 is 13 years.

2017

On August 29, 2017, the company acquired, within the Laboratory Products and Services segment, Patheon N.V., a leading global provider of high-quality drug development and delivery solutions to the pharmaceutical and biopharma sectors, for $35.00 per share in cash, or $7.36 billion, including the assumption of net debt. The company financed the purchase price, including the repayment of indebtedness of Patheon, with issuances of debt and equity.

Patheon provides comprehensive, integrated and highly customizable solutions as well as the expertise to help biopharmaceutical companies of all sizes satisfy complex development and manufacturing needs. The acquisition provided entry into the pharmaceutical contract development and manufacturing organization market and added a complementary service to the company's existing pharmaceutical services portfolio. Patheon reported revenues of $1.87 billion for the year ended October 31, 2016. The purchase price exceeded the fair market value of the identifiable net assets and, accordingly, $3.28 billion was allocated to goodwill, $125 million of which is tax deductible.

In addition, in 2017 the company acquired, within the Analytical Instruments segment, a North America-based provider of cloud-based platforms supporting scientific data management; within the Life Sciences Solutions segment, a North America-based developer of scalable control automation systems and software for bioproduction; within the Specialty Diagnostics segment, a North America-based molecular diagnostics company offering qPCR tests to the transplant community; and within the Analytical Instruments segment, a provider of desktop scanning electron microscopy solutions and a manufacturer of volatile organic compound monitoring instruments and integrated systems, for an aggregate purchase price of $425 million.

The components of the purchase price and net assets acquired for 2017 acquisitions are as follows:

(In millions)	Patheon	Other	Total
Purchase Price			
Cash paid	$ 6,911	$ 422	$ 7,333
Debt assumed	488	—	488
Fair value of contingent consideration	—	17	17
Fair value of equity awards exchanged	6	—	6
Fair value of previously held interest	—	11	11
Cash acquired	(47)	(25)	(72)
	$ 7,358	$ 425	$ 7,783
Net Assets Acquired			
Current assets	$ 1,062	$ 39	$ 1,101
Property, plant and equipment	1,242	4	1,246
Definite-lived intangible assets:			
Customer relationships	3,641	90	3,731
Product technology	—	96	96
Tradenames	112	5	117
Indefinite-lived intangible assets:			
In-process research and development	—	2	2
Goodwill	3,276	263	3,539
Other assets	54	—	54
Deferred tax liabilities	(1,093)	(40)	(1,133)
Other liabilities assumed	(936)	(34)	(970)
	$ 7,358	$ 425	$ 7,783

The weighted-average amortization periods for definite-lived intangible assets acquired in 2017 are 17 years for customer relationships, 9 years for product technology and 4 years for tradenames. The weighted average amortization period for all definite-lived intangible assets acquired in 2017 is 16 years.

Unaudited Pro Forma Information

The following unaudited pro forma information provides the effect of the company's 2017 acquisition of Patheon as if the acquisition had occurred on January 1, 2016:

(In millions)	2017
Revenues	$ 22,144
Net Income	$ 2,258

To reflect the acquisition of Patheon as if it had occurred on January 1, 2016, the unaudited pro forma results include adjustments to reflect, among other things, the incremental intangible asset amortization to be incurred based on the preliminary values of each identifiable intangible asset and the interest expense from debt financings obtained to partially fund the cash consideration transferred. Pro forma adjustments were tax effected at the company's

historical statutory rates in effect for the respective periods. The unaudited pro forma amounts are not necessarily indicative of the combined results of operations that would have been realized had the acquisition and related financings occurred on the aforementioned date, nor are they meant to be indicative of any anticipated combined results of operations that the company will experience after the transaction. In addition, the amounts do not include any adjustments for actions that may be taken following the completion of the transaction, such as expected cost savings, operating synergies, or revenue enhancements that may be realized subsequent to the transaction.

Pro forma net income for the year ended December 31, 2017, excludes certain items associated with the Patheon acquisition that were included in the determination of net income for that period. These items have been included in the determination of pro forma net income for the year ended December 31, 2016 (not presented), and are as follows: $54 million

of direct transaction costs, $39 million of accounting policy conformity adjustments, $21 million of initial restructuring costs, $40 million reduction of revenues for revaluing the deferred revenue obligations to fair value, and $55 million of expense related to the fair value adjustment to acquisition-date inventories.

The company's results would not have been materially different from its pro forma results had the company's other 2019, 2018 or 2017 acquisitions occurred at the beginning of 2018, 2017 or 2016, respectively.

Disposition

On June 28, 2019, the company sold its Anatomical Pathology business to PHC Holdings Corporation for $1.13 billion, net of cash divested. The business was part of the Specialty Diagnostics segment. The sale of this business resulted in a pre-tax gain of approximately $478 million, included in restructuring and other (income) costs, net. Revenues in 2019, through the date of sale, and the full year 2018 of the business sold were approximately $115 million and $238 million, respectively, net of retained sales through the company's healthcare market and research and safety market channel businesses. The assets and liabilities of the Anatomical Pathology business were as follows on December 31, 2018:

(In millions)	December 31, 2018
Current Assets	$ 81
Long-term Assets	528
Current Liabilities	34
Long-term Liabilities	24

Note 3. Revenue

Disaggregated Revenue

Revenue by type is as follows:

(In millions)	2019	2018
Revenues		
Consumables	$ 13,109	12,576
Instruments	6,387	6,292
Services	6,046	5,490
Consolidated revenues	$ 25,542	$ 24,358

Revenue by geographic region is as follows:

(In millions)	2019	2018
Revenues (a)		
North America	$ 12,896	$ 12,143
Europe	6,358	6,215
Asia-Pacific	5,524	5,250
Other regions	764	750
Consolidated revenues	$ 25,542	$ 24,358

(a) Revenues are attributed to regions based on customer location.

Each reportable segment earns revenues from consumables, instruments and services in North America, Europe, Asia-Pacific and other regions. See note 4 for revenue by reportable segment and other geographic data.

Remaining Performance Obligations

The aggregate amount of the transaction price allocated to the remaining performance obligations for all open customer contracts as of December 31, 2019 was $7.77 billion. The company will recognize revenue for these performance obligations as they are satisfied, approximately 63% of which is expected to occur within the next twelve months.

Note 4. Business Segment and Geographical Information

The company's financial performance is reported in four segments. A description of each segment follows.

Life Sciences Solutions: provides an extensive portfolio of reagents, instruments and consumables used in biological and medical research, discovery and production of new drugs and vaccines as well as diagnosis of disease. These products and services are used by customers in pharmaceutical, biotechnology, agricultural, clinical, academic, and government markets.

Analytical Instruments: provides a broad offering of instruments, consumables, software and services that are used for a range of applications in the laboratory, on the production line and in the field. These products and services are used by customers in pharmaceutical, biotechnology, academic, government, environmental and other research and industrial markets, as well as the clinical laboratory.

Specialty Diagnostics: provides a wide range of diagnostic test kits, reagents, culture media, instruments and associated products used to increase the speed and accuracy of diagnoses. These products are used by customers in healthcare, clinical, pharmaceutical, industrial and food safety laboratories.

Laboratory Products and Services: provides virtually everything needed for the laboratory, including a combination of self-manufactured and sourced products for customers in research, academic, government, industrial and healthcare settings. The segment also includes a comprehensive offering of outsourced services used by the pharmaceutical and biotech industries for drug development, clinical trials logistics and commercial drug manufacturing.

The company's management evaluates segment operating performance based on operating income before certain charges/credits to cost of revenues and selling, general and administrative expenses, principally associated with acquisition accounting; restructuring and other costs/income including costs arising from facility consolidations such as severance and abandoned lease expense and gains and losses from the sale of real estate and product lines as well as from significant litigation-related matters; and amortization of acquisition-related intangible assets. The company uses this measure because it helps management understand and evaluate the segments' core operating results and facilitates comparison of performance for determining compensation.

Business Segment Information

(In millions)	2019	2018	2017
Revenues			
Life Sciences Solutions	$ 6,856	$ 6,269	$ 5,728
Analytical Instruments	5,522	5,469	4,821
Specialty Diagnostics	3,718	3,724	3,486
Laboratory Products and Services	10,599	10,035	7,825
Eliminations	(1,153)	(1,139)	(942)
Consolidated revenues	25,542	24,358	20,918
Segment Income (a)			
Life Sciences Solutions	2,446	2,158	1,894
Analytical Instruments	1,273	1,247	1,027
Specialty Diagnostics	930	952	927
Laboratory Products and Services	1,324	1,258	1,004
Subtotal reportable segments (a)	5,973	5,615	4,852
Cost of revenues charges, net	(17)	(12)	(123)
Selling, general and administrative charges, net	(62)	(29)	(78)
Restructuring and other income (costs), net	413	(50)	(97)
Amortization of acquisition-related intangible assets	(1,713)	(1,741)	(1,594)
Consolidated operating income	4,594	3,783	2,960
Interest income (b)	224	137	81
Interest expense (b)	(676)	(667)	(592)
Other (expense) income, net (b)	(72)	9	(20)
Income from Continuing Operations Before Income Taxes	$ 4,070	$ 3,262	$ 2,429
Depreciation			
Life Sciences Solutions	$ 130	$ 119	$ 129
Analytical Instruments	75	73	71
Specialty Diagnostics	67	76	72
Laboratory Products and Services	292	258	167
Consolidated depreciation	$ 564	$ 526	$ 439

(a) Represents operating income before certain charges to cost of revenues and selling, general and administrative expenses; restructuring and other costs/income, net; and amortization of acquisition-related intangibles.

(b) The company does not allocate interest or other expense/income, net to its segments.

(In millions)	2019	2018	2017
Total Assets			
Life Sciences Solutions	$ 18,306	$ 18,774	$ 19,063
Analytical Instruments	9,896	9,907	9,960
Specialty Diagnostics	5,867	6,663	7,095
Laboratory Products and Services	21,761	19,051	19,181
Corporate/Other (c)	2,551	1,837	1,370
Consolidated total assets	$ 58,381	$ 56,232	$ 56,669
Capital Expenditures			
Life Sciences Solutions	$ 151	$ 107	$ 118
Analytical Instruments	64	85	56
Specialty Diagnostics	83	103	87
Laboratory Products and Services	554	374	178
Corporate/Other	74	89	69
Consolidated capital expenditures	$ 926	$ 758	$ 508

(c) Corporate assets consist primarily of cash and cash equivalents and property and equipment at the company's corporate offices.

Geographical Information

(In millions)	2019	2018	2017
Revenues (d)			
United States	$ 12,366	$ 11,629	$ 10,129
China	2,752	2,504	2,060
Other	10,424	10,225	8,729
Consolidated revenues	$ 25,542	$ 24,358	$ 20,918
Long-lived Assets (e)			
United States	$ 3,099	$ 2,444	$ 2,349
Other	2,349	1,721	1,698
Consolidated long-lived assets	$ 5,448	$ 4,165	$ 4,047

(d) Revenues are attributed to countries based on customer location.

(e) Includes property, plant and equipment, net, and beginning in 2019, operating lease right-of-use assets.

Note 5. Other Expense/Income, Net

In all periods, other expense, net includes currency transaction gains and losses on monetary assets and liabilities and net periodic pension benefit cost/income, excluding the service cost component which is included in operating expenses on the accompanying statement of income. In 2019, other expense, net includes $184 million of losses on

the early extinguishment of debt (see Note 10), offset in part by $44 million of net gains on investments. The investment gains include a $28 million gain on the sale of a joint venture for net proceeds of $42 million.

In 2018, other expense, net also includes $15 million of net losses on investments.

In 2017, other expense, net includes $32 million of charges related to amortization of fees paid to obtain bridge financing commitments related to the Patheon acquisition (Note 2) and $4 million of losses on the early extinguishment of debt, offset in part by $17 million of net gains on investments.

Note 6. Stock-based Compensation Expense

The company has stock-based compensation plans for its key employees, directors and others. These plans permit the grant of a variety of stock and stock-based awards, including restricted stock units, stock options or performance-based shares, as determined by the compensation committee of the company's Board of Directors or, for certain non-officer grants, by the company's employee equity committee, which consists of its chief executive officer. The company generally issues new shares of its common stock to satisfy option exercises and restricted unit vestings. Grants of stock options and restricted units generally provide that in the event of both a change in control of the company and a qualifying termination of an option or unit holder's employment, all options and service-based restricted unit awards held by the recipient become immediately vested (unless an employment or other agreement with the employee provides for different treatment).

Compensation cost is based on the grant-date fair value and is recognized ratably over the requisite vesting period or to the date based on qualifying retirement eligibility, if earlier.

Stock-based compensation expense is primarily included in selling, general and administrative expenses.

(In millions)	2019	2018	2017
Stock-based Compensation Expense	$ 181	$ 181	$ 159

Stock Options

The company's practice is to grant stock options at fair market value. Options vest over 3-5 years with terms of 7-10 years, assuming continued employment with certain exceptions. Vesting of the option awards is contingent upon meeting certain service conditions. The fair value of most option grants is estimated using the Black-Scholes option pricing model. For option grants that require the achievement of both service and market conditions, a lattice model is used to estimate fair value. The fair value is then amortized on a straight-line basis over the requisite service periods of the awards, which is generally the vesting period. Use of a valuation model requires management to make certain assumptions with respect to selected model inputs. Expected volatility was calculated based on the historical volatility of the company's stock. Historical data on exercise patterns is the basis for estimating the expected life of an option. The risk-free interest rate is based on U.S. Treasury zero-coupon issues with a remaining term which approximates the expected life assumed at the date of grant. The expected annual dividend rate was calculated by dividing the company's annual dividend, based on the most recent quarterly dividend rate, by the closing stock price on the grant date. The compensation expense recognized for all stock-based awards is net of estimated forfeitures. Forfeitures are estimated based on an analysis of actual option forfeitures.

The weighted average assumptions used in the Black-Scholes option pricing model are as follows:

	2019	2018	2017
Expected Stock Price Volatility	21 %	20 %	20 %
Risk Free Interest Rate	2.4 %	2.6 %	1.9 %
Expected Life of Options (years)	4.3	4.3	4.3
Expected Annual Dividend	0.3 %	0.3 %	0.4 %

The weighted average per share grant-date fair values of options granted during 2019, 2018 and 2017 were $53.37, $43.45 and $30.73, respectively. The total intrinsic value of options exercised during the same periods was $320 million, $312 million and $199 million, respectively. The intrinsic value is the difference between the market value of the shares on the exercise date and the exercise price of the option.

A summary of the company's option activity for the year ended December 31, 2019 is presented below:

	Shares (in millions)	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term (in years)	Aggregate Intrinsic Value (a) (in millions)
Outstanding at December 31, 2018	8.0	$ 148.09		
Granted	1.3	256.61		
Exercised	(2.0)	111.13		
Canceled/Expired	(0.4)	193.78		
Outstanding at December 31, 2019	6.9	$ 176.26	4.1	
Vested and Unvested Expected to Vest at December 31, 2019	6.6	$ 174.33	4.1	$ 992
Exercisable at December 31, 2019	3.1	$ 141.20	2.9	$ 561

As of December 31, 2019, there was $95 million of total unrecognized compensation cost related to unvested stock options granted. The cost is expected to be recognized through 2023 with a weighted average amortization period of 2.2 years.

Restricted Share/Unit Awards

Awards of restricted units convert into an equivalent number of shares of common stock. The awards generally vest over 3-4 years, assuming continued employment, with some exceptions. Vesting of the awards is contingent upon meeting certain service conditions and may also be contingent upon meeting certain performance and/or market conditions. The fair market value of the award at the time of the grant is amortized to expense over the requisite service period of the award, which is generally the vesting period. Recipients of restricted units have no voting rights but are entitled to accrue dividend equivalents. The fair value of service- and performance-based restricted unit awards is determined based on the number of units granted and the market value of the company's shares on the grant date. For awards with market-based vesting conditions, the company uses a lattice model to estimate the grant-date fair value of the award.

A summary of the company's restricted unit activity for the year ended December 31, 2019 is presented below:

	Units (in millions)	Weighted Average Grant-Date Fair Value
Unvested at December 31, 2018	1.2	$ 177.04
Granted	0.6	248.10
Vested	(0.7)	173.61
Forfeited	(0.1)	198.73
Unvested at December 31, 2019	1.0	$ 218.34

The total fair value of shares vested during 2019, 2018 and 2017 was $118 million, $114 million and $97 million, respectively.

As of December 31, 2019, there was $141 million of total unrecognized compensation cost related to unvested restricted stock unit awards. The cost is expected to be recognized through 2023 with a weighted average amortization period of 1.9 years.

Employee Stock Purchase Plans

Qualifying employees are eligible to participate in an employee stock purchase plan sponsored by the company. Shares may be purchased under the program at 95% of the fair market value at the end of the purchase period and the shares purchased are not subject to a holding period. Shares are purchased through payroll deductions of up to 10% of each participating

employee's qualifying gross wages. The company issued 0.2 million, 0.1 million and 0.1 million shares, respectively, of its common stock in 2019, 2018 and 2017 under the employee stock purchase plan.

Note 7. Pension and Other Postretirement Benefit Plans

401(k) Savings Plan and Other Defined Contribution Plans

The company's 401(k) savings and other defined contribution plans cover the majority of the company's eligible U.S. and certain non-U.S. employees. Contributions to the plans are made by both the employee and the company. Company contributions are based on the level of employee contributions. Company contributions to these plans are based on formulas determined by the company. In 2019, 2018 and 2017, the company charged to expense $232 million, $204 million and $161 million, respectively, related to its defined contribution plans.

Defined Benefit Pension Plans

Employees of a number of the company's non-U.S. and certain U.S. subsidiaries participate in defined benefit pension plans covering substantially all full-time employees at those subsidiaries. Some of the plans are unfunded, as permitted under the plans and applicable laws. The company also maintains postretirement healthcare programs at several acquired businesses where certain employees are eligible to participate. The costs of the postretirement healthcare programs are generally funded on a self-insured and insured-premium basis.

The company recognizes the funded status of defined benefit pension and other postretirement benefit plans as an asset or liability. This amount is defined as the difference between the fair value of plan assets and the benefit obligation. The company is required to recognize as a component of other comprehensive items, net of tax, the actuarial gains/losses and prior service costs/credits that arise but were not previously required to be recognized as components of net periodic benefit cost. Other comprehensive items is adjusted as these amounts are later recognized in income as components of net periodic benefit cost.

When a company with a pension plan is acquired, any excess of projected benefit obligation over the plan assets is recognized as a liability and any excess of plan assets over the projected benefit obligation is recognized as an asset. The recognition of a new liability or a new asset results in the elimination of (a) previously existing unrecognized net gain or loss and (b) unrecognized prior service cost or credits.

The company funds annually, at a minimum, the statutorily required minimum amount as actuarially determined. During 2019, 2018 and 2017, the company made cash contributions of approximately $50 million, $93 million and $200 million, respectively. Contributions to the plans included in the following table are estimated at between $40 and $60 million for 2020.

The following table provides a reconciliation of benefit obligations and plan assets of the company's domestic and non-U.S. pension plans and postretirement benefit plans:

(In millions)	Domestic Pension Benefits 2019	Domestic Pension Benefits 2018	Non-U.S. Pension Benefits 2019	Non-U.S. Pension Benefits 2018	Postretirement Benefits 2019	Postretirement Benefits 2018
Change in Projected Benefit Obligations						
Benefit Obligation at Beginning of Year	$ 1,179	$ 1,300	$ 1,193	$ 1,324	$ 50	$ 63
Business combinations/divestiture	—	8	(23)	—	—	1
Service costs	—	—	23	26	1	1
Interest costs	45	41	24	23	2	2
Settlements	—	—	(34)	(33)	—	—
Plan participants' contributions	—	—	5	5	—	—
Actuarial (gains) losses	156	(87)	136	(48)	3	(8)
Benefits paid	(78)	(83)	(27)	(34)	(2)	(2)
Currency translation and other	—	—	6	(70)	1	(7)
Benefit Obligation at End of Year	$ 1,302	$ 1,179	$ 1,303	$ 1,193	$ 55	$ 50
Change in Fair Value of Plan Assets						
Fair Value of Plan Assets at Beginning of Year	$ 1,091	$ 1,181	$ 932	$ 1,011	$ 8	$ 9
Business combinations/divestiture	—	7	(15)	—	—	—
Actual return on plan assets	183	(49)	60	(21)	2	(1)
Employer contribution	5	35	43	56	2	2
Settlements	—	—	(34)	(33)	—	—
Plan participants' contributions	—	—	5	5	—	—
Benefits paid	(78)	(83)	(27)	(34)	(2)	(2)
Currency translation and other	—	—	22	(52)	—	—
Fair Value of Plan Assets at End of Year	$ 1,201	$ 1,091	$ 986	$ 932	$ 10	$ 8
Funded Status	$ (101)	$ (88)	$ (317)	$ (261)	$ (45)	$ (42)
Accumulated Benefit Obligation	$ 1,302	$ 1,179	$ 1,238	$ 1,136		
Amounts Recognized in Balance Sheet						
Noncurrent assets	$ —	$ —	$ 97	$ 106	$ 9	$ 8
Current liability	(6)	(6)	(8)	(8)	(3)	(3)
Noncurrent liabilities	(95)	(82)	(406)	(359)	(51)	(47)
Net amount recognized	$ (101)	$ (88)	$ (317)	$ (261)	$ (45)	$ (42)
Amounts Recognized in Accumulated Other Comprehensive Items						
Net actuarial loss	$ 195	$ 168	$ 200	$ 106	$ 5	$ 4
Prior service credits	—	—	(3)	5	(5)	(5)
Net amount recognized	$ 195	$ 168	$ 197	$ 111	$ —	$ (1)

The actuarial assumptions used to compute the funded status for the plans are based upon information available as of December 31, 2019 and 2018 and are as follows:

	Domestic Pension Benefits		Non-U.S. Pension Benefits		Postretirement Benefits	
	2019	2018	2019	2018	2019	2018
Weighted Average Assumptions Used to Determine Projected Benefit Obligations						
Discount rate	3.12 %	4.21 %	1.60 %	2.34 %	2.86 %	3.81 %
Average rate of increase in employee compensation	N/A	N/A	2.27 %	2.47 %	N/A	N/A
Initial healthcare cost trend rate					5.98 %	6.35 %
Ultimate healthcare cost trend rate					4.48 %	4.89 %

The actuarial assumptions used to compute the net periodic pension benefit cost (income) are based upon information available as of the beginning of the year, as presented in the following table:

	Domestic Pension Benefits			Non-U.S. Pension Benefits		
	2019	2018	2017	2019	2018	2017
Weighted Average Assumptions Used to Determine Net Benefit Cost (Income)						
Discount rate	4.22 %	3.54 %	4.06 %	2.34 %	2.10 %	1.95 %
Average rate of increase in employee compensation	N/A	N/A	N/A	2.47 %	2.59 %	3.10 %
Expected long-term rate of return on assets	5.76 %	5.75 %	6.50 %	3.25 %	3.31 %	3.11 %

The ultimate healthcare cost trend rates for the postretirement benefit plans are expected to be reached between 2020 and 2040.

The discount rate reflects the rate the company would have to pay to purchase high-quality investments that would provide cash sufficient to settle its current pension obligations. The discount rate is determined based on a range of factors, including the rates of return on high-quality, fixed-income corporate bonds and the related expected duration of the obligations or, in certain instances, the company has used a hypothetical portfolio of high quality instruments with maturities that mirror the benefit obligation in order to accurately estimate the discount rate relevant to a particular plan.

The company utilizes a full yield curve approach in the estimation of these components by applying the specific spot-rates along the yield curve used in the determination of the benefit obligation to the relevant projected cash flows.

The expected long-term rate of return on plan assets reflects the average rate of earnings expected on the funds invested, or to be invested, to provide for the benefits included in the projected benefit obligations. In determining the expected long-term rate of return on plan assets, the company considers the relative weighting of plan assets, the historical performance of total plan assets and individual asset classes and economic and other indicators of future performance. In addition, the company may consult with and consider the opinions of financial and other professionals in developing appropriate return benchmarks.

Asset management objectives include maintaining an adequate level of diversification to reduce interest rate and market risk and providing adequate liquidity to meet immediate and future benefit payment requirements.

The expected rate of compensation increase reflects the long-term average rate of salary increases and is based on historic salary increase experience and management’s expectations of future salary increases.

The amounts in accumulated other comprehensive items expected to be recognized as components of net periodic benefit cost in 2020 are not material.

The projected benefit obligation and fair value of plan assets for the company's qualified and non-qualified pension plans with projected benefit obligations in excess of plan assets are as follows:

	Pension Plans	
(In millions)	2019	2018
Pension Plans with Projected Benefit Obligations in Excess of Plan Assets		
Projected benefit obligation	$ 2,072	$ 1,876
Fair value of plan assets	1,557	1,421

The accumulated benefit obligation and fair value of plan assets for the company's qualified and non-qualified pension plans with accumulated benefit obligations in excess of plan assets are as follows:

	Pension Plans	
(In millions)	2019	2018
Pension Plans with Accumulated Benefit Obligations in Excess of Plan Assets		
Accumulated benefit obligation	$ 1,976	$ 1,792
Fair value of plan assets	1,525	1,393

The measurement date used to determine benefit information is December 31 for all plan assets and benefit obligations.

The net periodic pension benefit cost (income) includes the following components:

	Domestic Pension Benefits			Non-U.S. Pension Benefits		
(In millions)	2019	2018	2017	2019	2018	2017
Components of Net Benefit Cost (Income)						
Service cost-benefits earned	$ —	$ —	$ —	$ 23	$ 26	$ 26
Interest cost on benefit obligation	45	41	43	24	23	21
Expected return on plan assets	(55)	(55)	(56)	(30)	(32)	(29)
Amortization of actuarial net loss	2	3	2	6	7	9
Amortization of prior service benefit	—	—	—	(1)	—	—
Settlement/curtailment loss	—	—	1	4	7	5
Net periodic benefit cost (income)	$ (8)	$ (11)	$ (10)	$ 26	$ 31	$ 32

The net periodic postretirement benefit cost was not material in 2019, 2018 and 2017.

Expected benefit payments are estimated using the same assumptions used in determining the company's benefit obligation at December 31, 2019. Benefit payments will depend on future employment and compensation levels, average years employed and average life spans, among other factors, and changes in any of these factors could significantly affect these estimated future benefit payments. Estimated future benefit payments during the next five years and in the aggregate for the five fiscal years thereafter, are as follows:

(In millions)	Domestic Pension Benefits	Non-U.S. Pension Benefits	Post-retirement Benefits
Expected Benefit Payments			
2020	$ 90	$ 34	$ 2
2021	90	37	2
2022	87	38	2
2023	86	41	2
2024	85	45	2
2025-2029	390	250	8

A change in the assumed healthcare cost trend rate by one percentage point effective January 2019 would not have caused a material change in the accumulated postretirement benefit obligation as of December 31, 2019 and the 2019 aggregate of service and interest costs.

Domestic Pension Plan Assets

The company's overall objective is to manage the assets in a liability framework where investments are selected that are expected to have similar changes in fair value as the related liabilities will have upon changes in interest rates. The company invests in a portfolio of both return-seeking and liability-hedging assets, primarily through the use of institutional collective funds, to achieve long-term growth and to insulate the funded position from interest rate volatility. The strategic asset allocation uses a combination of risk controlled and index strategies in fixed income and global equities. The target allocations for the investments are approximately 10% to funds investing in U.S. equities, approximately 10% to funds investing in international equities and approximately 80% to funds investing in fixed income securities. The portfolio maintains enough liquidity at all times to meet the near-term benefit payments.

Non-U.S. Pension Plan Assets

The company maintains specific plan assets for many of the individual pension plans outside the U.S. The investment strategy of each plan has been uniquely established based on the country specific standards and characteristics of the plans. Several of the plans have contracts with insurance companies whereby the market risks of the benefit obligations are borne by the insurance companies. When assets are held directly in investments, generally the objective is to invest in a portfolio of diversified assets with a variety of fund managers. The investments may include equity funds, fixed income funds, hedge funds, multi-asset funds, alternative investments and derivative funds with the target asset allocations ranging from approximately 0% - 25% for equity funds, 0% - 70% for fixed income funds, 0% - 20% for hedge funds, 0% - 100% for multi-asset funds, 0% to 5% for alternative investments and 0% - 30% for funds holding derivatives. The derivatives held by the funds are primarily interest rate swaps intended to match the movements in the plan liabilities as well as equity futures in a synthetic equity fund which provide targeted exposure to equity markets without the fund holding individual equity positions. Each plan maintains enough liquidity at all times to meet the near-term benefit payments.

The fair values of the company's plan assets at December 31, 2019 and 2018, by asset category are as follows:

(In millions)	December 31, 2019	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Not Subject to Leveling (1)
Domestic Pension Plan Assets					
U.S. equity funds	$ 122	$ —	$ —	$ —	$ 122
International equity funds	116	—	—	—	116
Fixed income funds	951	—	—	—	951
Money market funds	12	—	—	—	12
Total Domestic Pension Plans	$ 1,201	$ —	$ —	$ —	$ 1,201
Non-U.S. Pension Plan Assets					
Equity funds	$ 37	$ —	$ —	$ —	$ 37
Fixed income funds	430	—	—	—	430
Hedge funds	61	—	—	—	61
Multi-asset funds	76	—	—	—	76
Derivative funds	129	—	—	—	129
Alternative investments	4	—	—	—	4
Insurance contracts	237	—	237	—	—
Cash / money market funds	12	9	—	—	3
Total Non-U.S. Pension Plans	$ 986	$ 9	$ 237	$ —	$ 740

(1) Investments measured at the net asset value per share (or its equivalent) practical expedient have not been classified in the fair value hierarchy.

(In millions)	December 31, 2018	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Not Subject to Leveling (1)
Domestic Pension Plan Assets					
U.S. equity funds	$ 104	$ —	$ —	$ —	$ 104
International equity funds	103	—	—	—	103
Fixed income funds	868	—	—	—	868
Money market funds	16	—	—	—	16
Total Domestic Pension Plans	$ 1,091	$ —	$ —	$ —	$ 1,091
Non-U.S. Pension Plan Assets					
Equity funds	$ 43	$ —	$ —	$ —	$ 43
Fixed income funds	299	—	—	—	299
Hedge funds	61	—	—	—	61
Multi-asset funds	97	—	—	—	97
Derivative funds	169	—	—	—	169
Alternative investments	20	—	—	—	20
Insurance contracts	237	—	237	—	—
Cash / money market funds	6	5	—	—	1
Total Non-U.S. Pension Plans	$ 932	$ 5	$ 237	$ —	$ 690

(1) Investments measured at the net asset value per share (or its equivalent) practical expedient have not been classified in the fair value hierarchy.

The tables above present the fair value of the company's plan assets in accordance with the fair value hierarchy (Note 14). Certain investments that are measured at fair value using the net asset value per share practical expedient have not been classified in the fair value hierarchy. The fair value amounts of these investments presented in the above tables are intended to permit reconciliation of the fair value hierarchy to the amounts presented for the total pension plan assets. These investments were also redeemable at the balance sheet date or within limited time restrictions.

Note 8. Income Taxes

The components of income from continuing operations before provision for income taxes are as follows:

(In millions)	2019	2018	2017
U.S.	$ 2,278	$ 1,329	$ 655
Non-U.S.	1,792	1,933	1,774
Income from Continuing Operations	$ 4,070	$ 3,262	$ 2,429

The components of the provision for income taxes of continuing operations are as follows:

(In millions)	2019	2018	2017
Current Income Tax Provision			
Federal	$ 267	$ 165	$ 1,259
Non-U.S.	544	574	576
State	62	59	62
	873	798	1,897
Deferred Income Tax Provision (Benefit)			
Federal	$ (222)	$ (258)	$ (1,437)
Non-U.S.	(252)	(187)	(271)
State	(25)	(29)	12
	(499)	(474)	(1,696)
Provision for Income Taxes	$ 374	$ 324	$ 201

The provision for income taxes in the accompanying statement of income differs from the provision calculated by applying the statutory federal income tax rate to income from continuing operations before provision for income taxes due to the following:

(In millions)	2019	2018	2017
Statutory Federal Income Tax Rate	21 %	21 %	35 %
Provision for Income Taxes at Statutory Rate	$ 855	$ 685	$ 850
Increases (Decreases) Resulting From:			
Foreign rate differential	(204)	(375)	(380)
Foreign exchange loss on inter-company debt refinancing	(62)	—	(237)
Income tax credits	(379)	(349)	(273)
Withholding taxes	38	31	55
Global intangible low-taxed income	258	167	—
Foreign-derived intangible income	(111)	(47)	—
Impact of change in tax laws and apportionment on deferred taxes	6	(12)	(1,121)
Transition tax and other impacts of U.S. tax reform	8	117	1,250
Provision for (reversal of) tax reserves, net	62	(49)	99
Excess tax benefits from stock options and restricted stock units	(80)	(77)	(65)
Basis difference on disposal of business	73	—	—
Valuation allowance	(4)	260	7
Intra-entity transfers	(79)	—	—
Other, net	(7)	(27)	16
Provision for Income Taxes	$ 374	$ 324	$ 201

The company has operations and a taxable presence in approximately 50 countries outside the U.S. The company's effective income tax rate differs from the U.S. federal statutory rate each year due to certain operations that are subject to tax incentives, state and local taxes, and foreign taxes that are different than the U.S. federal statutory rate.

U.S. Tax Reform Impacts

On December 22, 2017, the Tax Cuts and Jobs Act of 2017 was enacted. The Tax Act includes significant changes to existing U.S. tax laws that affect the company, including a reduction of the U.S. corporate income tax rate from 35% to 21% beginning in 2018 and creation of a territorial tax system with a one-time transition tax on deemed repatriated earnings and profits of foreign subsidiaries (transition tax). As detailed below, the company recognized a net charge of $204 million for certain aspects of the Tax Act in its 2017 financial statements for which the accounting was provisional, but a reasonable

estimate could be determined. During 2018, the company completed its accounting for the income tax effects of the Tax Act and recognized net adjustments (detailed below) to the provisional amounts, totaling a net charge of $68 million, as a component of income tax expense.

The transition tax is based on the company's total post-1986 earnings and profits, the tax on which was previously deferred from U.S. income taxes under U.S. law. The company recorded a provisional amount for the transition tax liability for each of the foreign subsidiaries, resulting in a total transition liability of $1.25 billion at December 31, 2017. After further analysis of new U.S. Treasury guidance, available tax accounting methods and elections, legislative updates, regulations, earnings and profits computations and foreign taxes, the company finalized the calculations of the transition tax liability during 2018. The increase in the liability for the transition tax in 2018 consisted of an incremental provision of $117 million offset in part by a $49 million reduction of related unrecognized tax benefits established in 2017.

In 2017, as a result of the Tax Act, the company remeasured certain deferred tax assets and liabilities based on the rates at which they were expected to reverse in the future (which was generally 21%), by recording a provisional tax benefit of $1.06 billion. During 2018, no material changes to this provisional amount were made.

The Tax Act included a provision for global intangible low-taxed income. The company has adopted a policy to account for this provision as a period cost.

During 2019, the company recorded a net tax provision of $1 million to adjust the impacts of U.S. tax reform based on final regulations issued by the U.S. Treasury in 2019. The income tax provision consists of an incremental charge of $8 million offset by a $7 million reduction of related unrecognized tax benefits.

Other Tax Impacts

In 2019, the company recorded a $62 million income tax benefit, including both U.S. federal and state taxes, related to a foreign exchange loss for tax purposes on certain intercompany financing arrangements as well as a tax provision of $191 million related to the gain on the sale of the Anatomical Pathology business. Also in 2019, the company recorded a $79 million benefit related to the deferred tax implications of intra-entity transactions which included a tax benefit to release a valuation allowance against net operating losses previously determined to be unrealizable.

In 2018, the provision for income taxes also included a $71 million charge to establish a valuation allowance against net operating losses that will not be utilized as a result of the 2019 sale of the Anatomical Pathology business (Note 2).

The foreign tax credits discussed below are the result of foreign earnings and profits remitted or deemed remitted to the U.S. during the reporting year and the U.S. treatment of taxes paid in the foreign jurisdictions in the years those profits were originally earned.

In 2019, the company implemented foreign tax credit planning in Sweden which resulted in $75 million of foreign tax credits, with no related incremental U.S. income tax expense.

In 2017, the company continued to implement tax planning initiatives related to non U.S. subsidiaries. These non-U.S. subsidiaries incurred foreign tax obligations, and made cash and deemed distributions to the company’s U.S. operations which resulted in no net tax cost. As a result of these distributions, the company benefited from U.S. foreign tax credits of $86 million, offset in part by additional U.S. income taxes of $53 million on the related foreign income (which reduced the benefit from the foreign rate differential in 2017). The company also implemented foreign tax credit planning in Sweden which resulted in $20 million of foreign tax credits, with no related incremental U.S. income tax expense. In 2017, the company refinanced certain long term inter-company debt which resulted in an income tax benefit of $237 million related to a foreign exchange loss recognized for income tax purposes.

The company generally receives a tax deduction upon the exercise of non-qualified stock options by employees, or the vesting of restricted stock units held by employees, for the difference between the exercise price and the market price of the underlying common stock on the date of exercise. The company uses the incremental tax benefit approach for utilization of tax attributes. These excess tax benefits reduce the tax provision. In 2019, 2018 and 2017, the company's tax provision was reduced by $80 million, $77 million and $65 million, respectively, of such benefits.

Net deferred tax asset (liability) in the accompanying balance sheet consists of the following:

(In millions)	2019	2018
Deferred Tax Asset (Liability)		
Depreciation and amortization	$ (3,084)	$ (3,444)
Net operating loss and credit carryforwards	1,231	1,311
Reserves and accruals	144	148
Accrued compensation	261	250
Inventory basis difference	99	105
Other capitalized costs	71	103
Unrealized losses on hedging instruments	10	23
Other, net	57	143
Deferred tax assets (liabilities), net before valuation allowance	(1,211)	(1,361)
Less: Valuation allowance	408	471
Deferred tax assets (liabilities), net	$ (1,619)	$ (1,832)

The company estimates the degree to which tax assets and loss and credit carryforwards will result in a benefit based on expected profitability by tax jurisdiction and provides a valuation allowance for tax assets and loss and credit carryforwards that it believes will more likely than not expire unutilized. At December 31, 2019, all of the company's valuation allowance relates to deferred tax assets, primarily net operating losses, for which any subsequently recognized tax benefits will reduce income tax expense.

The changes in the valuation allowance are as follows:

	Year Ended December 31,		
(In millions)	2019	2018	2017
Beginning Balance	$ 471	$ 256	$ 113
(Reductions) additions charged to income tax provision, net	(27)	223	28
Additions due to acquisitions	—	17	108
Reduction due to a divestiture	(33)	—	—
Deductions	—	(15)	—
Currency translation and other	(3)	(10)	7
Ending Balance	$ 408	$ 471	$ 256

At December 31, 2019, the company had federal, state and non-U.S. net operating loss carryforwards of $282 million, $1.73 billion and $4.82 billion, respectively. Use of the carryforwards is limited based on the future income of certain subsidiaries. The federal and state net operating loss carryforwards expire in the years 2020 through 2039. Of the non-U.S. net operating loss carryforwards, $1.98 billion expire in the years 2024 through 2039, and the remainder do not expire.

As a result of the Tax Act, U.S. federal taxes have been recorded on $15 billion of undistributed foreign earnings as of December 31, 2019. A provision has not been made for certain U.S. state income taxes or additional non-U.S. taxes that would be due when cash is repatriated to the U.S. as the company's undistributed foreign earnings are intended to be reinvested outside of the U.S. indefinitely. The determination of the amount of the unrecognized deferred tax liability related to the undistributed foreign earnings is not practicable due to the uncertainty in the

manner in which these earnings will be distributed. The company's intent is to only make distributions from non-U.S. subsidiaries in the future when they can be made at no net tax cost.

Unrecognized Tax Benefits

As of December 31, 2019, the company had $1.55 billion of unrecognized tax benefits which, if recognized, would reduce the effective tax rate.

A reconciliation of the beginning and ending amounts of unrecognized tax benefits is as follows:

(In millions)	2019	2018	2017
Beginning Balance	$ 1,442	$ 1,409	$ 802
Additions due to acquisitions	—	—	31
Reductions due to acquisitions	—	(5)	—
Additions for tax positions of current year	53	48	565
Additions for tax positions of prior years	69	82	51
Reductions for tax positions of prior years	(7)	—	—
Closure of tax years	—	(5)	—
Settlements	(5)	(87)	(40)
Ending Balance	$ 1,552	$ 1,442	$ 1,409

Substantially all of the total $1.55 billion liability is classified as a long-term liability. The company does not expect its unrecognized tax benefits to change significantly over the next twelve months.

During 2019, the company’s unrecognized tax benefits increased $70 million as a result of uncertain tax positions relating to foreign tax positions and $45 million relating to U.S. federal and state tax positions.

During 2018, the company's unrecognized tax benefits increased $85 million as a result of uncertain tax positions relating to foreign tax positions and $45 million relating to U.S. federal and state tax positions.

During 2017, the company’s unrecognized tax benefits provisionally increased $511 million as a result of uncertain tax positions relating to the scope of the Tax Act’s one-time transition tax, $54 million relating to foreign tax positions, $43 million as a result of a foreign exchange loss recognized on the refinancing of certain long term inter-company debt and $31 million due to an acquisition.

The company classified interest and penalties related to unrecognized tax benefits as income tax expense. The total amount of interest and penalties related to uncertain tax positions and recognized in the balance sheet as of December 31, 2019 and 2018 was $67 million and $59 million, respectively.

The company conducts business globally and, as a result, Thermo Fisher or one or more of its subsidiaries files income tax returns in the U.S. federal jurisdiction and various state and foreign jurisdictions. In the normal course of business, the company is subject to examination by taxing authorities throughout the world, including such major jurisdictions as Australia, Canada, China, Denmark, Finland, France, Germany, Japan, Singapore, Sweden, the United Kingdom and the United States. With few exceptions, the company is no longer subject to U.S. federal, state and local, or non-U.S., income tax examinations for years before 2011.

Note 9. Earnings per Share

(In millions except per share amounts)	2019	2018	2017
Income from Continuing Operations	$ 3,696	$ 2,938	$ 2,228
Loss from Discontinued Operations	—	—	(3)
Net Income	$ 3,696	$ 2,938	$ 2,225
Basic Weighted Average Shares	400	402	395
Plus Effect of:			
Stock options and restricted units	3	4	3
Diluted Weighted Average Shares	403	406	398
Basic Earnings per Share:			
Continuing operations	$ 9.24	$ 7.31	$ 5.65
Discontinued operations	—	—	(0.01)
Basic Earnings per Share	$ 9.24	$ 7.31	$ 5.64
Diluted Earnings per Share:			
Continuing operations	$ 9.17	$ 7.24	$ 5.60
Discontinued operations	—	—	(0.01)
Diluted Earnings per Share	$ 9.17	$ 7.24	$ 5.59
Antidilutive Stock Options Excluded from Diluted Weighted Average Shares	1	2	2

Note 10. Debt and Other Financing Arrangements

(Dollars in millions)	Effective Interest Rate at December 31, 2019	December 31, 2019	December 31, 2018
Commercial Paper		$ —	$ 693
Floating Rate 2-Year Senior Notes, Due 7/24/2019 (euro-denominated)		—	574
6.00% 10-Year Senior Notes, Due 3/1/2020		—	750
4.70% 10-Year Senior Notes, Due 5/1/2020		—	300
Floating Rate 2-Year Senior Notes, Due 8/7/2020 (euro-denominated)	0.17 %	673	688
1.50% 5-Year Senior Notes, Due 12/1/2020 (euro-denominated)		—	487
5.00% 10-Year Senior Notes, Due 1/15/2021		—	400
4.50% 10-Year Senior Notes, Due 3/1/2021		—	1,000
3.60% 10-Year Senior Notes, Due 8/15/2021		—	1,100
3.30% 7-Year Senior Notes, Due 2/15/2022		—	800
2.15% 7-Year Senior Notes, Due 7/21/2022 (euro-denominated)	2.28 %	561	574
3.15% 10-Year Senior Notes, Due 1/15/2023		—	800
3.00% 7-Year Senior Notes, Due 4/15/2023	5.02 %	1,000	1,000
4.15% 10-Year Senior Notes, Due 2/1/2024	4.16 %	1,000	1,000
0.75% 8-Year Senior Notes, Due 9/12/2024 (euro-denominated)	0.94 %	1,121	1,147
0.125% 5.5-Year Senior Notes, Due 3/1/2025 (euro-denominated)	0.41 %	897	—
2.00% 10-Year Senior Notes, Due 4/15/2025 (euro-denominated)	2.10 %	717	734
3.65% 10-Year Senior Notes, Due 12/15/2025	3.77 %	350	350
1.40% 8.5-Year Senior Notes, Due 1/23/2026 (euro-denominated)	1.53 %	785	802
2.95% 10-Year Senior Notes, Due 9/19/2026	3.19 %	1,200	1,200
1.45% 10-Year Senior Notes, Due 3/16/2027 (euro-denominated)	1.65 %	561	574
3.20% 10-Year Senior Notes, Due 8/15/2027	3.39 %	750	750
0.50% 8.5-Year Senior Notes, Due 3/1/2028 (euro-denominated)	0.77 %	897	—
1.375% 12-Year Senior Notes, Due 9/12/2028 (euro-denominated)	1.46 %	673	688
1.95% 12-Year Senior Notes, Due 7/24/2029 (euro-denominated)	2.08 %	785	802
2.60% 10-Year Senior Notes, Due 10/1/2029	2.74 %	900	—
0.875% 12-Year Senior Notes, Due 10/1/2031 (euro-denominated)	1.13 %	1,009	—
2.875% 20-Year Senior Notes, Due 7/24/2037 (euro-denominated)	2.94 %	785	802
1.50% 20-Year Senior Notes, Due 10/1/2039 (euro-denominated)	1.73 %	1,009	—
5.30% 30-Year Senior Notes, Due 2/1/2044	5.37 %	400	400
4.10% 30-Year Senior Notes, Due 8/15/2047	4.23 %	750	750
1.875% 30-Year Senior Notes, Due 10/1/2049 (euro-denominated)	1.98 %	1,121	—
Other		16	21
Total Borrowings at Par Value		17,960	19,186
Fair Value Hedge Accounting Adjustments		(13)	(93)
Unamortized Discount, Net		(94)	(21)
Unamortized Debt Issuance Costs		(101)	(82)
Total Borrowings at Carrying Value		17,752	18,990
Less: Short-term Obligations and Current Maturities		676	1,271
Long-term Obligations		$ 17,076	$ 17,719

The effective interest rates for the fixed-rate debt include the stated interest on the notes, the accretion of any discount or amortization of any premium, the amortization of any debt issuance costs and, if applicable, adjustments related to hedging.

See Note 14 for fair value information pertaining to the company's long-term obligations.

As of December 31, 2019, the annual repayment requirements for debt obligations are as follows:

(In millions)	
2020	$ 676
2021	4
2022	564
2023	1,001
2024	2,122
2025 and Thereafter	13,593
	$ 17,960

As of December 31, 2018, short-term obligations and current maturities of long-term obligations in the accompanying balance sheet included $693 million of commercial paper, short-term bank borrowings and borrowings under lines of credit of certain of the company's subsidiaries. The weighted average interest rate for short-term borrowings was 0.74% at December 31, 2018. No such borrowings were outstanding at December 31, 2019. In addition to available borrowings under the company's revolving credit agreements, discussed below, the company had unused lines of credit of $62 million as of December 31, 2019. These unused lines of credit generally provide for short-term unsecured borrowings at various interest rates.

Credit Facilities

The company has a revolving credit facility with a bank group that provides for up to $2.50 billion of unsecured multi-currency revolving credit. The facility expires in July 2021. The agreement calls for interest at either a LIBOR-based rate, a EURIBOR-based rate (for funds drawn in euro) or a rate based on the prime lending rate of the agent bank, at the company's option. The agreement contains affirmative, negative and financial covenants, and events of default customary for facilities of this type. The covenants in our revolving credit facility (the Facility) include a Consolidated Leverage Ratio (total debt-to-Consolidated EBITDA) and a Consolidated Interest Coverage Ratio (Consolidated EBITDA to Consolidated Interest Expense), as such terms are defined in the Facility. Specifically, the company has agreed that, so long as any lender has any commitment under the Facility, any letter of credit is outstanding under the Facility, or any loan or other obligation is outstanding under the Facility, it will maintain a maximum Consolidated Leverage Ratio of 3.5:1.0. The company has also agreed that so long as any lender has any commitment under the Facility or any letter of credit is outstanding under the Facility, or any loan or other obligation is outstanding under the Facility, it will maintain a minimum Consolidated Interest Coverage Ratio of 3.0:1.0 as of the last day of any fiscal quarter. As of December 31, 2019, no borrowings were outstanding under the Facility, although available capacity was reduced by approximately $72 million as a result of outstanding letters of credit.

Commercial Paper Programs

The company has commercial paper programs pursuant to which it may issue and sell unsecured, short-term promissory notes (CP Notes). Under the U.S. program, a) maturities may not exceed 397 days from the date of issue and b) the CP Notes are issued on a private placement basis under customary terms in the commercial paper market and are not redeemable prior to maturity nor subject to voluntary prepayment. Under the euro program, maturities may not exceed 183 days and may be denominated in euro, U.S. dollars, Japanese yen, British pounds sterling, Swiss franc, Canadian dollars or other currencies. Under both programs, the CP Notes are issued at a discount from par (or premium to par, in the case of negative interest rates), or, alternatively, are sold at par and bear varying interest rates on a fixed or floating basis. As of December 31, 2019, there were no outstanding borrowings under these programs.

Senior Notes

Interest on the floating rate senior notes is payable quarterly. Interest is payable annually on the other euro-denominated senior notes and semi-annually on all other senior notes. Each of the notes may be redeemed at a redemption price of 100% of the principal amount plus a specified make-whole premium and accrued interest. The company is subject to certain affirmative and negative covenants under the indentures governing the senior notes, the

most restrictive of which limits the ability of the company to pledge principal properties as security under borrowing arrangements.

In 2019, the company refinanced certain of its debt by issuing new senior notes and using the proceeds to redeem some of its existing senior notes. In connection with these redemptions, the company incurred $184 million of losses on the early extinguishment of debt included in Other Expense, Net on the accompanying statement of income. Upon redemption of the senior notes, the company terminated the related fixed to floating rate interest rate swap arrangements and paid $17 million, included in other financing activities, net, in the accompanying statement of cash flows. The company also terminated related

cross-currency interest rate swap arrangements and received $44 million, included in other investing activities, net, in the accompanying statement of cash flows.

In 2018, Thermo Fisher Scientific (Finance I) B.V., a wholly-owned finance subsidiary of the company, issued the Floating Rate Senior Notes due 2020 included in the table above. This subsidiary has no independent function other than financing activities. The Floating Rate Senior Notes due 2020 are fully and unconditionally guaranteed by the company and no other subsidiaries of the company have guaranteed the obligations.

Interest Rate Swap Arrangements

The company has entered into LIBOR-based interest rate swap arrangements with various banks. The aggregate amounts of the swaps are equal to the principal amount of the notes and the payment dates of the swaps coincide with the interest payment dates of the note. The swap contracts provide for the company to pay a variable interest rate and receive a fixed rate. The variable interest rates reset monthly. The swaps have been accounted for as fair value hedges of the notes. See Note 14 for additional information on the interest rate swap arrangements and related cross-currency interest rate swap arrangements. The following table summarizes the outstanding interest rate swap arrangements on the company's senior notes at December 31, 2019:

(Dollars in millions)	Aggregate Notional Amount	Pay Rate	Pay Rate as of December 31, 2019	Receive Rate
3.00% Senior Notes due 2023 (a)	$ 1,000	1-month LIBOR + 1.7640%	3.5038 %	3.00 %

(a) The payments on $900 million notional value of these interest rate swaps are offset in part by cross-currency interest rate swaps which effectively reduced the pay rate as of December 31, 2019 from a weighted average of 3.50% to a weighted average of 1.14%.

The company entered into $900 million notional value of cross-currency interest rate swaps, which effectively convert a portion of the semi-annual payments related to the variable rate, U.S. dollar denominated, LIBOR-based interest rate swaps to payments on variable rate, euro denominated, EURIBOR-based cross-currency interest rate swaps.

Note 11. Leases

As a lessee, the company leases certain logistics, office, and manufacturing facilities, as well as vehicles, copiers, and other equipment. These operating leases generally have remaining lease terms between 1 month and 30 years, and some include options to extend (generally for 1 to 10 years) or have options to terminate the arrangement within 1 year. The company’s finance leases are not material.

The company has guaranteed the residual value of three leased operating facilities with lease terms ending in 2020, 2023 and 2024. The company has agreed with the lessor to comply with certain financial covenants consistent with its other debt arrangements (Note 10). The aggregate maximum guarantee under these three lease arrangements is $147 million. Operating lease ROU assets and lease liabilities for these lease arrangements are recorded on the consolidated balance sheet as of December 31, 2019, but exclude any amounts for residual value guarantees.

As a lessee, the consolidated statement of income includes pre-tax operating lease costs of $208 million and pre-tax variable lease costs of $41 million for the year ended December 31, 2019. Lease costs arising from finance leases, short-term leases, and sublease income are not material.

Cash used in operating activities for payments of amounts included in the measurement of operating lease liabilities was $208 million in the year ended December 31, 2019. Operating lease ROU assets of $205 million were obtained in exchange for new operating lease liabilities in the year ended December 31, 2019.

The weighted-average remaining operating lease term was 6.2 years and the weighted average discount rate was 4.0% as of December 31, 2019.

ROU assets of $699 million as of December 31, 2019, are classified in other assets in the consolidated balance sheet. Operating lease liabilities of $167 million and $571 million as of December 31, 2019, are classified in other accrued expenses and other long-term liabilities, respectively, in the consolidated balance sheet.

As of December 31, 2019, future payments of operating lease liabilities are as follows:

(In millions)	
2020	$ 197
2021	158
2022	124
2023	92
2024	68
2025 and Thereafter	197
Total Lease Payments	836
Less: Imputed Interest	98
Total Operating Lease Liability	$ 738

As a lessor, operating leases, sales-type leases and direct financing leases are not material.

As previously disclosed in the company's 2018 Annual Report on Form 10-K and under previous lease accounting guidance, income from continuing operations includes expense from operating leases of $211 million and $198 million in 2018 and 2017, respectively, and the following is a summary of annual future minimum lease and rental commitments under noncancelable operating leases as of December 31, 2018:

(In millions)	
2019	$ 192
2020	158
2021	118
2022	86
2023	58
2024 and Thereafter	177
	$ 789

Note 12. Commitments and Contingencies

Purchase Obligations

The company has entered into unconditional purchase obligations, in the ordinary course of business, that include agreements to purchase goods, services or fixed assets and to pay royalties that are enforceable and legally binding and that specify all significant terms including: fixed or minimum quantities to be purchased; fixed, minimum or variable price provisions; and the approximate timing of the transaction. Purchase obligations exclude agreements that are cancelable at any time without penalty. The aggregate amount of the company’s unconditional purchase obligations totaled $1.20 billion at December 31, 2019 and the majority of these obligations are expected to be settled during 2020.

Letters of Credit, Guarantees and Other Commitments

Outstanding letters of credit and bank guarantees totaled $272 million at December 31, 2019. Substantially all of these letters of credit and guarantees expire before 2026.

Outstanding surety bonds and other guarantees totaled $61 million at December 31, 2019. The expiration of these bonds and guarantees ranges through 2022.

The letters of credit, bank guarantees and surety bonds principally secure performance obligations, and allow the holder to draw funds up to the face amount of the letter of credit, bank guarantee or surety bond if the applicable business unit does not perform as contractually required.

The company is a guarantor of pension plan obligations of a divested business. The purchaser of the divested business has agreed to pay for the pension benefits, however the company was required to guarantee payment of these pension benefits should the purchaser fail to do so. The amount of the guarantee at December 31, 2019 was $41 million.

In connection with the sale of businesses of the company, the buyers have assumed certain contractual obligations of such businesses and have agreed to indemnify the company with respect to those assumed liabilities. In the event a third-party to a transferred contract does not recognize the transfer of obligations or a buyer defaults on its obligations under the transferred contract, the company could be liable to the third-party for such obligations. However, in such event, the company would be entitled to seek indemnification from the buyer.

Indemnifications

In conjunction with certain transactions, primarily divestitures, the company has agreed to indemnify the other parties with respect to certain liabilities related to the businesses that were sold or leased properties that were abandoned (e.g., retention of certain environmental, tax, employee and product liabilities). The scope and duration of such indemnity obligations vary from transaction to transaction. Where probable, an obligation for such indemnifications is recorded as a liability. Generally, a maximum obligation cannot be reasonably estimated. Other than obligations recorded as liabilities at the time of divestiture, historically the company has not made significant payments for these indemnifications.

In connection with the company's efforts to reduce the number of facilities that it occupies, the company has vacated some of its leased facilities or sublet them to third parties. When the company sublets a facility to a third-party, it remains the primary obligor under the master lease agreement with the owner of the facility. As a result, if a third-party vacates the sublet facility, the company would be obligated to make lease or other payments under the master lease agreement. The company believes that the financial risk of default by sublessors is individually and in the aggregate not material to the company's financial position or results of operations.

In connection with the sale of products in the ordinary course of business, the company often makes representations affirming, among other things, that its products do not infringe on the intellectual property rights of others and agrees to indemnify customers against third-party claims for such infringement. The company has not been required to make material payments under such provisions.

Environmental Matters

The company is currently involved in various stages of investigation and remediation related to environmental matters. The company cannot predict all potential costs related to environmental remediation matters and the possible impact on future operations given the uncertainties regarding the extent of the required cleanup, the complexity and interpretation of applicable laws and regulations, the varying costs of alternative cleanup methods and the extent of the company's responsibility. Expenses for environmental remediation matters related to the costs of installing, operating and maintaining groundwater-treatment systems and other remedial activities related to historical environmental contamination at the company's domestic and international facilities were not material in any period presented. The company records accruals for environmental remediation liabilities, based on current interpretations of environmental laws and regulations, when it is probable that a liability has been incurred and the amount of such liability can be reasonably estimated. The company calculates estimates based upon several factors, including input from environmental specialists and management's knowledge of and experience with these environmental matters. The company includes in these estimates potential costs for investigation, remediation and operation and maintenance of cleanup sites. At December 31, 2019, the company's total environmental liability was approximately $66 million. While management believes the accruals for environmental remediation are adequate based on current estimates of remediation costs, the company may be subject to additional remedial or compliance costs due to future events such as changes in existing laws and regulations, changes in agency direction or enforcement policies, developments in remediation technologies or changes in the conduct of the company's operations, which could have a material adverse effect on the company's financial position, results of operations or cash flows.

Litigation and Related Contingencies

There are various lawsuits and claims pending against the company including matters involving product liability, intellectual property, employment and commercial issues. The company determines the probability and range of possible loss based on the current status of each of these matters. A liability is recorded in the financial statements if it is believed to be probable that a loss has been incurred and the amount of the loss can be reasonably estimated. The company establishes a liability that is an estimate of amounts expected to be paid in the future for events that have already occurred. The company accrues the most likely amount or at least the minimum of the range of probable loss when a range of probable loss can be estimated. The accrued liabilities are based on management's judgment as to the probability of losses for asserted and unasserted claims and, where applicable, actuarially determined estimates.

Accrual estimates are adjusted as additional information becomes known or payments are made. The amount of ultimate loss may differ from these estimates. Due to the inherent uncertainties associated with pending litigation or claims, the company cannot predict the outcome, nor, with respect to certain pending litigation or claims where no liability has been accrued, make a meaningful estimate of the reasonably possible

loss or range of loss that could result from an unfavorable outcome. The company has no material accruals for pending litigation or claims for which accrual amounts are not disclosed below, nor are material losses deemed probable for such matters. It is reasonably possible, however, that an unfavorable outcome that exceeds the company's current accrual estimate, if any, for one or more of the matters described below could have a material adverse effect on the company's results of operations, financial position and cash flows.

Product Liability, Workers Compensation and Other Personal Injury Matters

The range of probable loss for product liability, workers compensation and other personal injury matters of the company's continuing operations at December 31, 2019, was approximately $206 million to $342 million on an undiscounted basis. The portion of these liabilities assumed in the 2006 merger with Fisher was recorded at its fair (present) value at the date of merger. The company's accrual for all such matters in total, including the discounted liabilities, was $198 million at December 31, 2019 (or $215 million undiscounted). The accrual includes estimated defense costs and is gross of estimated amounts due from insurers of $84 million at December 31, 2019 (or $96 million undiscounted) that are included in other assets in the accompanying balance sheet. The portion of these insurance assets assumed in the merger with Fisher was also recorded at its fair value at the date of merger. In addition to the above accrual, as of December 31, 2019, the company had a product liability accrual of $9 million (undiscounted) relating to divested businesses.

The assets and liabilities assumed at the Fisher merger date were ascribed a fair value based on the present value of expected future cash flows, using a discount rate equivalent to the risk free rate of interest for monetary assets with comparable maturities (weighted average discount rate of 4.67%). The discount on the liabilities of approximately $17 million and the discount on the assets of approximately $12 million (net discount $5 million) are being accreted to interest expense over the expected settlement period.

Although the company believes that the amounts accrued and estimated recoveries are probable and appropriate based on available information, including actuarial studies of loss estimates, the process of estimating losses and insurance recoveries involves a considerable degree of judgment by management and the ultimate amounts could vary materially. Insurance contracts do not relieve the company of its primary obligation with respect to any losses incurred. The collectability of amounts due from its insurers is subject to the solvency and willingness of the insurer to pay, as well as the legal sufficiency of the insurance claims. Management monitors the payment history as well as the financial condition and ratings of its insurers on an ongoing basis.

Intellectual Property Matters

On June 3, 2013, Unisone Strategic IP filed a complaint against Life Technologies, a subsidiary of the company, in the United States District Court for the Southern District of California alleging patent infringement by Life Technologies' supply chain management system software, which operates with product "supply centers" installed at customer sites. Plaintiff seeks damages for alleged willful infringement, attorneys' fees, costs, and injunctive relief. On August 24, 2017, Unisone filed an appeal from a decision by the Patent Trial and Appeal Board (PTAB) that found the challenged patent claims invalid. The United States Court of Appeals for the Federal Circuit upheld the PTAB's ruling finding the challenged claims in the Unisone patent invalid. Unisone had until March 11, 2019 to file an appeal with the United States Supreme Court. Unisone did not appeal that decision, and consequently the case before the United States District Court, which had been stayed pending the outcome of the PTAB decision, resumed with Unisone filing an amended complaint on September 12, 2019 regarding similar patent claims that were not included in the PTAB proceeding. On November 1, 2019, Life Technologies filed two additional covered business method (CBM) challenges with the PTAB regarding Unisone's new patent claims. On December 16, 2019, the United States District Court granted Life Technologies' motion to stay the case pending the PTAB's decision whether to institute a CBM review of the new patent claims.

Note 13. Comprehensive Income and Shareholders' Equity

Comprehensive Income (Loss)

Comprehensive income combines net income and other comprehensive items. Other comprehensive items represent certain amounts that are reported as components of shareholders' equity in the accompanying balance sheet.

In the fourth quarter of 2017, the company recorded an out of period adjustment to correct an error in the accounting for income taxes associated with the partial hedge of its net investment in a foreign operation in 2014 through the third quarter of 2017. The adjustment affected deferred income taxes and other comprehensive income and, in the aggregate, increased comprehensive income by $101 million for the year ended December 31, 2017. The adjustment does not have any impact on the

company's statements of income or cash flows. The company determined that the adjustment was not material to the consolidated financial statements for any previously reported annual or interim periods.

Changes in each component of accumulated other comprehensive items, net of tax are as follows:

(In millions)	Currency Translation Adjustment	Unrealized Losses on Hedging Instruments	Pension and Other Postretirement Benefit Liability Adjustment	Total
Balance at December 31, 2018	$ (2,243)	$ (52)	$ (203)	$ (2,498)
Other comprehensive items before reclassifications	(107)	(38)	(93)	(238)
Amounts reclassified from accumulated other comprehensive items	30	19	8	57
Net other comprehensive items	(77)	(19)	(85)	(181)
Balance at December 31, 2019	$ (2,320)	$ (71)	$ (288)	$ (2,679)

Shareholders' Equity

At December 31, 2019, the company had reserved 25 million unissued shares of its common stock for possible issuance under stock-based compensation plans.

Note 14. Fair Value Measurements and Fair Value of Financial Instruments

Fair Value Measurements

The company uses the market approach technique to value its financial instruments and there were no changes in valuation techniques during 2019. The company's financial assets and liabilities carried at fair value are primarily comprised of insurance contracts, investments in derivative contracts, mutual funds holding publicly traded securities and other investments in unit trusts held as assets to satisfy outstanding deferred compensation and retirement liabilities; and acquisition-related contingent consideration.

The fair value accounting guidance requires that assets and liabilities carried at fair value be classified and disclosed in one of the following three categories:

Level 1: Quoted market prices in active markets for identical assets or liabilities that the company has the ability to access.

Level 2: Observable market based inputs or unobservable inputs that are corroborated by market data such as quoted prices, interest rates and yield curves.

Level 3: Inputs are unobservable data points that are not corroborated by market data.

The following tables present information about the company's financial assets and liabilities measured at fair value on a recurring basis as of December 31, 2019 and December 31, 2018:

(In millions)	December 31, 2019	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets				
Cash equivalents	$ 1,280	$ 1,280	$ —	$ —
Investments in common stock, mutual funds and other similar instruments	19	19	—	—
Warrants	6	—	6	—
Insurance contracts	131	—	131	—
Derivative contracts	37	—	37	—
Total Assets	$ 1,473	$ 1,299	$ 174	$ —
Liabilities				
Derivative contracts	$ 24	$ —	$ 24	$ —
Contingent consideration	55	—	—	55
Total Liabilities	$ 79	$ —	$ 24	$ 55

(In millions)	December 31, 2018	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets				
Cash equivalents	$ 769	$ 769	$ —	$ —
Bank time deposits	2	2	—	—
Investments in mutual funds and other similar instruments	10	10	—	—
Warrants	8	—	8	—
Insurance contracts	113	—	113	—
Derivative contracts	31	—	31	—
Total Assets	$ 933	$ 781	$ 152	$ —
Liabilities				
Derivative contracts	$ 145	$ —	$ 145	$ —
Contingent consideration	37	—	—	37
Total Liabilities	$ 182	$ —	$ 145	$ 37

The company uses the Black-Scholes model to value its warrants. The company determines the fair value of its insurance contracts by obtaining the cash surrender value of the contracts from the issuer. The fair value of derivative contracts is the estimated amount that the company would receive/pay upon liquidation of the contracts, taking into account the change in interest rates and currency exchange rates. The company determines the fair value of acquisition-related contingent consideration based on the probability-weighted discounted cash flows associated with such future payments. Changes to the fair value of contingent consideration are recorded in selling, general and administrative expense. The following table provides a rollforward of the fair value, as determined by level 3 inputs, of the contingent consideration.

(In millions)	2019	2018
Contingent Consideration		
Beginning Balance	$ 37	$ 35
Acquisitions (including assumed balances)	24	11
Payments	(3)	(8)
Change in fair value included in earnings	(3)	(1)
Ending Balance	$ 55	$ 37

Derivative Contracts

The following table provides the aggregate notional value of outstanding derivative contracts.

(In millions)	December 31, 2019	December 31, 2018
Notional Amount		
Interest rate swaps (described in Note 10)	$ 1,000	$ 3,100
Cross-currency interest rate swaps - designated as net investment hedges	900	1,500
Currency exchange contracts	2,846	3,424

While certain derivatives are subject to netting arrangements with counterparties, the company does not offset derivative assets and liabilities within the consolidated balance sheet. The following tables present the fair value of derivative instruments in the consolidated balance sheet and statement of income.

	Fair Value – Assets		Fair Value – Liabilities	
(In millions)	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018
Derivatives Designated as Hedging Instruments				
Interest rate swaps (a)	$ —	$ —	$ 13	$ 129
Cross-currency interest rate swaps (b)	33	28	—	—
Derivatives Not Designated as Hedging Instruments				
Currency exchange contracts (c)	4	3	11	16
Total Derivatives	$ 37	$ 31	$ 24	$ 145

(a) The fair value of the interest rate swaps is included in the consolidated balance sheet under the caption other long-term liabilities.

(b) The fair value of the cross-currency interest rate swaps is included in the consolidated balance sheet under the caption other assets.

(c) The fair value of the currency exchange contracts is included in the consolidated balance sheet under the captions other current assets or other accrued expenses.

The following amounts related to cumulative basis adjustments for fair value hedges were included in the consolidated balance sheet under the caption long-term obligations:

(In millions)	Carrying Amount of the Hedged Liability		Cumulative Amount of Fair Value Hedging Adjustment - Increase (Decrease) Included in Carrying Amount of Liability (d)	
	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018
Long-term Obligations	$ 980	$ 3,291	$ (13)	$ (93)

(d) Includes increase in the carrying amount of $30 million at December 31, 2018 on discontinued hedging relationships.

(In millions)	Gain (Loss) Recognized 2019	2018
Fair Value Hedging Relationships		
Interest rate swaps		
Hedged long-term obligations - included in other expense, net	$ (93)	$ 7
Derivatives designated as hedging instruments - included in other expense, net	97	(5)
Derivatives Designated as Cash Flow Hedges		
Interest rate swaps		
Included in unrealized losses on hedging instruments within other comprehensive items	(50)	—
Amount reclassified from accumulated other comprehensive items to other expense, net	(25)	(12)
Financial Instruments Designated as Net Investment Hedges		
Foreign currency-denominated debt		
Included in currency translation adjustment within other comprehensive items	60	336
Cross-currency interest rate swaps		
Included in currency translation adjustment within other comprehensive items	49	28
Included in other expense, net	48	21
Derivatives Not Designated as Hedging Instruments		
Currency exchange contracts		
Included in cost of product revenues	1	2
Included in other expense, net	52	37

Gains and losses recognized on currency exchange contracts and the interest rate swaps designated as fair value hedges are included in the consolidated statement of income together with the corresponding, offsetting losses and gains on the underlying hedged transactions.

The company also uses foreign currency-denominated debt and cross-currency interest rate swaps to partially hedge its net investments in foreign operations against adverse movements in exchange rates. The majority of the company’s euro-denominated senior notes and cross-currency interest rate swaps have been designated as, and are effective as, economic hedges of part of the net investment in a foreign operation. Accordingly, foreign currency transaction gains or losses due to spot rate fluctuations on the euro-denominated debt instruments and contract fair value changes on the cross-currency interest rate swaps, excluding interest accruals, are included in currency translation adjustment within other comprehensive items and shareholders’ equity.

See Note 1 and Note 10 for additional information on the company's risk management objectives and strategies.

Cash Flow Hedge Arrangements

In 2019, the company entered into interest rate swap arrangements to mitigate the risk of interest rates rising prior to the completion of debt offerings. Based on the company's conclusion that the debt offerings were probable, the swaps hedged the cash flow risk for each of the interest payments on €1.80 billion plus $900 million aggregate principal amounts of the planned fixed-rate debt issues. The hedges were terminated in 2019, in connection with the debt offerings. The aggregate fair value of the hedges at that time, $38 million, net of tax, has been classified as a reduction to accumulated other comprehensive items and will be amortized to interest expense over the terms of the related debt issuances. The company had a cash outlay of $50 million in 2019 associated with termination of the arrangements, included in other financing activities, net, in the accompanying statement of cash flows.

Fair Value of Other Financial Instruments

The carrying value and fair value of the company's notes receivable and debt obligations are as follows:

(In millions)	December 31, 2019 Carrying Value	December 31, 2019 Fair Value	December 31, 2018 Carrying Value	December 31, 2018 Fair Value
Debt Obligations:				
Senior notes	$ 17,736	$ 18,650	$ 18,276	$ 18,322
Commercial paper	—	—	693	693
Other	16	16	21	21
	$ 17,752	$ 18,666	$ 18,990	$ 19,036

The fair value of debt obligations was determined based on quoted market prices and on borrowing rates available to the company at the respective period ends which represent level 2 measurements.

Note 15. Supplemental Cash Flow Information

(In millions)	2019	2018	2017
Cash Paid For:			
Interest	$ 790	$ 687	$ 533
Income Taxes	896	591	479
Non-cash Investing and Financing Activities			
Declared but unpaid dividends	77	69	61
Issuance of stock upon vesting of restricted stock units	182	170	125

Cash, cash equivalents and restricted cash is included in the consolidated balance sheet as follows:

(In millions)	December 31, 2019	December 31, 2018
Cash and Cash Equivalents	$ 2,399	$ 2,103
Restricted Cash Included in Other Current Assets	21	12
Restricted Cash Included in Other Assets	2	2
Cash, Cash Equivalents and Restricted Cash	$ 2,422	$ 2,117

Amounts included in restricted cash represent funds held as collateral for bank guarantees and incoming cash in China awaiting government administrative clearance.

Note 16. Restructuring and Other Costs (Income), Net

Restructuring and other costs (income), net, in 2019 primarily included the gain on the sale of the company's Anatomical Pathology business, and, to a lesser extent, transaction/integration costs related to acquisitions and a

divestiture; sales of inventory revalued at the date of acquisition; and continuing charges for headcount reductions and facility consolidations in an effort to streamline operations, including the closure and consolidation of operations within several facilities in the U.S. and Europe. In 2019, severance actions associated with facility consolidations and cost reduction measures affected approximately 1% of the company's workforce.

Restructuring and other costs in 2018 included continuing charges for headcount reductions and facility consolidations in an effort to streamline operations, including the closure and consolidation of operations within several facilities in the U.S. and Europe; third-party transaction/integration costs primarily related to recent acquisitions; sales of inventories revalued at the date of acquisition; and environmental remediation charges. These charges were partially offset by gains on sales of real estate and favorable results of litigation. In 2018, severance actions associated with facility consolidations and cost reduction measures affected approximately 1% of the company's workforce.

Restructuring and other costs in 2017 included continuing charges for headcount reductions and facility consolidations in an effort to streamline operations, including the closure and consolidation of operations within several facilities in the U.S., Europe and Asia; costs to achieve synergies related to acquisitions, including severance and abandoned facility costs; third-party acquisition transaction and integration costs primarily associated with the acquisitions of FEI and Patheon; sales of inventories revalued at the date of acquisition; charges to conform the accounting policies of Patheon to the company's accounting policies; charges for changes in estimates of acquisition contingent consideration; hurricane response/impairment costs; net charges for the settlement/curtailment of retirement plans; and net credits for litigation matters. In 2017, severance actions associated with facility consolidations and cost reduction measures affected less than 2% of the company's workforce.

As of February 26, 2020, the company has identified restructuring actions that will result in additional charges of approximately $65 million, primarily in 2020, and expects to identify additional actions during 2020 which will be recorded when specified criteria are met, such as communication of benefit arrangements or when the costs have been incurred.

2019

During 2019, the company recorded net restructuring and other costs by segment as follows:

(In millions)	Cost of Revenues	Selling, General and Administrative Expenses	Restructuring and Other Costs (Income), Net	Total
Life Sciences Solutions	$ 16	$ —	$ 24	$ 40
Analytical Instruments	—	24	14	38
Specialty Diagnostics	—	4	(471)	(467)
Laboratory Products and Services	1	35	17	53
Corporate	—	(1)	3	2
	$ 17	$ 62	$ (413)	$ (334)

The principal components of net restructuring and other costs by segment are as follows:

Life Sciences Solutions

In 2019, the Life Sciences Solutions segment recorded $40 million of net restructuring and other charges, including $16 million of charges to cost of revenues for the sales of inventory revalued at the date of acquisition. The segment also recorded $24 million of net restructuring and other charges for severance and other costs associated with facility consolidations in the U.S and Europe, the impairment of acquired technology in development, and pre-acquisition litigation-related matters.

Analytical Instruments

In 2019, the Analytical Instruments segment recorded $38 million of net restructuring and other charges, including $24 million of charges to selling, general, and administrative expense, principally third-party transaction costs related to the acquisition of Gatan, subsequently terminated. The segment also recorded $14 million of restructuring and other costs, primarily for employee severance and other costs associated with facility consolidations in the U.S. and Europe.

Specialty Diagnostics

In 2019, the Specialty Diagnostics segment recorded $467 million of net restructuring and other income, primarily a gain on the divestiture of its Anatomical Pathology business (see Note 2). The segment also recorded $4 million of charges to selling, general, and administrative expense, principally third-party transaction costs in connection with the sale of the Anatomical Pathology business.

Laboratory Products and Services

In 2019, the Laboratory Products and Services segment recorded $53 million of net restructuring and other charges. The segment recorded charges to cost of revenues of $1 million to conform the accounting policies of recently acquired businesses with the company's accounting policies and $35 million of charges to selling, general, and administrative expenses, principally third-party transaction/integration costs for recently completed acquisitions. The segment also recorded $17 million of restructuring and other costs, primarily charges for severance at businesses streamlining operations and employee compensation due at Brammer Bio on the date of acquisition.

Corporate

In 2019, the company recorded $2 million of net restructuring and other costs principally for severance at its corporate operations, partially offset by income from favorable results of product liability litigation.

2018

During 2018, the company recorded net restructuring and other costs by segment as follows:

(In millions)	Cost of Revenues	Selling, General and Administrative Expenses	Restructuring and Other Costs, Net	Total
Life Sciences Solutions	$ 4	$ 12	$ (17)	$ (1)
Analytical Instruments	3	8	28	39
Specialty Diagnostics	—	3	(1)	2
Laboratory Products and Services	5	16	31	52
Corporate	—	(10)	9	(1)
	$ 12	$ 29	$ 50	$ 91

The principal components of net restructuring and other costs by segment are as follows:

Life Sciences Solutions

In 2018, the Life Sciences Solutions segment recorded $1 million of net restructuring and other income. The segment recorded charges to cost of revenues of $4 million for the sales of inventory revalued at the date of acquisition, as well as $12 million of charges to selling, general, and administrative expenses, primarily third-party transaction/integration costs related to recent acquisitions. The segment also recorded $17 million of net restructuring and other income, principally for a $46 million net gain on the resolution of litigation, partially offset by charges for severance other costs associated with facility consolidations in the U.S.

Analytical Instruments

In 2018, the Analytical Instruments segment recorded $39 million of net restructuring and other charges. The segment recorded net charges to cost of revenues of $3 million for the sales of inventory revalued at the date of acquisition; $8 million of net charges to selling, general, and administrative expense, principally third-party transaction costs related to the acquisition of Gatan; and $28 million of restructuring and other costs, primarily for employee severance and other costs associated with facility consolidations in the U.S. and Europe, as well as abandoned facilities costs associated with the remediation and closure of a manufacturing facility in the U.S.

Specialty Diagnostics

In 2018, the Specialty Diagnostics segment recorded $2 million of net restructuring and other charges, including $3 million of net charges to selling, general, and administrative expense, principally third-party transaction costs in connection with the planned sale of the Anatomical Pathology business. The segment also recorded $1 million of net restructuring and other income, including a $6 million gain on the sale of real estate, mostly offset by cash charges for severance and other costs associated with facility consolidations in the U.S. and Europe.

Laboratory Products and Services

In 2018, the Laboratory Products and Services segment recorded $52 million of net restructuring and other charges. The segment recorded charges to cost of revenues of $5 million, principally for the sales of inventory revalued at the date of acquisition, and $16 million of charges to selling, general, and administrative expenses for third-party transaction/integration costs related to the acquisition of Patheon. The segment also recorded $31 million of restructuring and other costs, primarily charges for environmental remediation associated with a Superfund site in the U.S., employee severance, and, to a lesser extent, hurricane response costs.

Corporate

In 2018, the company recorded $1 million of net restructuring and other income, principally income from favorable results of product liability litigation, mostly offset by charges for environmental remediation at an abandoned facility and, to a lesser extent, severance at its corporate operations.

2017

During 2017, the company recorded net restructuring and other costs by segment as follows:

(In millions)	Cost of Revenues	Selling, General and Administrative Expenses	Restructuring and Other Costs, Net	Total
Life Sciences Solutions	$ 1	$ 29	$ (16)	$ 14
Analytical Instruments	31	(2)	30	59
Specialty Diagnostics	1	(2)	39	38
Laboratory Products and Services	90	61	41	192
Corporate	—	(8)	3	(5)
	$ 123	$ 78	$ 97	$ 298

The principal components of net restructuring and other costs by segment are as follows:

Life Sciences Solutions

In 2017, the Life Sciences Solutions segment recorded $14 million of net restructuring and other charges. The segment recorded $29 million of charges to selling, general and administrative expenses, principally for changes in estimates of acquisition contingent consideration. The segment also recorded $16 million of restructuring and other income, net, including $64 million of net credits principally for pre-acquisition litigation-related matters, and, to a lesser extent, net gains on the settlement of retirement plans. These credits were largely offset by $48 million of cash restructuring costs, including $23 million of severance and related costs primarily to achieve acquisition synergies, and $25 million of abandoned facilities costs primarily for the consolidation of facilities in the U.S.

Analytical Instruments

In 2017, the Analytical Instruments segment recorded $59 million of net restructuring and other charges. The segment recorded charges to cost of revenues of $31 million for the sales of inventory revalued at the date of acquisition, as well as $30 million of restructuring and other costs, primarily for severance and other costs to achieve acquisition synergies, as well as charges for the settlement of retirement plans.

Specialty Diagnostics

In 2017, the Specialty Diagnostics segment recorded $38 million of net restructuring and other charges, principally charges for litigation-related matters, and, to a lesser extent, cash costs for employee severance and other costs associated with headcount reductions in the U.S. and Europe.

Laboratory Products and Services

In 2017, the Laboratory Products and Services segment recorded $192 million of net restructuring and other charges. The segment recorded charges to cost of revenues of $90 million, including $33 million to conform the accounting policies of Patheon to the company's accounting policies and $55 million for sales of inventory revalued at the date of acquisition. The segment also recorded $61 million of charges to selling, general, and administrative expenses, including $55 million for third-party acquisition transaction costs, as well as $6 million to conform the accounting policies of Patheon to the company's accounting policies. The segment also recorded $41 million of restructuring and other costs, primarily for employee severance and compensation due at Patheon on the date of acquisition, and, to a lesser extent, hurricane response/impairment charges.

Corporate

In 2017, the company recorded $5 million of net restructuring and other income, principally $8 million of income from favorable results of product liability litigation, partially offset by charges for the settlement of a retirement plan and severance at its corporate operations.

The following table summarizes the cash components of the company's restructuring plans. The non-cash components and other amounts reported as restructuring and other costs, net, in the accompanying statement of income have been summarized in the notes to the tables. Accrued restructuring costs are included in other accrued expenses in the accompanying balance sheet.

(In millions)	Severance	Abandonment of Excess Facilities	Other (a)	Total
Balance at December 31, 2016	$ 38	$ 32	$ 2	$ 72
Costs incurred in 2017 (c)	62	27	17	106
Reserves reversed (b)	(9)	—	—	(9)
Payments	(62)	(19)	(12)	(93)
Currency translation	1	—	(1)	—
Balance at December 31, 2017	30	40	6	76
Costs incurred in 2018 (d)	51	33	18	102
Reserves reversed (b)	(7)	(4)	(3)	(14)
Payments	(39)	(27)	(17)	(83)
Currency translation	(1)	—	—	(1)
Balance at December 31, 2018	34	42	4	80
Cumulative effect of accounting change (f)	—	(28)	—	(28)
Costs incurred in 2019 (e)	45	7	14	66
Reserves reversed (b)	(13)	(1)	—	(14)
Payments	(47)	(10)	(12)	(69)
Currency translation	(1)	—	—	(1)
Balance at December 31, 2019	$ 18	$ 10	$ 6	$ 34

(a) Other includes relocation and moving expenses associated with facility consolidations, as well as employee retention costs which are accrued ratably over the period through which employees must work to qualify for a payment.

(b) Represents reductions in cost of plans.

(c) Excludes $27 million of net credits associated with litigation-related matters, and $27 million of other restructuring charges, net, primarily for hurricane response/impairment, charges associated with the settlement/curtailment of retirement plans, and non-cash compensation due at an acquired business.

(d) Excludes $38 million of income, net, primarily associated with litigation-related matters, gains on sales of real estate, charges for environmental remediation, and hurricane response costs.

(e) Excludes $482 million of net gain on the sale of businesses, and $17 million of other restructuring charges, net, primarily for the impairment of acquired in-process research and development, pre-acquisition litigation-related matters, and compensation due to employees on the date of acquisition.

(f) Impact of adopting new lease accounting guidance on January 1, 2019.

The company expects to pay accrued restructuring costs primarily through 2020.

Note 17. Unaudited Quarterly Information

	2019			
(In millions except per share amounts)	First (a)	Second (b)	Third (c)	Fourth (d)
Revenues	$ 6,125	$ 6,316	$ 6,272	$ 6,829
Gross Profit	2,707	2,823	2,763	3,035
Net Income	815	1,119	760	1,002
Earnings per Share:				
Basic	2.04	2.80	1.89	2.51
Diluted	2.02	2.77	1.88	2.49

Amounts reflect aggregate restructuring and other items, net, as follows:

(a) Costs of $28 million.
(b) Income of $443 million.
(c) Costs of $43 million.
(d) Costs of $38 million.

	2018			
(In millions except per share amounts)	First (a)	Second (b)	Third (c)	Fourth (d)
Revenues	$ 5,853	$ 6,078	$ 5,920	$ 6,507
Gross Profit	2,580	2,738	2,615	2,924
Net Income	579	752	709	898
Earnings per Share:				
Basic	1.44	1.87	1.76	2.23
Diluted	1.43	1.85	1.75	2.22

Amounts reflect aggregate restructuring and other items, net, as follows:

(a) Costs of $56 million.
(b) Costs of $25 million.
(c) Income of $32 million.
(d) Costs of $42 million.

10-K 1 a201810k.htm THERMO FISHER SCIENTIFIC INC., FORM 10-K, DATED DECEMBER 31, 2018

UNITED STATES SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

☒ Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 for the fiscal year ended December 31, 2018 or
☐ Transition Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934

Commission file number 1-8002

THERMO FISHER SCIENTIFIC INC.

(Exact name of Registrant as specified in its charter)

Delaware	04-2209186
(State of incorporation or organization)	*(I.R.S. Employer Identification No.)*
168 Third Avenue	
Waltham, Massachusetts	02451
(Address of principal executive offices)	*(Zip Code)*

Registrant's telephone number, including area code: (781) 622-1000

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Name of each exchange on which registered	Title of each class	Name of each exchange on which registered
Common Stock, $1.00 par value	New York Stock Exchange	2.000% Notes due 2025	New York Stock Exchange
Floating Rate Notes due 2019	New York Stock Exchange	1.400% Notes due 2026	New York Stock Exchange
Floating Rate Notes due 2020	New York Stock Exchange	1.450% Notes due 2027	New York Stock Exchange
1.500% Notes due 2020	New York Stock Exchange	1.375% Notes due 2028	New York Stock Exchange
2.150% Notes due 2022	New York Stock Exchange	1.950% Notes due 2029	New York Stock Exchange
0.750% Notes due 2024	New York Stock Exchange	2.875% Notes due 2037	New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. Yes ☐ No ☒

Indicate by check mark whether the Registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months, and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the Registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the Registrant was required to submit such files). Yes ☒ No ☐

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of the Registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ☒

Indicate by check mark whether the Registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act. (Check one) Large accelerated filer ☒ Accelerated filer ☐ Non-accelerated filer ☐ Smaller reporting company ☐ Emerging growth company ☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

As of June 29, 2018, the aggregate market value of the voting stock held by nonaffiliates of the Registrant was approximately $83,322,432,000 (based on the last reported sale of common stock on the New York Stock Exchange Composite Tape reporting system on June 29, 2018).

As of February 2, 2019, the Registrant had 399,003,681 shares of Common Stock outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Sections of Thermo Fisher's definitive Proxy Statement for the 2019 Annual Meeting of Shareholders are incorporated by reference into Parts II and III of this report.

THERMO FISHER SCIENTIFIC INC.

ANNUAL REPORT ON FORM 10-K
FOR THE FISCAL YEAR ENDED DECEMBER 31, 2018

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THERMO FISHER SCIENTIFIC INC.

PART I

Item 1. Business

General Development of Business

Thermo Fisher Scientific Inc. (also referred to in this document as "Thermo Fisher," "we," the "company," or the "registrant") is the world leader in serving science. Our mission is to enable our customers to make the world healthier, cleaner and safer. We help our customers accelerate life sciences research, solve complex analytical challenges, improve patient diagnostics, deliver medicines to market and increase laboratory productivity.

Thermo Fisher has approximately 70,000 employees and serves more than 400,000 customers within pharmaceutical and biotech companies, hospitals and clinical diagnostic labs, universities, research institutions and government agencies, as well as environmental, industrial quality and process control settings.

We serve our customers through our premier brands, Thermo Scientific, Applied Biosystems, Invitrogen, Fisher Scientific and Unity Lab Services:

- The Thermo Scientific brand offers customers in research, diagnostics, industrial, and applied markets a complete range of high-end analytical instruments as well as laboratory equipment, software, services, consumables and reagents. Our portfolio of products includes innovative technologies for mass spectrometry, chromatography, elemental analysis, electron microscopy, molecular spectroscopy, sample preparation, informatics, chemical research and analysis, cell culture, bioprocess production, cellular, protein and molecular biology research, allergy testing, drugs-of-abuse testing, therapeutic drug monitoring testing, microbiology, anatomical pathology, as well as environmental monitoring and process control.

- The Applied Biosystems brand offers customers in research, clinical and applied markets integrated instrument systems, reagents, and software for genetic analysis. Our portfolio includes innovative technologies for genetic sequencing and real-time, digital and end point polymerase chain reaction (PCR), that are used to determine meaningful genetic information in applications such as cancer diagnostics, human identification testing, and animal health, as well as inherited and infectious disease.

- The Invitrogen brand offers life science customers a broad range of consumables and instruments that accelerate research and ensure consistency of results. Our portfolio of products includes innovative solutions for cellular analysis and biology, flow cytometry, cell culture, protein expression, synthetic biology, molecular biology and protein biology.

- Fisher Scientific is our channels brand, offering customers a complete portfolio of laboratory equipment and consumables, chemicals, supplies and services used in scientific research, healthcare, safety, and education markets. These products are offered through an extensive network of direct sales professionals, segment-relevant printed collateral and digital content, a state-of-the-art website, and supply-chain management services. We also offer a range of biopharma services for clinical trials management and biospecimen storage.

- Unity Lab Services is our instrument and equipment services brand, offering a complete portfolio of services from enterprise level engagements to individual instruments and laboratory equipment, regardless of the original manufacturer. Through our network of world-class service and support personnel, we provide services that are designed to help our customers improve productivity, reduce costs, and drive decisions with better data.

We continuously increase our depth of capabilities in technologies, software and services, and leverage our extensive global channels to address our customers' emerging needs. For example, in October 2018, we acquired, within the Life Sciences Solutions segment, Becton Dickinson and Company's Advanced Bioprocessing business, expanding our bioproduction offerings. Our goal is to make our customers more productive in an increasingly competitive business environment, and to allow them to solve their challenges, from complex research to improved patient care, environmental and process monitoring, and consumer safety.

Thermo Fisher is a Delaware corporation and was incorporated in 1956. The company completed its initial public offering in 1967 and was listed on the New York Stock Exchange in 1980.

Forward-looking Statements

Forward-looking statements, within the meaning of Section 21E of the Securities Exchange Act of 1934 (the Exchange Act), are made throughout this Annual Report on Form 10-K. Any statements contained herein that are not statements of historical fact may be deemed to be forward-looking statements, including without limitation statements regarding: projections of revenue, expenses, earnings, margins, tax rates, tax provisions, cash flows, pension and benefit obligations and funding

Business (continued)

requirements, our liquidity position; cost reductions, restructuring activities, new product and service developments, competitive strengths or market position, acquisitions or divestitures; growth, declines and other trends in markets we sell into; new or modified laws, regulations and accounting pronouncements; outstanding claims, legal proceedings, tax audits and assessments and other contingent liabilities; foreign currency exchange rates and fluctuations in those rates; general economic and capital markets conditions; the timing of any of the foregoing; assumptions underlying any of the foregoing; and any other statements that address events or developments that Thermo Fisher intends or believes will or may occur in the future. Without limiting the foregoing, the words "believes," "anticipates," "plans," "expects," "seeks," "estimates," and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements are accompanied by such words. While the company may elect to update forward-looking statements in the future, it specifically disclaims any obligation to do so, even if the company's estimates change, and readers should not rely on those forward-looking statements as representing the company's views as of any date subsequent to the date of the filing of this report.

A number of important factors could cause the results of the company to differ materially from those indicated by such forward-looking statements, including those detailed under the heading, "Risk Factors" in Part I, Item 1A.

Business Segments and Products

We report our business in four segments – Life Sciences Solutions, Analytical Instruments, Specialty Diagnostics, and Laboratory Products and Services.

Life Sciences Solutions Segment

Through our Life Sciences Solutions segment, we provide an extensive portfolio of reagents, instruments and consumables used in biological and medical research, discovery and production of new drugs and vaccines as well as diagnosis of disease. These products and services are used by customers in pharmaceutical, biotechnology, agricultural, clinical, academic, and government markets. Life Sciences Solutions includes four primary businesses – Biosciences, Genetic Sciences, Clinical Next-Generation Sequencing, and BioProduction.

Biosciences

Our biosciences business includes reagents, instruments and consumables that help our customers conduct biological and medical research, discover new drugs and vaccines, and, in the case of some specific products, the diagnosis of disease.

Our biosciences offerings include:

- Reagents, instruments, and consumables used for protein biology, molecular biology, sample preparation and cell imaging and analysis. The portfolio includes antibodies and products for protein purification, detection, modification, and analysis; and sequencing, detection and purification products used for high content analysis of nucleic acids. Many of these products are also used in applied markets, including agriculture, forensics, diagnostics product development, and toxicology research.

- Tools used for genetic engineering, amplification, quantification and analysis as well as RNA isolation, including stem cell reprogramming kits, transfection reagents, RNA interference reagents, along with gene editing tools and gene synthesis products.

- Cell culture media, reagents, and plastics for preserving and growing mammalian cells which are used in many life science research applications.

- Fluorescence-based technologies, which facilitate the labeling of molecules for biological research and drug discovery. These technologies include a wide range of cell analysis instruments, including flow cytometers and imaging platforms that enable fluorescence microscopy.

- Protein analysis products, including pre-cast electrophoresis gels for separating nucleic acids and proteins, and western blotting and staining tools.

Genetic Sciences

Our genetic sciences business combines a wide variety of instruments and related reagents used to provide high-value genomic solutions to assist customer decisions in the research, clinical and applied markets.

Our offerings include real-time PCR technology used to identify changes in gene expression, genotyping or proteins on an individual gene-by-gene basis; capillary electrophoresis (CE) sequencing, a core technology used in DNA sequencing and fragment analysis and forensic analysis applications; and microarray technology, used in gene expression, genotyping and reproductive health.

Business (continued)

Our genetic analyzers served as the foundational platform used to sequence the first human genome. These systems are used in a variety of basic, commercial and clinical research applications.

Clinical Next-Generation Sequencing

Our clinical next-generation sequencing (NGS) business focuses on delivering simple, fast and cost-effective NGS technology for a range of applications. The business is focused on targeted sequencing solutions for research use; the application of NGS in oncology; and is an enabling technology for other businesses within Thermo Fisher.

BioProduction

Our bioproduction business supports developers and manufacturers of biological-based therapeutics and vaccines with a portfolio of premium solutions and services focused on upstream cell culture, downstream purification, analytics for detection and quantitation of process/product impurities, and a suite of single-use solutions spanning the biologics workflow.

Our bioproduction offerings include:

- Single-use bioproduction solutions that provide our customers with faster turnaround and set-up times, minimal validation requirements, reduced investment and running costs, and increased flexibility of manufacturing capacity.

- Production cell culture media solutions, which are used by leading biotechnology and pharmaceutical companies to grow cells in controlled conditions and enable large scale cGMP (Current Good Manufacturing Practices) manufacturing of drugs and vaccines. We also provide our customers with the associated services to optimize the productivity of these production platforms.

- Chromatography products, which deliver superior capacity and resolution for process-scale bioseparations, and offer a broad set of scalable options for the purification of antibodies, antibody fragments and proteins.

- Rapid molecular products that deliver accurate results in less than four hours for contaminant detection, identification and quantitation.

- Scalable solutions for the manufacture of cell therapy based drugs.

Our Doe & Ingalls offerings include chemical distribution and supply chain services that provide primarily life science manufacturers with reliable, secure supply chains for their chemical raw material.

Analytical Instruments Segment

Through our Analytical Instruments segment, we provide a broad offering of instruments, consumables, software and services that are used for a range of applications in the laboratory, on the production line and in the field. These products and services are used by customers in pharmaceutical, biotechnology, academic, government, environmental and other research and industrial markets, as well as the clinical laboratory. This segment includes three primary businesses – Chromatography and Mass Spectrometry, Chemical Analysis, and Materials and Structural Analysis.

Chromatography and Mass Spectrometry

Our chromatography and mass spectrometry (MS) business provides analytical instrumentation for organic and inorganic sample analysis across both applied technologies and life science research. These products are complemented by laboratory information management systems (LIMS); chromatography data systems (CDS); database analytical tools; automation systems; a range of consumables, such as a full line of chromatography columns; and a range of sample preparation and separation products including auto-samplers and multiplexing systems.

Chromatography is a technique for separating, identifying and quantifying individual chemical components of substances based on their specific physical and chemical characteristics. Our chromatography product line includes

high performance liquid chromatography, ion chromatography and gas chromatography systems, all of which are supported by our Chromeleon chromatography data system software.

- *Liquid Chromatography (LC) Systems* analyze complex sample matrices in liquids. Our high-pressure liquid chromatography (HPLC) and ultrahigh pressure liquid chromatography (UHPLC) systems offer high throughput and sensitivity and are sold either as stand-alone systems or integrated with our mass spectrometers (LC/MS and LC/MS/MS). These systems are used for a range of applications, from complex proteomic analyses to routine industrial quality assurance and quality control (QA/QC).

- *Ion Chromatography (IC) Systems* separate ionic (charged) or highly polar molecules (e.g., sugars and carbohydrates), usually found in water-based solutions, and typically detect them based on their electrical conductivity. Our IC

Business (continued)

products are used in a wide range of applications, including scientific research, and environmental testing, as well as quality control in pharmaceutical, food and beverage, and other industrial processes.

- *Gas Chromatography (GC) Systems* analyze complex sample matrices in gases, comprising both separation and detection technology. Separation technology is common to all gas chromatography analyzers, and is paired with either a conventional detector (GC) or with different types of mass spectrometers (GC/MS). Our GC/MS offering includes a triple stage quadrupole, a single stage quadrupole, an Orbitrap, and an ion trap, for a range of applications, including food safety testing, quantitative screening of environmental samples, and complex molecular analyses.

- *Elemental Analysis Spectrometers* use atomic spectroscopy techniques to identify trace concentrations of elements in liquid and solid samples primarily in environmental, petrochemical, food safety, metallurgical, geochemical and clinical/toxicology research applications. These products are widely used in growth markets such as China, India and Latin America to support compliance with increasingly stringent international environmental and consumer safety regulations.

Mass spectrometry is a technique for analyzing chemical compounds, individually or in complex mixtures, by forming charged ions that are then analyzed according to their mass-to-charge ratios. In addition to molecular information, each discrete chemical compound generates a pattern that provides structurally identifiable information. Our comprehensive offering includes life sciences mass spectrometry systems; and inorganic mass spectrometry systems; as well as a range of sample preparation and separation products including auto-samplers and multiplexing systems.

- *Life Sciences Mass Spectrometers* include triple quadrupole and Orbitrap technologies. Our triple quadrupole systems provide high performance quantitative analysis of chemicals in biological fluids, environmental samples and food matrices. They are also used by the pharmaceutical industry for targeted quantitation during drug discovery. Our Orbitrap technologies provide high resolution and accurate mass capabilities for both research and applied markets and are well suited for drug metabolism, proteomics, environmental analysis, food safety, toxicology and clinical research applications. We also offer a comprehensive portfolio of instrument control and data analysis software to help customers simplify their workflows and obtain knowledge from often complex data.

- *Inorganic Mass Spectrometers* include four product lines: isotope ratio mass spectrometry (IRMS); multi-collector isotope ratio mass spectrometry (MC/IRMS); inductively coupled plasma mass spectrometry (ICP/MS); and high resolution trace mass spectrometry (HR Trace/MS). These products are primarily used for qualitative and quantitative analysis of inorganic matter in a range of applications, including environmental analysis, materials science and earth sciences.

Chemical Analysis

Our chemical analysis products fall into four main categories: materials and minerals; portable analytical instruments; radiation measurement and security instruments; and environmental and process instruments. Customers use these products to quickly and accurately analyze the composition of materials to optimize workflows primarily in industrial applications or to help them comply with governmental regulations and industry safety standards. Our product lines range from those used on production lines to improve quality and efficiency, to portable systems for rapid and real-time chemical identification in the field or to analyze, measure or respond to hazardous situations.

- *Materials and Minerals Instruments* include production line process monitoring, and control systems for a range of industrial applications. For example, we offer on-line instruments that analyze bulk materials non-invasively and in real time to improve quality control and ensure safe operation in a mine or cement manufacturing plant, as well as systems that enable high-speed weighing during bulk materials handling. We also offer gauging systems that employ ionizing and non-ionizing technologies to measure the total thickness, basis weight and coating thickness of flat-sheet materials, such as steel, plastics, foil, rubber and glass. We also offer on line analyzers based on a variety of technologies such as X-ray imaging and ultra-trace chemical detection, to inspect packaged goods for physical contaminants, validate fill quantities, or check for missing or broken parts on line and at high speeds in the food and beverage, pharmaceutical production and packaging industries to maintain safety and quality standards.

- *Portable Analytical Instruments* are rugged handheld products that provide rapid, precise, real-time analysis at the point of need. Our two main product categories are elemental and optical analyzers. Our portable elemental analyzers use X-ray fluorescence (XRF) technology for identifying metal alloys in scrap metal recycling; QA/QC; precious metals analysis; environmental analysis; and lead screening in a range of consumer products. Our portable optical analyzers utilize Raman, Fourier transform infrared (FTIR) and near-infrared (NIR) technologies for use in the field by first responders, and law enforcement and military personnel who need to quickly and accurately identify

Business (continued)

chemicals and explosives in critical safety and security situations. Other applications include QA/QC in pharmaceutical production and identification of counterfeit drugs.

- *Radiation Measurement and Security Products* are used to monitor, detect and identify specific forms of radiation in nuclear power, environmental, industrial, medical, and security applications. Our primary customers include national, regional, and local government agencies responsible for monitoring cargo, vehicles and people traveling across borders. These products are also used by first-responders in safety and security situations, and for worker safety in the nuclear power and other industrial markets.

- *Environmental and Process Instruments* include fixed and portable instrumentation that help our customers protect people and the environment as well as comply with government regulations and industry safety standards. Our products are used by environmental regulatory agencies and power plant operators to measure ambient air, and stack gas emissions for compliance with regulated emissions standards for criteria pollutant gases. Our products are also used in ambient particulate monitoring applications by customers in mining environments to provide continuous measurements and logging of real-time concentrations and median particle sizes of airborne dust, smoke, mist and fumes to improve efficiency and increase worker safety.

In addition to our broad product offerings, we offer a variety of specialized services to our customers, including equipment servicing, instrument calibration services, asset management and training.

Materials and Structural Analysis

Our materials and structural analysis business includes electron microscopy, molecular spectroscopy and laboratory elemental analysis instruments that are used by customers in life sciences, materials sciences and industrial markets to accelerate breakthrough discoveries.

- *Electron Microscopy Instruments* include transmission electron microscopes which provide imaging and characterization at the atomic scale, with applications in semiconductor development, materials science research and the characterization of protein structure and function. We also offer scanning electron microscopes which resolve features from the optical regime down to the nanometer length scale and are used for a wide variety of applications from materials characterization in science and engineering to applications in natural resources, manufacturing, and biological systems. Our DualBeam focused ion beam-scanning electron microscope systems are used for sample preparation, 3D characterization, nanoprototyping, and industrial failure analysis. Our focused ion beam microscopes are used in a range of process control, failure analysis, and materials research applications. We also offer electrical failure analysis instruments which are used in root cause failure analysis and quality control, microCT instruments which are micro-computed tomography solutions for quantitative analysis of a broad range of materials, providing 3D visualization of large volumes non-destructively and 3D visualization software that turns the data and images generated by a broad range of instruments into 3D visualizations of the microscopic sample, allowing quantitative analysis of material properties.

- *Molecular Spectroscopy Instruments* are divided into four primary techniques: FTIR, Raman, NIR and ultraviolet/visible (UV/Vis) spectroscopy. These technologies are typically used in the laboratory to provide information on the structure of molecules to identify, verify and quantify organic materials in pharmaceutical, biotechnology, polymer, chemical, and forensic sciences. Our material characterization instruments include rheometers and extruders that measure viscosity, elasticity, processability, and temperature-related mechanical changes of various materials. We also provide a range of surface analysis instruments commonly used in the semiconductor, metals, coatings, and polymer industries as a product development and failure analysis tool.

- *Laboratory Elemental Analysis Instruments* and analyzers use X-ray fluorescence (XRF), X-ray diffraction (XRD), and arc spark optical emission (OES) techniques for accurate and precise analysis of bulk materials in the metals, cement, minerals, and petrochemicals industries.

The company has entered into an agreement to acquire Gatan, Inc., a wholly owned subsidiary of Roper Technologies, Inc., for approximately $925 million in cash. Gatan is a leading manufacturer of instrumentation and

software used to enhance and extend the operation and performance of electron microscopes. The transaction is subject to customary closing conditions, including regulatory approvals.

Specialty Diagnostics Segment

Our Specialty Diagnostics segment offers a wide range of diagnostic test kits, reagents, culture media, instruments and associated products in order to serve customers in healthcare, clinical, pharmaceutical, industrial, and food safety laboratories. Our healthcare products are used to increase the speed and accuracy of diagnoses, which improves patient care in a more cost

Business (continued)

efficient manner. This segment has six primary businesses – Clinical Diagnostics, ImmunoDiagnostics, Microbiology, Anatomical Pathology, Transplant Diagnostics and our Healthcare Market Channel.

Clinical Diagnostics

Our clinical diagnostics products include a broad offering of liquid, ready-to-use and lyophilized immunodiagnostic reagent kits, calibrators, controls and calibration verification fluids. In particular, we provide products used for drugs-of-abuse testing; therapeutic drug monitoring, including immunosuppressant drug testing; thyroid hormone testing; serum toxicology; clinical chemistry; immunology; hematology; coagulation; glucose tolerance testing; first trimester screening; tumor markers testing; and biomarkers testing for sepsis, acute myocardial infarction and congestive heart failure. We also private label many of our reagents and controls for major *in vitro* diagnostics companies through OEM arrangements. In many instances, we will work with customers or partners to develop new products and applications for their instrument platforms.

We have developed one of the broadest menus for drugs-of-abuse immunoassays. We also provide a broad offering of immunosuppressant drug immunoassays that can be used on a variety of clinical chemistry analyzers.

Our clinical chemistry systems include analyzers and reagents to analyze and measure routine blood and urine chemistry, such as glucose and cholesterol; and advanced testing for specific proteins, therapeutic drug monitoring and drugs-of-abuse. Our diagnostic test range currently covers approximately 80 different validated methods. We also provide pre- and post-analytical automation for preparation of blood specimens before and after analysis, and specialty diagnostic tests based on patented biomarkers for sepsis, cardiovascular and pulmonary diseases, as well as intensive care treatments and prenatal screening.

ImmunoDiagnostics

Our immunodiagnostics offerings include developing, manufacturing and marketing complete blood-test systems to support the clinical diagnosis and monitoring of allergy, asthma and autoimmune diseases. In addition, we offer antibody tests for approximately 20 indications to help diagnose autoimmune diseases such as rheumatoid arthritis, celiac disease, lupus and scleroderma. Our products include ImmunoCAP for allergy and asthma tests and EliA for autoimmunity tests.

Microbiology

Our microbiology offerings include dehydrated and prepared culture media, collection and transport systems, instrumentation and consumables to detect pathogens in blood, diagnostic and rapid direct specimen tests, quality-control products and associated products for the microbiology laboratory. Our products help customers worldwide to diagnose infectious disease; determine appropriate antimicrobial therapy; implement effective infection control programs; and detect microbial contamination of their products or manufacturing facilities.

Within the food and pharmaceutical industries, our products are used to assure the safety and quality of consumer products by monitoring production environments; raw materials and end products for bacterial contamination; and animal health in the dairy industry.

Anatomical Pathology

Our anatomical pathology offerings include a broad portfolio of products primarily for cancer diagnosis and medical research in histology, cytology and hematology applications. These products include a wide range of instruments, consumables and reagents for specimen collection and transport, tissue preparation, staining and immunohistochemistry assays and controls. Reagent and consumable products include sample collection and preservation products used to ensure specimen integrity; tissue cassettes and reagents necessary for same-day, high-quality specimen processing; blades and paraffin used to section tissue; and a wide range of leading stains. Also included are a full line of immunohistochemistry antibodies, detection systems, ancillaries and controls.

We also provide a complete range of anatomical pathology instruments including cassette and slide labeling systems, which enable on-demand slide and cassette printing; tissue processors for same-day tissue-processing; embedding stations, microtomes and cryostats used to section tissue; and automated staining and cover slip systems used for primary and immunohistochemistry staining. In cytology, we offer low-speed centrifugation technology coupled with patented EZ cytofunnels to deposit a thin layer of cells onto a microscope slide to ensure better cell capture and better preservation of cell morphology. We manufacture high-quality flat-sheet glass to produce medical disposable products such as microscope slides, plates, cover glass, and microarray substrates serving the medical,

diagnostics, and scientific communities. We also offer specialized hydrophobic, adhesive, and fluorescent slides through proprietary coating techniques.

Business (continued)

On January 28, 2019, the company entered into an agreement to sell its Anatomical Pathology business to PHC Holdings Corporation for approximately $1.14 billion. The sale is subject to customary closing conditions and applicable regulatory approvals.

Transplant Diagnostics

Our transplant diagnostics products include human leukocyte antigen (HLA) typing and testing for the organ transplant market. Our diagnostic tests are used by transplant centers for tissue typing, primarily to determine the compatibility of donors and recipients pre-transplant, and to detect the presence of antibodies post-transplant that can lead to transplant rejection. These transplant diagnostic tests are widely used across the transplant-testing workflow to improve patient outcomes. Our transplant diagnostic offerings include several lines of HLA typing and antibody detection assays utilizing serological, molecular, enzyme-linked immunosorbent assays (ELISA), flow, and multiplexing technologies.

Healthcare Market Channel

Our healthcare market channel offerings include a broad array of consumables, diagnostic kits and reagents, equipment, instruments, solutions and services for hospitals, clinical laboratories, reference laboratories, physicians' offices and other clinical testing facilities. These products are manufactured by Thermo Fisher and third parties and are primarily used in clinical diagnosis.

Laboratory Products and Services Segment

Our Laboratory Products and Services segment offers virtually everything needed for the laboratory. Our unique combination of self-manufactured and sourced products and extensive service offering, enables our customers to focus on their core activities and helps them to be more efficient, productive and cost effective. The segment also includes a comprehensive offering of outsourced services used by the pharmaceutical and biotech industries for drug development, clinical trials logistics and commercial drug manufacturing. We serve the pharmaceutical, biotechnology, academic, government and other research and industrial markets, as well as the clinical laboratory through four key businesses: Laboratory Products, Laboratory Chemicals, Research and Safety Market Channel, and Pharma Services.

Laboratory Products

Our laboratory products are used primarily by pharmaceutical companies for drug discovery and development and by biotechnology companies and universities for life science research to advance the prevention and cure of diseases and enhance quality of life. This offering consists of equipment, accessories, and services for sample preparation, storage and protection, and analysis:

- *Laboratory Equipment Technologies* includes our leading laboratory refrigerators and freezers, ultralow-temperature freezers and cryopreservation storage tanks for maintaining samples in a cold environment to protect them from degradation. We also offer temperature control products such as heated bath circulators, immersion coolers, recirculating chillers, water baths, and dry baths in a range of sizes, temperatures and configurations for life science, analytical chemistry, manufacturing and quality-control applications. In addition, we offer sample preparation and preservation equipment, which protects our customers' chemical and biological samples and supports the growth of cells and organisms in optimal conditions such as temperature, carbon dioxide and humidity as well as incubators and related products. We also offer centrifugation products, which are used to separate biological matrices and inorganic materials, including microcentrifuges, general use bench-top centrifuges and floor models. Additionally, we offer biological safety cabinets, which enable technicians to handle samples without risk to themselves or their environment and without risk of cross-contamination of samples.

- *Water and Laboratory Products* include water analysis instruments such as meters, electrodes and solutions for the measurement of pH, ions, conductivity, dissolved oxygen, turbidity and other key parameters in the lab and production line. We also offer other laboratory equipment such as water purification systems, shakers, vacuum concentrators, microbiological incubators, ovens, furnaces, hotplates, stirrers, stirring hotplates, and other related products.

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Laboratory Plastics Essentials include a leading offering of laboratory pipette tips and a complementary range of handheld and automated pipetting systems, supporting low-through high-throughput activity. These products optimize productivity and ergonomics, and ensure accurate results. We also offer sample preparation and storage products such as centrifugation consumables as well as vials and organization systems for ultralow temperature and cryogenic storage, with specific products designed for low protein binding and low DNA binding and containers for packaging life science and diagnostic reagents as well for the storage and transport of bulk intermediates and active pharmaceutical ingredients. Additionally, our offerings include a complete selection of clinical specimen collection products, drug-of-abuse collection kits and environmental and food-safety glass and plastic vials, bottles and

Business (continued)

containers, plastic transfer pipettes, general purpose clinical laboratory consumables and containers for breast milk collection, storage and feeding primarily used in neo-natal units and by lactation specialists. We also provide OEM and custom kit assembly services for clinical and drugs-of-abuse test kits.

Laboratory Chemicals

Our laboratory chemicals offering comprises a broad range of chemicals, solvents and reagents supporting virtually every laboratory application – from research to drug discovery and development and manufacturing. This portfolio includes organic chemicals used to synthesize new materials; essential laboratory chemicals used by scientists to purify, extract, separate, identify and manufacture products; high-purity analytical reagents, bioreagents used in many different applications, from cell growth to detailed protein analysis; novel chemical building blocks, reactive intermediates and screening libraries used to accelerate drug discovery; and precious metals, salts and solutions used in a broad range of applications where highly specific reactions are desired. We provide bulk volumes of many products for scale-up from research to development and customized services for chemical procurement, processing, production, testing, and packaging.

Research and Safety Market Channel

Our research and safety market channel serves academic, pharmaceutical, biotechnology, government and industrial customers. We go to market through our expert sales force, segment-relevant printed collateral and digital content in five languages, a state-of-the-art website, www.fishersci.com, containing full product content for more than 1.5 million products, and our global network of resellers and distributors.

We have an international network of warehouses in our primary markets through which we maintain inventory and coordinate product delivery. With specialized product vaults and warehouse management systems, we are able to handle the complete range of products we offer to our customers. Our transportation capabilities include our dedicated fleet of delivery vehicles as well as parcel shipping capabilities that are closely integrated with our third-party parcel carriers. Throughout the product delivery process, we provide our customers with convenient access to comprehensive electronic systems that offer automated catalog search, product order and invoicing, and payment capabilities.

Our channel offers a mix of products that are manufactured by Thermo Fisher, by third parties for us on a private-label basis, and by third parties under their brand but offered for sale exclusively through us. We also offer a broad range of third-party products representing leading industry brand names on a non-exclusive basis.

Our research products include a complete offering of laboratory products, ranging from capital equipment and instruments to chemicals to consumable products. Our safety products include clean-room and controlled-environment supplies, personal protective equipment, firefighting, military, and first responder equipment and supplies, and environmental monitoring and sampling equipment. Our education products include science-related and laboratory products for the K-12 and secondary education market.

In addition to our broad product offerings, we offer a variety of specialized services to our customers through our Unity Lab Services team, including training, equipment servicing and asset management, and dedicated supply management personnel. We also offer scientific support services including desktop delivery, coordination of instrument calibration and service, and on-site customer service.

Pharma Services

We provide the entire spectrum of development, manufacturing and clinical trials services for both small-molecule and large-molecule pharmaceuticals. This includes i) development of a suitable formulation and manufacturing process for the active pharmaceutical ingredient (API) or biologic; ii) technology transfer to scale up the manufacturing; iii) labeling, packaging, distribution and logistics for clinical trials; and iv) commercial scale manufacturing and packaging.

- *Drug Substance Services* - Our service offerings address small molecules, produced through chemical synthesis, and large molecules such as antibodies and proteins produced through mammalian cell culture. We provide development and manufacturing services for small molecule APIs and the biologically active component of pharmaceutical products under current good manufacturing practice (cGMP) conditions from early development through commercial production.

- *Drug Product Services* - We manufacture both small-molecule and large-molecule products for customers in conventional and specialized dosage forms. We differentiate ourselves by our breadth of dosage forms and specialized capabilities in both oral solid and sterile dosage forms. We provide a wide spectrum of advanced formulation, production and technical services and scientific expertise and solutions, from the early stages of a product's development to regulatory approval and commercial scale production.

Business (continued)

- *Clinical Trials Services* - we provide global services for pharmaceutical and biotechnology companies engaged in clinical trials, including comparator sourcing; specialized packaging; over-encapsulation; multi-lingual and specialized labeling and distribution for phase I through phase IV clinical trials; biological-specimen management and biobanking services; specialty pharmaceutical logistics; and clinical supply-chain planning and management.

Sales and Marketing

We market and sell our products and services through a direct sales force, customer-service professionals, electronic commerce, third-party distributors and various catalogs.

We have approximately 12,000 sales personnel including highly trained technical specialists who enable us to better meet the needs of our more technical end-users. We also provide customers with product standardization and other supply-chain-management services to reduce procurement costs.

New Products and Research and Development

Our business includes the development and introduction of new products and may include entry into new business segments. We anticipate that we will continue to make significant expenditures for research and development as we seek to provide a continuing flow of innovative products to maintain and improve our competitive position.

Raw Materials

Our management team believes that we have a readily available supply of raw materials for all of our significant products from various sources. We do not anticipate any difficulties obtaining the raw materials essential to our business.

Raw material and fuel prices are subject to fluctuations due to market conditions. We employ many strategies, including the use of alternative materials, to mitigate the effect of these fluctuations on our results.

Patents, Licenses and Trademarks

Patents are important in many aspects of our business. No particular patent, or related group of patents, is so important, however, that its loss would significantly affect our operations as a whole. Where appropriate, we seek patent protection for inventions and developments made by our personnel that are incorporated into our products or otherwise fall within our fields of interest. Patent rights resulting from work sponsored by outside parties do not always accrue exclusively to the company and may be limited by agreements or contracts.

We protect some of our technology as trade secrets and, where appropriate, we use trademarks or register trademarks used in connection with products. We also enter into license agreements with others to grant and/or receive rights to patents and know-how.

Seasonal Influences

Revenues in the fourth quarter are historically stronger than in other quarters due to the capital spending patterns of industrial, pharmaceutical and government customers. Sales of flu tests and related diagnostic products vary quarter to quarter and year to year based on the severity and duration of each period’s flu season. Sales of allergy tests vary quarter to quarter and year to year based on the severity and duration of each period’s airborne pollen allergens.

Working Capital Requirements

There are no special inventory requirements or credit terms extended to customers that would have a material adverse effect on our working capital.

Dependency on a Single Customer

There is no single customer the loss of which would have a material adverse effect on our business. No customer accounted for more than 5% of our total revenues in any of the past three years.

Business (continued)

Backlog

Our backlog of firm orders at year-end 2018 and 2017 was as follows:

(In millions)	2018	2017
Life Sciences Solutions	$ 647	$ 581
Analytical Instruments	2,243	2,050
Specialty Diagnostics	187	158
Laboratory Products and Services	2,055	1,679
Eliminations	(45)	(20)
	$ 5,087	$ 4,448

We believe that approximately 90% of our backlog at the end of 2018 will be filled during 2019.

Government Contracts

Although the company transacts business with various government agencies, no government contract is of such magnitude that a renegotiation of profits or termination of the contract at the election of the government agency would have a material adverse effect on the company's financial results.

Competition

The company encounters aggressive and able competition in virtually all of the markets we serve. Because of the diversity of our products and services, we face many different types of competitors and competition. Our competitors include a broad range of manufacturers and third-party distributors. Competitive climates in many of the markets we serve are characterized by changing technology and customer demands that require continuing research and development. Our success primarily depends on the following factors:

- technical performance and advances in technology that result in new products and improved price/ performance ratios;
- product differentiation, availability and reliability;
- the depth of our capabilities;
- our reputation among customers as a quality provider of products and services;
- customer service and support;
- active research and application-development programs; and
- relative prices of our products and services.

Environmental Matters

We are subject to various laws and governmental regulations concerning environmental matters and employee safety and health in the United States and other countries. U.S. federal environmental legislation that affects us includes the Toxic Substances Control Act, the Resource Conservation and Recovery Act, the Clean Air Act, the Clean Water Act, the Safe Drinking Water Act, and the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). We are also subject to regulation by the Occupational Safety and Health Administration (OSHA) concerning employee safety and health matters. The United States Environmental Protection Agency (EPA), OSHA, and other federal agencies have the authority to promulgate regulations that have an effect on our operations.

In addition to these federal activities, various states have been delegated certain authority under the aforementioned federal statutes as well as having authority over these matters under state laws. Many state and local

governments have adopted environmental and employee safety and health laws and regulations, some of which are similar to federal requirements.

A number of our operations involve the handling, manufacturing, use or sale of substances that are or could be classified as toxic or hazardous materials within the meaning of applicable laws. Consequently, some risk of environmental harm is inherent in our operations and products, as it is with other companies engaged in similar businesses.

Our expenses for environmental requirements are incurred generally for ongoing compliance and historical remediation matters. Based on current information, we believe that these compliance costs are not material. For historical remediation obligations, our expenditures relate primarily to the cost of permitting, installing, and operating and maintaining groundwater-treatment systems and other remedial measures.

Business (continued)

Our Fair Lawn and Somerville, New Jersey facilities entered into administrative consent orders with the New Jersey Department of Environmental Protection in 1984 to maintain groundwater-remediation activities at these sites, and are currently under the State's Licensed Site Remediation Professional Program. As the owner of the Fair Lawn facility, we are listed as a potentially responsible party for remediation within an area called the Fair Lawn Wellfields Superfund Site, and, in 2008, the company and certain other parties entered into a consent order with the U.S. Environmental Protection Agency (USEPA) to complete a Remedial Investigation/Feasibility Study. In 2018, the USEPA issued a Record of Decision, including the scope of required remediation work based on findings of this study. The company has indicated its willingness to finance and perform the required remediation work together with the other responsible parties. In 2011, our Life Technologies subsidiary entered into a consent decree with the USEPA and other responsible parties to implement a groundwater remedy at the former Davis Landfill Superfund site in Smithfield, Rhode Island.

We record accruals for environmental liabilities based on current interpretations of environmental laws and regulations when it is probable that a liability has been incurred and the amount of such liability can be reasonably estimated. We calculate estimates based upon several factors, including reports prepared by environmental specialists and management's knowledge and experience with these environmental matters. We include in these estimates potential costs for investigation, remediation and operation and maintenance of cleanup sites. Accrued liabilities for environmental matters totaled $69 million at December 31, 2018.

These environmental liabilities do not include third-party recoveries to which we may be entitled. We believe that our accrual is adequate for the environmental liabilities we currently expect to incur. As a result we believe that our ultimate liability with respect to environmental matters will not have a material adverse effect on our financial position, results of operations or cash flows. However, we may be subject to remedial or compliance costs due to future events, such as changes in existing laws and regulations, changes in agency direction or enforcement policies, developments in remediation technologies, changes in the conduct of our operations, and the effect of changes in accounting rules, which could have a material adverse effect on our financial position, results of operations or cash flows.

Regulatory Affairs

Our operations, and some of the products we offer, are subject to a number of complex and stringent laws and regulations governing the production, handling, transportation and distribution of chemicals, drugs and other similar products, including the operating and security standards of the Food and Drug Administration, the Drug Enforcement Administration, the Bureau of Alcohol, Tobacco, Firearms and Explosives, and various state boards of pharmacy as well as comparable state and foreign agencies. As Thermo Fisher's businesses also include export and import activities, we are subject to pertinent laws enforced by the U.S. Departments of Commerce, State and Treasury. In addition, our logistics activities must comply with the rules and regulations of the Department of Transportation, the Federal Aviation Administration and similar foreign agencies. While we believe we are in compliance in all material respects with such laws and regulations, any noncompliance could result in substantial fines or otherwise restrict our ability to provide competitive distribution services and thereby have an adverse effect on our financial condition. To date, none has had a material impact on our operations.

We are subject to laws and regulations governing government contracts, and failure to address these laws and regulations or comply with government contracts could harm our business by leading to a reduction in revenue associated with these customers. We have agreements relating to the sale of our products to government entities and, as a result, we are subject to various statutes and regulations that apply to companies doing business with the government. We are also subject to investigation for compliance with the regulations governing government contracts. A failure to comply with these regulations could result in suspension of these contracts, criminal, civil and administrative penalties or debarment.

Number of Employees

We have approximately 70,000 employees.

Available Information

The company files annual, quarterly and current reports, proxy statements and other documents with the Securities and Exchange Commission (SEC) under the Exchange Act. The SEC maintains a website that contains reports, proxy and information statements and other information that issuers, including the company, file electronically with the SEC. The public can obtain any documents that we file with the SEC at www.sec.gov. We also

make available free of charge on or through our own website at www.thermofisher.com our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and, if applicable, amendments to those reports filed or furnished pursuant to Section 13(a) of the Exchange Act as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC. In addition, paper copies of these documents may be obtained free of charge by writing to the company care of its Investor Relations Department at our principal executive office located at 168 Third Avenue, Waltham, Massachusetts 02451.

Business (continued)

Executive Officers of the Registrant

Name	Age	Present Title (Fiscal Year First Became Executive Officer)	Other Positions Held
Marc N. Casper	50	President and Chief Executive Officer (2001)	Chief Operating Officer (2008-2009) Executive Vice President (2006-2009) Senior Vice President (2003-2006)
Mark P. Stevenson	56	Executive Vice President and Chief Operating Officer (2014)	Executive Vice President and President, Life Sciences Solutions (2014-2017) President and Chief Operating Officer, Life Technologies Corporation (2008-2014)
Michael A. Boxer	57	Senior Vice President and General Counsel (2018)	Executive Vice President and Group General Counsel, Luxottica Group S.p.A. (2011-2017)
Patrick M. Durbin	52	Senior Vice President and President, Specialty Diagnostics (2015)	President, BioPharma Services (2010-2015)
Gregory J. Herrema	53	Senior Vice President and President, Customer Channels (2017)	President, Biosciences (2012-2014)
Michel Lagarde	45	Senior Vice President and President, Pharma Services (2017)	President and Chief Operating Officer, Patheon N.V. (2016-2017) Managing Director, JLL Partners* (2008-2016)
Stephen Williamson	52	Senior Vice President and Chief Financial Officer (2015)	Vice President, Financial Operations (2008-2015)
Peter E. Hornstra	59	Vice President and Chief Accounting Officer (2001)	Corporate Controller (1996-2007)

*JLL Partners is a private equity firm focused on healthcare.

Item 1A. Risk Factors

Set forth below are the risks that we believe are material to our investors. This section contains forward-looking statements. You should refer to the explanation of the qualifications and limitations on forward-looking statements in Item 1. Business under the caption "Forward-looking Statements".

We must develop new products, adapt to rapid and significant technological change and respond to introductions of new products by competitors to remain competitive. Our growth strategy includes significant investment in and expenditures for product development. We sell our products in several industries that are characterized by rapid and significant technological changes, frequent new product and service introductions and enhancements and evolving industry standards. Competitive factors include technological innovation, price, service and delivery, breadth of product line, customer support, e-business capabilities and the ability to meet the special requirements of customers. Our competitors may adapt more quickly to new technologies and changes in customers' requirements than we can. Without the timely introduction of new products, services and enhancements, our products and services will likely become technologically obsolete over time, in which case our revenue and operating results would suffer.

Many of our existing products and those under development are technologically innovative and require significant planning, design, development and testing at the technological, product and manufacturing-process levels. Our customers use many of our products to develop, test and manufacture their own products. As a result, we must anticipate industry trends and develop products in advance of the commercialization of our customers' products. If we fail to adequately predict our customers' needs and future activities, we may invest heavily in research and development of products and services that do not lead to significant revenue.

It may be difficult for us to implement our strategies for improving internal growth. Our growth depends in part on the growth of the markets which we serve. Any decline or lower than expected growth in our served markets could diminish demand for our products and services, which would adversely affect our results of operations and

financial condition. To address this issue, we are pursuing a number of strategies to improve our internal growth, including:

- strengthening our presence in selected geographic markets;
- allocating research and development funding to products with higher growth prospects;

- developing new applications for our technologies;
- expanding our service offerings;
- continuing key customer initiatives;
- combining sales and marketing operations in appropriate markets to compete more effectively;
- finding new markets for our products; and
- continuing the development of commercial tools and infrastructure to increase and support cross-selling opportunities of products and services to take advantage of our depth in product offerings.

We may not be able to successfully implement these strategies, and these strategies may not result in the expected growth of our business.

Our business is affected by general economic conditions and related uncertainties affecting markets in which we operate. Our business is affected by general economic conditions, both inside and outside the U.S. If the global economy and financial markets, or economic conditions in Europe, the U.S. or other key markets, are unstable, it could adversely affect the business, results of operations and financial condition of the company and its customers, distributors, and suppliers, having the effect of

- reducing demand for some of our products;
- increasing the rate of order cancellations or delays;
- increasing the risk of excess and obsolete inventories;
- increasing pressure on the prices for our products and services;
- causing supply interruptions which could disrupt our ability to produce our products; and
- creating longer sales cycles and greater difficulty in collecting sales proceeds.

Demand for some of our products depends on capital spending policies of our customers and on government funding policies. Our customers include pharmaceutical and chemical companies, laboratories, universities, healthcare providers, government agencies and public and private research institutions. Many factors, including public policy spending priorities, available resources and product and economic cycles, have a significant effect on the capital spending policies of these entities.

Spending by some of these customers fluctuates based on budget allocations and the timely passage of the annual federal budget. An impasse in federal government budget decisions could lead to substantial delays or reductions in federal spending.

Economic, political, foreign currency and other risks associated with international sales and operations could adversely affect our results of operations. International markets contribute a substantial portion of our revenues, and we intend to continue expanding our presence in these regions. The exposure to fluctuations in currency exchange rates takes on different forms. International revenues and costs are subject to the risk that fluctuations in exchange rates could adversely affect our reported revenues and profitability when translated into U.S. dollars for financial reporting purposes. These fluctuations could also adversely affect the demand for products and services provided by us. As a multinational corporation, our businesses occasionally invoice third-party customers in currencies other than the one in which they primarily do business (the "functional currency"). Movements in the invoiced currency relative to the functional currency could adversely impact our cash flows and our results of operations. As our international sales grow, exposure to fluctuations in currency exchange rates could have a larger

effect on our financial results. In 2018, currency translation had a favorable effect of $173 million on revenues due to the weakening of the U.S. dollar relative to other currencies in which the company sells products and services.

In addition, many of our employees, contract manufacturers, suppliers, job functions, outsourcing activities and manufacturing facilities are located outside the United States. Accordingly, our future results could be harmed by a variety of factors, including:

- interruption to transportation flows for delivery of parts to us and finished goods to our customers;
- changes in a specific country's or region's political, economic or other conditions;
- changes in diplomatic and trade relationships, including new tariffs, trade protection measures, import or export licensing requirements, trade embargoes and sanctions and other trade barriers;

- tariffs imposed by the U.S. on goods from other countries and tariffs imposed by other countries on U.S. goods, including the tariffs recently adopted by the U.S. government on various imports from China and by the Chinese government on certain U.S. goods;
- negative consequences from changes in tax laws;
- difficulty in staffing and managing widespread operations;
- differing labor regulations;
- differing protection of intellectual property;
- unexpected changes in regulatory requirements; and
- geopolitical uncertainty or turmoil, including terrorism and war.

Significant developments stemming from the U.S. administration or the U.K.'s referendum on membership in the EU could have an adverse effect on us. The U.S. administration has called for substantial changes to trade agreements and is imposing significant increases on tariffs on goods imported into the United States. The administration has also indicated an intention to request Congress to make significant changes, replacement or elimination of the Patient Protection and Affordable Care Act, and government negotiation/regulation of drug prices paid by government programs. Changes in U.S. social, political, regulatory and economic conditions or laws and policies governing the health care system and drug prices, foreign trade, manufacturing, and development and investment in the territories and countries where we or our customers operate could adversely affect our operating results and our business.

Additionally, on June 23, 2016, the United Kingdom held a referendum and voted in favor of leaving the European Union, or EU. This referendum has created political and economic uncertainty, particularly in the United Kingdom and the EU, and this uncertainty may last for years. Our business could be affected during this period of uncertainty, and perhaps longer, by the impact of the United Kingdom's referendum. In addition, our business could be negatively affected by new trade agreements between the United Kingdom and other countries, including the United States, and by the possible imposition of trade or other regulatory barriers in the United Kingdom. These possible negative impacts, and others resulting from the United Kingdom's actual or threatened withdrawal from the EU, may adversely affect our operating results and our customers' businesses.

Our inability to protect our intellectual property could have a material adverse effect on our business. In addition, third parties may claim that we infringe their intellectual property, and we could suffer significant litigation or licensing expense as a result. We place considerable emphasis on obtaining patent and trade secret protection for significant new technologies, products and processes because of the length of time and expense associated with bringing new products through the development process and into the marketplace. Our success depends in part on our ability to develop patentable products and obtain and enforce patent protection for our products both in the United States and in other countries. We own numerous U.S. and foreign patents, and we intend to file additional applications, as appropriate, for patents covering our products. Patents may not be issued for any pending or future patent applications owned by or licensed to us, and the claims allowed under any issued patents may not be sufficiently broad to protect our technology. Any issued patents owned by or licensed to us may be challenged, invalidated or circumvented, and the rights under these patents may not provide us with competitive advantages. In addition, competitors may design around our technology or develop competing technologies. Intellectual property rights may also be unavailable or limited in some foreign countries, which could make it easier for competitors to capture increased market position. We could incur substantial costs to defend ourselves in suits brought against us or in suits in which we may assert our patent rights against others. An unfavorable outcome of any such litigation could materially adversely affect our business and results of operations.

We also rely on trade secrets and proprietary know-how with which we seek to protect our products, in part, by confidentiality agreements with our collaborators, employees and consultants. These agreements may be breached

and we may not have adequate remedies for any breach. In addition, our trade secrets may otherwise become known or be independently developed by our competitors.

Third parties may assert claims against us to the effect that we are infringing on their intellectual property rights. In the event that a claim relating to intellectual property is asserted against us, or third parties not affiliated with us hold pending or issued patents that relate to our products or technology, we may seek licenses to such intellectual property or challenge those patents. However, we may be unable to obtain these licenses on commercially reasonable terms, if at all, and our challenge of the patents may be unsuccessful. Our failure to obtain the necessary licenses or other rights could prevent the sale, manufacture, or distribution of our products and, therefore, could have a material adverse effect on our business, financial condition and results of operations.

Changes in governmental regulations may reduce demand for our products or increase our expenses. We compete in many markets in which we and our customers must comply with federal, state, local and international regulations, such as environmental, health and safety and food and drug regulations. We develop, configure and market our products to meet customer needs created by those regulations. Any significant change in regulations could reduce demand for our products or increase our expenses. For example, many of our instruments are marketed to the pharmaceutical industry for use in discovering and developing drugs. Changes in the U.S. Food and Drug Administration's regulation of the drug discovery and development process could have an adverse effect on the demand for these products.

Our pharma services offerings are highly complex, and if we are unable to provide quality and timely offerings to our customers, our business could suffer. Our pharma services offerings are highly exacting and complex, due in part to strict quality and regulatory requirements. Our operating results in this business depend on our ability to execute and, when necessary, improve our quality management strategy and systems, and our ability to effectively train and maintain our employee base with respect to quality management. A failure of our quality control systems could result in problems with facility operations or preparation or provision of products. In each case, such problems could arise for a variety of reasons, including equipment malfunction, failure to follow specific protocols and procedures, problems with raw materials or environmental factors and damage to, or loss of, manufacturing operations. Such problems could affect production of a particular batch or series of batches of products, requiring the destruction of such products or a halt of facility production altogether.

In addition, our failure to meet required quality standards may result in our failure to timely deliver products to our customers, which in turn could damage our reputation for quality and service. Any such failure could, among other things, lead to increased costs, lost revenue, reimbursement to customers for lost drug product, registered intermediates, registered starting materials, and active pharmaceutical ingredients, other customer claims, damage to and possibly termination of existing customer relationships, time and expense spent investigating the cause and, depending on the cause, similar losses with respect to other batches or products. Production problems in our drug and biologic manufacturing operations could be particularly significant because the cost of raw materials for such manufacturing is often high. If problems in preparation or manufacture of a product or failures to meet required quality standards for that product are not discovered before such product is released to the market, we may be subject to adverse regulatory actions, including product recalls, product seizures, injunctions to halt manufacture and distribution, restrictions on our operations, civil sanctions, including monetary sanctions, and criminal actions. In addition, such problems or failures could subject us to litigation claims, including claims from our customers for reimbursement for the cost of lost or damaged active pharmaceutical ingredients, the cost of which could be significant.

We are subject to product and other liability risks for which we may not have adequate insurance coverage. We may be named as a defendant in product liability lawsuits, which may allege that products or services we have provided from our pharma services offerings have resulted or could result in an unsafe condition or injury to consumers. Additionally, products currently or previously sold by our environmental and process instruments and radiation measurement and security instruments businesses include fixed and portable instruments used for chemical, radiation and trace explosives detection. These products are used in airports, embassies, cargo facilities, border crossings and other high-threat facilities for the detection and prevention of terrorist acts. If any of these products were to malfunction, it is possible that explosive or radioactive material could fail to be detected by our product, which could lead to product liability claims. There are also many other factors beyond our control that could lead to liability claims, such as the reliability and competence of the customers' operators and the training of such operators.

Any such product liability claims brought against us could be significant and any adverse determination may result in liabilities in excess of our insurance coverage. Although we carry product liability insurance, we cannot be certain that our current insurance will be sufficient to cover these claims or that it can be maintained on acceptable terms, if at all.

Our inability to complete any pending acquisitions or to successfully integrate any new or previous acquisitions could have a material adverse effect on our business. Our business strategy includes the acquisition of technologies and businesses that complement or augment our existing products and services. Certain acquisitions may be difficult to complete for a number of reasons, including the need for antitrust and/or other regulatory approvals. Any acquisition we may complete may be made at a substantial premium over the fair value of the net identifiable assets of the acquired company. Further, we may not be able to integrate acquired businesses successfully

into our existing businesses, make such businesses profitable, or realize anticipated cost savings or synergies, if any, from these acquisitions, which could adversely affect our business.

Moreover, we have acquired many companies and businesses. As a result of these acquisitions, we recorded significant goodwill and indefinite-lived intangible assets (primarily tradenames) on our balance sheet, which amount to approximately $25.35 billion and $1.27 billion, respectively, as of December 31, 2018. In addition, we have definite-lived intangible assets totaling $13.71 billion as of December 31, 2018. We assess the realizability of goodwill and indefinite-lived intangible assets annually as well as whenever events or changes in circumstances indicate that these assets may be impaired. We assess the

realizability of definite-lived intangible assets whenever events or changes in circumstances indicate that these assets may be impaired. These events or circumstances would generally include operating losses or a significant decline in earnings associated with the acquired business or asset. Our ability to realize the value of the goodwill and intangible assets will depend on the future cash flows of these businesses. These cash flows in turn depend in part on how well we have integrated these businesses. If we are not able to realize the value of the goodwill and intangible assets, we may be required to incur material charges relating to the impairment of those assets.

We are subject to laws and regulations governing government contracts, and failure to address these laws and regulations or comply with government contracts could harm our business by leading to a reduction in revenue associated with these customers. We have agreements relating to the sale of our products to government entities and, as a result, we are subject to various statutes and regulations that apply to companies doing business with the government. The laws governing government contracts differ from the laws governing private contracts and government contracts may contain pricing terms and conditions that are not applicable to private contracts. We are also subject to investigation for compliance with the regulations governing government contracts. A failure to comply with these regulations could result in suspension of these contracts, criminal, civil and administrative penalties or debarment.

Because we compete directly with certain of our larger customers and product suppliers, our results of operations could be adversely affected in the short term if these customers or suppliers abruptly discontinue or significantly modify their relationship with us. Our largest customer in the laboratory products business is also a significant competitor. Our business may be harmed in the short term if our competitive relationship in the marketplace with certain of our large customers results in a discontinuation of their purchases from us. In addition, we manufacture products that compete directly with products that we source from third-party suppliers. We also source competitive products from multiple suppliers. Our business could be adversely affected in the short term if any of our large third-party suppliers abruptly discontinues selling products to us.

Because we rely heavily on third-party package-delivery services, a significant disruption in these services or significant increases in prices may disrupt our ability to ship products, increase our costs and lower our profitability. We ship a significant portion of our products to our customers through independent package delivery companies, such as Federal Express in the U.S. and DHL in Europe. We also maintain a small fleet of vehicles dedicated to the delivery of our products and ship our products through other carriers, including national and regional trucking firms, overnight carrier services and the U.S. Postal Service. If one or more of these third-party package-delivery providers were to experience a major work stoppage, preventing our products from being delivered in a timely fashion or causing us to incur additional shipping costs we could not pass on to our customers, our costs could increase and our relationships with certain of our customers could be adversely affected. In addition, if one or more of these third-party package-delivery providers were to increase prices, and we were not able to find comparable alternatives or make adjustments in our delivery network, our profitability could be adversely affected.

We are required to comply with a wide variety of laws and regulations, and are subject to regulation by various federal, state and foreign agencies. We are subject to various local, state, federal, foreign and transnational laws and regulations, which include the operating and security standards of the U.S. Federal Drug Administration (the FDA), the U.S. Drug Enforcement Agency (the DEA), various state boards of pharmacy, state health departments, the U.S. Department of Health and Human Services (the DHHS), the European Medicines Agency (the EMA), in Europe, the EU member states and other comparable agencies and, in the future, any changes to such laws and regulations could adversely affect us. In particular, we are subject to laws and regulations concerning current good manufacturing practices and drug safety. Our subsidiaries may be required to register for permits and/or licenses with, and may be required to comply with the laws and regulations of the DEA, the FDA, the DHHS, foreign agencies including the EMA, and other various state boards of pharmacy, state health departments and/or comparable state agencies as well as certain accrediting bodies depending upon the type of operations and location of product distribution, manufacturing and sale.

The manufacture, distribution and marketing of many of our products and services, including medical devices and pharma services, are subject to extensive ongoing regulation by the FDA, the DEA, the EMA, and other equivalent local, state, federal and non-U.S. regulatory authorities. In addition, we are subject to inspections by these regulatory authorities. Failure by us or by our customers to comply with the requirements of these regulatory authorities, including without limitation, remediating any inspectional observations to the satisfaction of these regulatory authorities, could result in warning letters, product recalls or seizures, monetary sanctions, injunctions to

halt manufacture and distribution, restrictions on our operations, civil or criminal sanctions, or withdrawal of existing or denial of pending approvals, including those relating to products or facilities. In addition, such a failure could expose us to contractual or product liability claims, contractual claims from our customers, including claims for reimbursement for lost or damaged active pharmaceutical ingredients, as well as ongoing remediation and increased compliance costs, any or all of which could be significant. We are the sole manufacturer of a number of

pharmaceuticals for many of our customers and a negative regulatory event could impact our customers' ability to provide products to their customers.

We are also subject to a variety of federal, state, local and international laws and regulations that govern, among other things, the importation and exportation of products, the handling, transportation and manufacture of substances that could be classified as hazardous, and our business practices in the U.S. and abroad such as anti-corruption, anti-competition and privacy and data protection laws. Any noncompliance by us with applicable laws and regulations or the failure to maintain, renew or obtain necessary permits and licenses could result in criminal, civil and administrative penalties and could have an adverse effect on our results of operations.

Our business could be adversely affected by disruptions at our sites. We rely upon our manufacturing operations to produce many of the products we sell and our warehouse facilities to store products, pending sale. Any significant disruption of those operations for any reason, such as strikes or other labor unrest, power interruptions, fire, hurricanes or other events beyond our control could adversely affect our sales and customer relationships and therefore adversely affect our business. We have significant operations in California, near major earthquake faults, which make us susceptible to earthquake risk. Although most of our raw materials are available from a number of potential suppliers, our operations also depend upon our ability to obtain raw materials at reasonable prices. If we are unable to obtain the materials we need at a reasonable price, we may not be able to produce certain of our products or we may not be able to produce certain of these products at a marketable price, which could have an adverse effect on our results of operations.

Fluctuations in our effective tax rate may adversely affect our results of operations and cash flows. As a global company, we are subject to taxation in numerous countries, states and other jurisdictions. In preparing our financial statements, we record the amount of tax that is payable in each of the countries, states and other jurisdictions in which we operate. Our future effective tax rate, however, may be lower or higher than experienced in the past due to numerous factors, including a change in the mix of our profitability from country to country, changes in accounting for income taxes and recently enacted and future changes in tax laws in jurisdictions in which we operate. Any of these factors could cause us to experience an effective tax rate significantly different from previous periods or our current expectations, which could have an adverse effect on our business, results of operations and cash flows.

We may incur unexpected costs from increases in fuel and raw material prices, which could reduce our earnings and cash flow. Our primary commodity exposures are for fuel, petroleum-based resins and steel. While we may seek to minimize the impact of price increases through higher prices to customers and various cost-saving measures, our earnings and cash flows could be adversely affected in the event these measures are insufficient to cover our costs.

A significant disruption in, or breach in security of, our information technology systems or violation of data privacy laws could adversely affect our business. As a part of our ongoing effort to upgrade our current information systems, we periodically implement new enterprise resource planning software and other software applications to manage certain of our business operations. As we implement and add functionality, problems could arise that we have not foreseen. Such problems could disrupt our ability to provide quotes, take customer orders and otherwise run our business in a timely manner. When we upgrade or change systems, we may suffer interruptions in service, loss of data or reduced functionality. In addition, if our new systems fail to provide accurate pricing and cost data our results of operations and cash flows could be adversely affected.

We also rely on our information technology systems to process, transmit and store electronic information (including sensitive data such as confidential business information and personally identifiable data relating to employees, customers and other business partners) and to manage or support a variety of critical business processes and activities (such as interacting with suppliers, selling our products and services, fulfilling orders and billing, collecting and making payments, shipping products, providing services and support to customers, tracking customer activity, fulfilling contractual obligations and otherwise conducting business). Our systems may be vulnerable to damage or interruption from natural disasters, power loss, telecommunication failures, terrorist attacks, computer hackers, computer viruses, ransomware, phishing, computer denial-of-service attacks, unauthorized access to customer or employee data or company trade secrets, and other attempts to harm our systems. Certain of our systems are not redundant, and our disaster recovery planning is not sufficient for every eventuality. Despite any precautions we may take, such problems could result in, among other consequences, interruptions in our services, which could

harm our reputation and financial results. Any of the cyber-attacks, breaches or other disruptions or damage described above, if significant, could materially interrupt our operations, delay production and shipments, result in theft of our and our customers' intellectual property and trade secrets, damage customer, business partner and employee relationships and our reputation or result in defective products or services, legal claims and proceedings, liability and penalties under privacy laws and increased cost for security and remediation, each of which could adversely affect our business and financial results.

If we are unable to maintain reliable information technology systems and appropriate controls with respect to global data privacy and security requirements and prevent data breaches, we may suffer regulatory consequences in addition to business

consequences. As a global organization, we are subject to data privacy and security laws, regulations, and customer-imposed controls in numerous jurisdictions as a result of having access to and processing confidential, personal and/or sensitive data in the course of our business. For example, in the United States, individual states regulate data breach and security requirements and multiple governmental bodies assert authority over aspects of the protection of personal privacy. European laws require us to have an approved legal mechanism to transfer personal data out of Europe, and the recently-enacted EU General Data Protection Regulation, which took effect in May 2018, imposes significantly stricter requirements in how we collect and process personal data. Several countries, such as China and Russia, have passed laws that require personal data relating to their citizens to be maintained on local servers and impose additional data transfer restrictions. Government enforcement actions can be costly and interrupt the regular operation of our business, and data breaches or violations of data privacy laws can result in fines, reputational damage and civil lawsuits, any of which may adversely affect our business, reputation and financial statements.

Our debt may restrict our investment opportunities or limit our activities. As of December 31, 2018, we had approximately $18.99 billion in outstanding indebtedness. In addition, we have availability to borrow under a revolving credit facility that provides for up to $2.50 billion of unsecured multi-currency revolving credit. We may also obtain additional long-term debt and lines of credit to meet future financing needs, which would have the effect of increasing our total leverage.

Our leverage could have negative consequences, including increasing our vulnerability to adverse economic and industry conditions, limiting our ability to obtain additional financing and limiting our ability to acquire new products and technologies through strategic acquisitions.

Our ability to make scheduled payments, refinance our obligations or obtain additional financing will depend on our future operating performance and on economic, financial, competitive and other factors beyond our control. Our business may not generate sufficient cash flow to meet our obligations. If we are unable to service our debt, refinance our existing debt or obtain additional financing, we may be forced to delay strategic acquisitions, capital expenditures or research and development expenditures.

Additionally, the agreements governing our debt require that we maintain certain financial ratios, and contain affirmative and negative covenants that restrict our activities by, among other limitations, limiting our ability to incur additional indebtedness, merge or consolidate with other entities, make investments, create liens, sell assets and enter into transactions with affiliates. The covenants in our revolving credit facility (the Facility) include a Consolidated Leverage Ratio (total debt-to-Consolidated EBITDA) and a Consolidated Interest Coverage Ratio (Consolidated EBITDA to Consolidated Interest Expense), as such terms are defined in the Facility. Specifically, the company has agreed that, so long as any lender has any commitment under the Facility, any letter of credit is outstanding under the Facility, or any loan or other obligation is outstanding under the Facility, it will maintain a maximum Consolidated Leverage Ratio of 3.5:1.0. The company has also agreed that so long as any lender has any commitment under the Facility or any letter of credit is outstanding under the Facility, or any loan or other obligation is outstanding under the Facility, it will maintain a minimum Consolidated Interest Coverage Ratio of 3.0:1.0 as of the last day of any fiscal quarter.

Our ability to comply with these financial restrictions and covenants is dependent on our future performance, which is subject to prevailing economic conditions and other factors, including factors that are beyond our control such as foreign exchange rates and interest rates. Our failure to comply with any of these restrictions or covenants may result in an event of default under the applicable debt instrument, which could permit acceleration of the debt under that instrument and require us to prepay that debt before its scheduled due date. Also, an acceleration of the debt under certain of our debt instruments would trigger an event of default under other of our debt instruments.

Item 1B. Unresolved Staff Comments

Not applicable.

Item 2. Properties

The location and general character of our principal properties by segment are as follows:

Life Sciences Solutions

We own approximately 2.9 million square feet of office, engineering, laboratory and production space, principally in California, New York, Florida, Michigan, Maryland, Illinois, Oregon, Wisconsin and Pennsylvania, within the U.S., and in Lithuania, the U.K. and New Zealand. We lease approximately 3.1 million square feet of office, engineering, laboratory and production space, principally in California, Maryland, Utah, Massachusetts and Texas, within the U.S., and in Singapore, China, Netherlands, Germany, India, South Korea, Norway, Japan and Brazil under various leases that expire between 2019 and 2033.

Analytical Instruments

We own approximately 2.2 million square feet of office, engineering, laboratory and production space, principally in California, Massachusetts, Wisconsin, Oregon and Minnesota, within the U.S., and in Germany, Netherlands and Italy. We lease approximately 2.5 million square feet of office, engineering, laboratory and production space, principally in California, Texas, Tennessee, Illinois, Oregon, Pennsylvania, Colorado and Florida, within the U.S., and in Czech Republic, China, Germany, Switzerland, Netherlands, the U.K., Japan, Australia and India, under various leases that expire between 2019 and 2034.

Specialty Diagnostics

We own approximately 2.0 million square feet of office, engineering, laboratory and production space, principally in Virginia, Kansas, New Hampshire and California, within the U.S., and in Sweden, Germany, the U.K. and Switzerland. We lease approximately 1.6 million square feet of office, engineering, laboratory and production space, principally in California, Kansas and Michigan, within the U.S., and in Finland, China, the U.K., France, Canada and Japan under various leases that expire between 2019 and 2034.

Laboratory Products and Services

We own approximately 12.8 million square feet of office, engineering, laboratory, warehouse and production space, principally in North Carolina, Pennsylvania, Ohio, Puerto Rico, New York, New Jersey, South Carolina, Illinois and California, within the U.S., and in the U.K., Austria, Italy, Canada, France, Germany and China. We lease approximately 4.7 million square feet of office, engineering, laboratory, warehouse and production space, principally in California, Pennsylvania, New York, Maryland, Ohio, North Carolina, Massachusetts, Tennessee and Texas, within the U.S., and in Australia, Germany, China, the U.K., Mexico, India, Singapore, New Zealand and Sweden under various leases that expire between 2019 and 2038.

Corporate Headquarters

We own approximately 127,000 square feet of office space in Massachusetts.

We believe that all of the facilities that we are currently using are in good condition and are suitable and adequate to meet our current needs. If we are unable to renew any of the leases that are due to expire in 2019 or 2020, we believe that suitable replacement properties are available on commercially reasonable terms.

Item 3. Legal Proceedings

There are various lawsuits and claims against the company involving product liability, intellectual property, employment and commercial issues. See "Note 11 to our Consolidated Financial Statements – Commitments and Contingencies."

Item 4. Mine Safety Disclosures

Not applicable.

PART II

Item 5. Market for the Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities

Market Price of Common Stock

Our common stock is traded on the New York Stock Exchange under the symbol TMO.

Holders of Common Stock

As of February 2, 2019, the company had 3,344 holders of record of its common stock. This does not include holdings in street or nominee names.

Issuer Purchases of Equity Securities

A summary of the share repurchase activity for the company's fourth quarter of 2018 follows:

Period	Total Number of Shares Purchased	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs (1)	Maximum Dollar Amount of Shares That May Yet Be Purchased Under the Plans or Programs (1) (in millions)
Fiscal October (Sep. 30 - Nov. 3)	1,008,466	$ 247.90	1,008,466	$ 2,000.0
Fiscal November (Nov. 4 - Dec. 1)	—		—	2,000.0
Fiscal December (Dec. 2 - Dec. 31)	—		—	2,000.0
Total Fourth Quarter	1,008,466	$ 247.90	1,008,466	$ 2,000.0

(1) On July 7, 2016, the Board of Directors authorized the repurchase of up to $1.50 billion of the company’s common stock. All of the shares of common stock repurchased by the company during the fourth quarter of 2018 were purchased under this program. On September 7, 2018, the Board of Directors authorized the repurchase of up to $2.00 billion of the company’s common stock. In January 2019, the company repurchased $750 million of the company's common stock under the 2018 authorization.

Item 6. Selected Financial Data

(In millions except per share amounts)	2018 (a)	2017 (b)	2016 (c)	2015 (d)	2014 (e)
Statement of Income Data					
Revenues	$ 24,358	$ 20,918	$ 18,274	$ 16,965	$ 16,890
Income from Continuing Operations	2,938	2,228	2,025	1,980	1,895
Net Income	2,938	2,225	2,022	1,975	1,894
Earnings per Share from Continuing Operations:					
Basic	7.31	5.65	5.13	4.97	4.76
Diluted	7.24	5.60	5.10	4.93	4.71
Earnings per Share:					
Basic	7.31	5.64	5.12	4.96	4.76
Diluted	7.24	5.59	5.09	4.92	4.71
Balance Sheet Data					
Total Assets	56,232	56,669	45,908	40,834	42,852
Long-term Obligations	17,719	18,873	15,372	11,420	12,352

The caption "restructuring and other costs/income" in the notes below includes amounts charged to cost of revenues, primarily for the sale of inventories revalued at the date of acquisition, and charges/credits to selling, general and administrative expense primarily for significant acquisition transaction costs.

(a) Reflects $91 million of pre-tax charges for restructuring and other costs.

(b) Reflects $298 million of pre-tax charges for restructuring and other costs. Also reflects the acquisition of Patheon N.V. in August 2017.

(c) Reflects $395 million of pre-tax charges for restructuring and other costs. Also reflects the acquisitions of Affymetrix, Inc. in March 2016 and FEI Company in September 2016.

(d) Reflects $171 million of pre-tax charges for restructuring and other costs.

(e) Reflects $140 million of pre-tax income from gains on sale of businesses, net of restructuring and other costs. Also reflects the acquisition of Life Technologies Corporation in February 2014.

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

Reference is made throughout this Management's Discussion and Analysis of Financial Condition and Results of Operations to Notes to Consolidated Financial Statements, which begin on page F-1 of this report.

Overview

The company develops, manufactures and sells a broad range of products that are sold worldwide. The company expands the product lines and services it offers by developing and commercializing its own technologies and by making strategic acquisitions of complementary businesses. The company's continuing operations fall into four business segments (see Note 4): Life Sciences Solutions, Analytical Instruments, Specialty Diagnostics and Laboratory Products and Services.

Recent Acquisitions

The company's strategy is to augment internal growth at existing businesses with complementary acquisitions. The company's principal recent acquisitions are described below.

On March 31, 2016, the company acquired, primarily within the Life Sciences Solutions segment, Affymetrix, Inc., a North America-based provider of cellular and genetic analysis products, for a total purchase price of $1.34 billion, net of cash acquired, including the assumption of $254 million of debt. The acquisition expanded the company's existing portfolio of antibodies and assays for flow cytometry and single-cell biology applications. Additionally, the acquisition expanded the company's genetic analysis portfolio through the addition of microarrays. Revenues of Affymetrix were $360 million in 2015.

On September 19, 2016, the company acquired, within the Analytical Instruments segment, FEI Company, a North America-based provider of high-performance electron microscopy, for a total purchase price of $4.08 billion, net of cash acquired. The acquisition strengthened the company's analytical instrument portfolio with the addition of high-end electron microscopes. Revenues of FEI were $930 million in 2015.

On February 14, 2017, the company acquired, within the Life Sciences Solutions segment, Finesse Solutions, Inc., a North America-based developer of scalable control automation systems and software for bioproduction, for a total purchase price of $221 million, net of cash acquired. The acquisition expanded the company's bioproduction offerings. Revenues of Finesse Solutions were approximately $50 million in 2016.

On March 2, 2017, the company acquired, within the Analytical Instruments segment, Core Informatics, a North America-based provider of cloud-based platforms supporting scientific data management, for a total purchase price of $94 million, net of cash acquired. The acquisition enhanced the company's existing informatics solutions. Revenues of Core Informatics were approximately $10 million in 2016.

On August 29, 2017, the company acquired, within the Laboratory Products and Services segment, Patheon N.V., a leading global provider of high-quality drug development and delivery solutions to the pharmaceutical and biopharma sectors, for $35.00 per share in cash, or $7.36 billion, including the assumption of net debt. The company financed the purchase price, including the repayment of indebtedness of Patheon, with issuances of debt and equity.

Patheon provides comprehensive, integrated and highly customizable solutions as well as the expertise to help biopharmaceutical companies of all sizes satisfy complex development and manufacturing needs. The acquisition provided entry into the pharmaceutical contract development and manufacturing organization market and added a complementary service to the company's existing pharmaceutical services portfolio. Patheon's revenues totaled $1.87 billion for the year ended October 31, 2016.

On October 25, 2018, the company acquired, within the Life Sciences Solutions segment, Becton Dickinson and Company's Advanced Bioprocessing business for $477 million in cash. This North America-based business adds complementary cell culture products that expand the segment's bioproduction offerings to help customers increase yield during production of biologic drugs. Revenues of the Advanced Bioprocessing business were $100 million in 2017.

Overview of Results of Operations and Liquidity

(Dollars in millions)	2018		2017	
Revenues				
Life Sciences Solutions	$ 6,269	25.7 %	$ 5,728	27.4 %
Analytical Instruments	5,469	22.5 %	4,821	23.0 %
Specialty Diagnostics	3,724	15.3 %	3,486	16.7 %
Laboratory Products and Services	10,035	41.2 %	7,825	37.4 %
Eliminations	(1,139)	(4.7%)	(942)	(4.5%)
	$ 24,358	100 %	$ 20,918	100 %

Sales in 2018 were $24.36 billion, an increase of $3.44 billion from 2017. Sales increased $1.53 billion due to acquisitions. The favorable effects of currency translation resulted in an increase in revenues of $173 million in 2018. Aside from the effects of acquisitions and currency translation, revenues increased $1.74 billion (8%) primarily due to increased demand. Sales to customers in each of the company's primary end markets grew. Sales growth was strong in each of the company's primary geographic areas, particularly Asia.

In 2018, total company operating income and operating income margin were $3.78 billion and 15.5%, respectively, compared with $2.96 billion and 14.2%, respectively, in 2017. The increase in operating income was primarily due to profit on higher sales and, to a lesser extent, the effects of acquisitions and productivity improvements, net of inflationary cost increases, offset in part by an increase in strategic growth investments, unfavorable sales mix and amortization of acquisition-related intangible assets, due to recent acquisitions. The company’s references to strategic growth investments generally refer to targeted spending for enhancing commercial capabilities, including expansion of geographic sales reach and e-commerce platforms, marketing initiatives, expanded service and operational infrastructure, focused research projects and other expenditures to enhance the customer experience. The company’s references throughout this discussion to productivity improvements generally refer to improved cost efficiencies from its Practical Process Improvement (PPI) business system, reduced costs resulting from global sourcing initiatives, a lower cost structure following restructuring actions, including headcount reductions and consolidation of facilities, and low cost region manufacturing.

The company recorded a provision for income taxes in 2018 including a net provision of $68 million to adjust the estimated initial effects of the Tax Cuts and Jobs Act of 2017 (the Tax Act) recorded in 2017, consisting of an incremental provision of $117 million offset in part by a $49 million reduction of related unrecognized tax benefits established in 2017. These adjustments were required based on new U.S. Treasury guidance and further analysis of available tax accounting methods and elections, legislative updates, regulations, earnings and profit computations and foreign taxes. In 2018, the provision for income taxes also included a $71 million charge to establish a valuation allowance against net operating losses that will not be utilized as a result of the planned sale of the Anatomical Pathology business (Note 2).

The company recorded a provision for income taxes in 2017 principally due to a net provision of $204 million from the effects of the Tax Act consisting primarily of a one-time transition tax on deemed repatriated earnings and profits of foreign subsidiaries, net of a benefit from adjusting the deferred tax balances for the U.S. statutory tax rate reduction. In 2017, the company refinanced certain long term inter-company debt which resulted in an income tax benefit of $237 million related to a foreign exchange loss recognized for income tax purposes. In addition, in 2017 the company recorded a $65 million favorable adjustment to deferred tax balances due to extension of a tax holiday agreement in Singapore. The company continued to implement tax planning initiatives related to non-U.S. subsidiaries in 2017. These non-U.S. subsidiaries incurred foreign tax obligations, and made cash and deemed distributions to the company’s U.S. operations which resulted in no net tax cost. As a result of these distributions, the company benefitted from U.S. foreign tax credits of $86 million, offset in part by additional U.S. income taxes of $53 million on the related foreign income (which reduced the benefit from the foreign rate differential in 2017) for a net benefit of $33 million. The foreign tax credits are the result of foreign earnings and profits remitted or deemed remitted to the U.S. during the reporting year and the U.S. treatment of taxes paid in the foreign jurisdictions in the

years those profits were originally earned. The company also implemented foreign tax credit planning in Sweden which resulted in $20 million of foreign tax credits, with no related incremental U.S. income tax expense.,

The effective tax rate in both 2018 and 2017 was also affected by relatively significant earnings in lower tax jurisdictions. Due primarily to the non-deductibility of intangible asset amortization for tax purposes, the company's cash payments for

Overview of Results of Operations and Liquidity (continued)

income taxes were higher than its income tax expense for financial reporting purposes and totaled $591 million and $479 million in 2018 and 2017, respectively.

The company expects its effective tax rate in 2019 will be between 7% and 10% based on currently forecasted rates of profitability in the countries in which the company conducts business and expected generation of foreign tax credits. The effective tax rate can vary significantly from period to period as a result of discrete income tax factors and events.

Income from continuing operations increased to $2.94 billion in 2018, from $2.23 billion in 2017 principally due to increase in operating income in 2018 (discussed above).

During 2018, the company's cash flow from operations totaled $4.54 billion compared with $4.01 billion for 2017. The increase primarily resulted from higher income before amortization and depreciation in the 2018 period, offset in part by higher investment in working capital to support sales growth.

As of December 31, 2018, the company's short-term debt totaled $1.27 billion, including $693 million of commercial paper obligations and $573 million of senior notes due within the next twelve months. The company has a revolving credit facility with a bank group that provides up to $2.50 billion of unsecured multi-currency revolving credit. If the company borrows under this facility, it intends to leave undrawn an amount equivalent to outstanding commercial paper to provide a source of funds in the event that commercial paper markets are not available. As of December 31, 2018, no borrowings were outstanding under the company's revolving credit facility, although available capacity was reduced by approximately $82 million as a result of outstanding letters of credit.

The company expects to fund the acquisition of Gatan Inc. with a combination of existing cash balances and short-term borrowings. The company believes that its existing cash and cash equivalents of $2.10 billion as of December 31, 2018 and its future cash flow from operations together with available borrowing capacity under its revolving credit agreement will be sufficient to meet the cash requirements of its existing businesses for the foreseeable future, including at least the next 24 months.

Critical Accounting Policies and Estimates

The company's discussion and analysis of its financial condition and results of operations is based upon its financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States of America. The preparation of these financial statements requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenue and expenses and related disclosure of contingent liabilities. On an on-going basis, management evaluates its estimates, including those related to intangible assets and goodwill, income taxes, contingencies and litigation, and pension costs. Management believes the most complex and sensitive judgments, because of their significance to the consolidated financial statements, result primarily from the need to make estimates about the effects of matters that are inherently uncertain. Management bases its estimates on historical experience, current market and economic conditions and other assumptions that management believes are reasonable. The results of these estimates form the basis for judgments about the carrying value of assets and liabilities where the values are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

The company believes the following represent its critical accounting policies and estimates used in the preparation of its financial statements:

(a) *Intangible Assets and Goodwill*

The company uses assumptions and estimates in determining the fair value of assets acquired and liabilities assumed in a business combination. The determination of the fair value of intangible assets, which represent a significant portion of the purchase price in many of the company's acquisitions, requires the use of significant judgment with regard to (i) the fair value; and (ii) whether such intangibles are amortizable or non-amortizable and, if the former, the period and the method by which the intangible asset will be amortized. The company estimates the fair value of acquisition-related intangible assets principally based on projections of cash flows that will arise from identifiable intangible assets of acquired businesses. The projected cash flows are discounted to determine the present value of the assets at the dates of acquisition. Definite-lived intangible assets totaled $13.71 billion at December 31, 2018. The company reviews definite-

lived intangible assets for impairment when indication of potential impairment exists, such as a significant reduction in cash flows associated with the assets. Actual cash flows arising from a particular intangible asset could vary from projected cash flows which could imply different carrying values from those established at the dates of acquisition and which could result in impairment of such asset.

Critical Accounting Policies and Estimates (continued)

The company evaluates goodwill and indefinite-lived intangible assets for impairment annually and when events occur or circumstances change that would more-likely-than-not reduce the fair value of the asset below its carrying amount. Events or circumstances that might require an interim evaluation include unexpected adverse business conditions, economic factors, unanticipated technological changes or competitive activities, loss of key personnel and acts by governments and courts. Goodwill and indefinite-lived intangible assets totaled $25.35 billion and $1.27 billion, respectively, at December 31, 2018. Estimates of discounted future cash flows require assumptions related to revenue and operating income growth, discount rates and other factors. For the goodwill impairment tests, the company considers peer revenues and earnings trading multiples from companies that have operational and financial characteristics that are similar to the respective reporting units and estimated weighted average costs of capital. Different assumptions from those made in the company's analysis could materially affect projected cash flows and the company's evaluation of goodwill and indefinite-lived intangible assets for impairment.

For reporting units where the company performed the quantitative goodwill impairment test, indications of fair value based on projections of profitability for 2019 and thereafter and on peer revenues and earnings trading multiples were sufficient to conclude that no impairment of goodwill or indefinite-lived intangible assets existed at the end of the tenth fiscal month of 2018, the date of the company's impairment testing. There can be no assurance, however, that an economic downturn will not materially adversely affect peer trading multiples and the company's businesses such that they do not achieve their forecasted profitability and these assets become impaired. Should the fair value of the company's goodwill or indefinite-lived intangible assets decline because of reduced operating performance, market declines, or other indicators of impairment, or as a result of changes in the discount rate, charges for impairment may be necessary.

With the completion of the Patheon acquisition in August 2017, the company established a new reporting unit, called Pharma Services, which solely consists of the legacy Patheon business, the book carrying value of which equaled its fair value as of the acquisition date. During its annual 2018 goodwill impairment assessment, the company determined that the Pharma Services reporting unit's cushion of fair value over book value had increased to 5%. Despite this favorable increase, given that the fair value of the reporting unit was not substantially in excess of its carrying value, relatively small decreases in future cash flows from anticipated results could result in impairment of goodwill. The key variables that drive the valuation of the reporting unit are revenue and operating income growth rate assumptions, peer revenue and earnings trading multiples, as well as the weighted average cost of capital rate applied. The estimates used for these assumptions represent management's best estimates, which the company believes are reasonable. These assumptions, however are subject to variability and uncertainty, including the degree to which the reporting unit will grow revenue and profitability levels. The Pharma Services reporting unit had $3.37 billion of goodwill, and an overall carrying value of $7.70 billion as of December 31, 2018.

(b) Income Taxes

In the ordinary course of business there is inherent uncertainty in quantifying the company's income tax positions. The company assesses income tax positions and records tax benefits for all years subject to examination based upon management's evaluation of the facts, circumstances and information available at the reporting date. For those tax positions where it is more likely than not that a tax benefit will be sustained, the company has recorded the largest amount of tax benefit with a greater than 50 percent likelihood of being realized upon ultimate settlement with a taxing authority that has full knowledge of all relevant information. For those income tax positions where it is not more likely than not that a tax benefit will be sustained, no tax benefit has been recognized in the financial statements. Should tax return positions that the company expects are sustainable not be sustained upon audit, the company could be required to record an incremental tax provision for such taxes. The company's liability for these unrecognized tax benefits totaled $1.44 billion at December 31, 2018.

The company operates in numerous countries under many legal forms and, as a result, is subject to the jurisdiction of numerous domestic and non-U.S. tax authorities, as well as to tax agreements and treaties among these governments. Determination of taxable income in any jurisdiction requires the interpretation of the related tax laws and regulations and the use of estimates and assumptions regarding significant future

events, such as the amount, timing and character of deductions, permissible revenue recognition methods under the tax law and the sources and character of income and tax credits. Changes in tax laws, regulations, agreements and treaties, currency exchange restrictions or the company's level of operations or profitability in each taxing jurisdiction could have an impact upon the amount of current and deferred tax balances and hence the company's net income.

Critical Accounting Policies and Estimates (continued)

The company estimates the degree to which tax assets and loss carryforwards will result in a benefit, after consideration of all positive and negative evidence, and provides a valuation allowance for tax assets and loss carryforwards that it believes will more likely than not go unused. In situations in which the company has been able to conclude that its deferred tax assets will be realized, it has generally relied on future reversals of taxable temporary differences, expected future taxable income where such estimates have historically been reliable, and other factors. If it becomes more likely than not that a tax asset or loss carryforward will be used, the company reverses the related valuation allowance. Any such reversals are recorded as a reduction of the company's tax provision. The company's tax valuation allowance totaled $471 million at December 31, 2018. Should the company's actual future taxable income by tax jurisdiction vary from estimates, additional allowances or reversals thereof may be necessary.

The company has not provided state income or foreign withholding taxes on certain of its non-U.S. subsidiaries' undistributed earnings, as such amounts are intended to be reinvested outside the United States indefinitely in the respective jurisdictions based on specific business plans and tax strategies. These business plans and tax strategies consider: short-term and long-term forecasts and budgets of the U.S. parent and non-U.S. subsidiaries; working capital and other needs in locations where earnings are generated; the company's past practices regarding non-U.S. subsidiary dividends; sources of financing by the U.S. parent, such as issuing debt or equity; and uses of cash by the U.S. parent that are more discretionary in nature, such as business combinations and share repurchase programs. However, should the company change its business plans and tax strategies in the future and decide to repatriate a portion of these earnings to one of its U.S. subsidiaries, including cash maintained by these non-U.S. subsidiaries, the company would recognize additional tax liabilities. It is not practicable to estimate the amount of additional state and foreign withholding tax liabilities that the company would incur. The company's intent is to only make distributions from non-U.S. subsidiaries in the future when they can be made at no net tax costs.

(c) Contingencies and Litigation

The company records accruals for various contingencies, including legal proceedings, environmental, workers' compensation, product, general and auto liabilities, and other claims that arise in the normal course of business. The accruals are based on management's judgment, historical claims experience, the probability of losses and, where applicable, the consideration of opinions of internal and or external legal counsel and actuarial estimates. Accruals of acquired businesses, including product liability and environmental accruals, were initially recorded at fair value and discounted to their net present value. Additionally, the company records receivables from third-party insurers when recovery has been determined to be probable.

(d) Pension and Other Retiree Benefits

Several of the company's U.S. and non-U.S. subsidiaries sponsor defined benefit pension and other retiree benefit plans. The cost and obligations of these arrangements are calculated using many assumptions to estimate the benefits that the employee earns while working, the amount of which cannot be completely determined until the benefit payments cease. Major assumptions used in the accounting for these employee benefit plans include the discount rate, expected return on plan assets and rate of increase in employee compensation levels. Assumptions are determined based on company data and appropriate market indicators in consultation with third-party actuaries, and are evaluated each year as of the plans' measurement date. Net periodic pension costs for the company's pension and other postretirement benefit plans totaled $22 million in 2018. The company's unfunded benefit obligation totaled $391 million at year-end 2018 compared with $486 million at year-end 2017. Should any of these assumptions change, they would have an effect on net periodic pension costs and the unfunded benefit obligation. For example, a 10% decrease in the discount rate would result in an annual increase in pension and other postretirement benefit expense of approximately $2 million and an increase in the benefit obligation of approximately $93 million.

Results of Operations

2018 Compared With 2017

(In millions)	2018	2017	Total Change	Currency Translation	Acquisitions	Operations
Revenues						
Life Sciences Solutions	$ 6,269	$ 5,728	$ 541	$ 49	$ 28	$ 464
Analytical Instruments	5,469	4,821	648	41	45	562
Specialty Diagnostics	3,724	3,486	238	41	8	189
Laboratory Products and Services	10,035	7,825	2,210	50	1,466	694
Eliminations	(1,139)	(942)	(197)	(8)	(18)	(171)
Consolidated Revenues	$ 24,358	$ 20,918	$ 3,440	$ 173	$ 1,529	$ 1,738

Sales in 2018 were $24.36 billion, an increase of $3.44 billion from 2017. Sales increased $1.53 billion due to acquisitions. The favorable effects of currency translation resulted in an increase in revenues of $173 million in 2018. Aside from the effects of acquisitions and currency translation, revenues increased $1.74 billion (8%) primarily due to increased demand. Sales to customers in each of the company's primary end markets grew. Sales growth was strong in each of the company's primary geographic areas, particularly Asia.

In 2018, total company operating income and operating income margin were $3.78 billion and 15.5%, respectively, compared with $2.96 billion and 14.2%, respectively, in 2017. The increase in operating income was primarily due to profit on higher sales and, to a lesser extent, the effects of acquisitions and productivity improvements, net of inflationary cost increases, offset in part by an increase in strategic growth investments, unfavorable sales mix and amortization of acquisition-related intangible assets, due to recent acquisitions.

In 2018, the company recorded restructuring and other costs, net, of $91 million, including $12 million of charges to cost of revenues primarily for the sale of inventories revalued at the date of acquisition. The company recorded $29 million of net charges to selling, general and administrative expenses, principally third-party transaction and integration costs associated with recent and pending acquisitions, offset in part by income from the favorable results of product liability litigation. In addition, the company recorded $88 million of cash restructuring costs in its continuing effort to streamline operations, including severance at several businesses and abandoned facility expenses at businesses that have been or are being consolidated in the U.S. and Europe. The company also recorded $38 million of other income, net, principally for resolution of a litigation matter (see Note 15).

In 2017, the company recorded restructuring and other costs, net, of $298 million, including $123 million of charges to cost of revenues primarily for the sale of inventories revalued at the date of acquisition and, to a lesser extent, to conform the accounting policies of Patheon to the company's accounting policies; $78 million of charges to selling, general and administrative expenses primarily for third-party transaction and integration costs associated with recent acquisitions and changes in estimates of acquisition contingent consideration. In addition, the company recorded $97 million of cash restructuring costs, primarily to achieve acquisition synergies, including severance and abandoned facilities costs associated with the closure and consolidation of facilities in the U.S. and Europe. The company’s other businesses incurred costs for continued headcount reductions and facility consolidations in an effort to streamline operations, including severance at several businesses and abandoned facility expenses at businesses that have been or are being consolidated in the U.S., Europe and Asia. The company also recorded $27 million of net credits for litigation-related matters, which were mostly offset by compensation due at Patheon on the date of acquisition, hurricane response/impairment costs, and net charges for the settlement/curtailment of retirement plans.

As of February 27, 2019, the company has identified restructuring actions that will result in additional charges of approximately $65 million, primarily in 2019, and expects to identify additional actions during 2019 which will be recorded when specified criteria are met, such as communication of benefit arrangements and abandonment of leased facilities. Approximately 40% of the additional charges will be incurred in the Life Sciences Solutions segment, 25% in the Analytical Instruments segment, 30% in the Laboratory Products and Services segment, and 5% in the

Specialty Diagnostics segment. The restructuring projects for which charges were incurred in 2018 are expected to result in annual cost savings of approximately

Results of Operations (continued)

$65 million beginning in part in 2018 and, to a greater extent, in 2019, including $20 million in the Life Sciences Solutions segment, $10 million in the Analytical Instruments segment, $5 million in the Specialty Diagnostics segment and $30 million in the Laboratory Products and Services segment. The restructuring actions for which charges were incurred in 2017 resulted in annual cost savings of approximately $90 million beginning in part in 2017 and to a greater extent in 2018, including $50 million in the Life Sciences Solutions segment, $20 million in the Analytical Instruments segment, $10 million in the Specialty Diagnostics segment and $10 million in the Laboratory Products and Services segment.

Segment Results

The company's management evaluates segment operating performance using operating income before certain charges/credits to cost of revenues and selling, general and administrative expenses, principally associated with acquisition-related activities; restructuring and other costs/income including costs arising from facility consolidations such as severance and abandoned lease expense and gains and losses from the sale of real estate and product lines; and amortization of acquisition-related intangible assets. The company uses this measure because it helps management understand and evaluate the segments' core operating results and facilitate comparison of performance for determining compensation (Note 4). Accordingly, the following segment data is reported on this basis.

(Dollars in millions)	2018	2017	Change
Revenues			
Life Sciences Solutions	$ 6,269	$ 5,728	9 %
Analytical Instruments	5,469	4,821	13 %
Specialty Diagnostics	3,724	3,486	7 %
Laboratory Products and Services	10,035	7,825	28 %
Eliminations	(1,139)	(942)	21 %
Consolidated Revenues	$ 24,358	$ 20,918	16 %
Segment Income			
Life Sciences Solutions	$ 2,158	$ 1,894	14 %
Analytical Instruments	1,247	1,027	21 %
Specialty Diagnostics	952	927	3 %
Laboratory Products and Services	1,258	1,004	25 %
Subtotal Reportable Segments	5,615	4,852	16 %
Cost of Revenues Charges	(12)	(123)	
Selling, General and Administrative Charges, Net	(29)	(78)	
Restructuring and Other (Costs) Income, Net	(50)	(97)	
Amortization of Acquisition-related Intangible Assets	(1,741)	(1,594)	
Consolidated Operating Income	$ 3,783	$ 2,960	28 %
Reportable Segments Operating Income Margin	23.1 %	23.2 %	
Consolidated Operating Income Margin	15.5 %	14.2 %	

Income from the company's reportable segments increased 16% to $5.62 billion in 2018 due primarily to profit on higher sales and, to a lesser extent, the effects of acquisitions, and productivity improvements, net of inflationary cost increases, offset in part by strategic growth investments and unfavorable sales mix.

Results of Operations (continued)

Life Sciences Solutions

(Dollars in millions)	2018	2017	Change
Revenues	$ 6,269	$ 5,728	9 %
Operating Income Margin	34.4 %	33.1 %	1.3 pt

Sales in the Life Sciences Solutions segment increased $541 million to $6.27 billion in 2018. Sales increased $464 million (8%) due to higher revenues at existing businesses, $49 million due to the favorable effects of currency translation and $28 million due to acquisitions. The increase in revenue at existing businesses was primarily due to increased demand at each of the segment's primary businesses, with particular strength from sales of biosciences products and bioprocess production products.

Operating income margin was 34.4% in 2018 compared to 33.1% in 2017. The increase in operating margin resulted primarily from profit on higher sales and productivity improvements, net of inflationary cost increases. These increases were offset in part by unfavorable sales mix, and strategic growth investments.

Analytical Instruments

(Dollars in millions)	2018	2017	Change
Revenues	$ 5,469	$ 4,821	13 %
Operating Income Margin	22.8 %	21.3 %	1.5 pt

Sales in the Analytical Instruments segment increased $648 million to $5.47 billion in 2018. Sales increased $562 million (12%) due to higher revenues at existing businesses, $45 million due to acquisitions and $41 million due to the favorable effects of currency translation. The increase in revenue at existing businesses was primarily due to increased demand at each of the segment's primary businesses.

Operating income margin was 22.8% in 2018 compared to 21.3% in 2017. The increase resulted primarily from profit on higher sales and, to a lesser extent, productivity improvements, net of inflationary cost increases, offset in part by strategic growth investments.

Specialty Diagnostics

(Dollars in millions)	2018	2017	Change
Revenues	$ 3,724	$ 3,486	7 %
Operating Income Margin	25.6 %	26.6 %	-1.0 pt

Sales in the Specialty Diagnostics segment increased $238 million to $3.72 billion in 2018. Sales increased $189 million (5%) due to higher revenues at existing businesses, $41 million due to the favorable effects of currency translation and $8 million due to an acquisition. The increase in revenue at existing businesses was due to broad based higher demand in each of the segment's primary businesses with particular strength in sales of products sold through the segment’s healthcare market channel.

Operating income margin was 25.6% in 2018 and 26.6% in 2017. The decrease resulted primarily from strategic growth investments and, to a lesser extent, unfavorable sales mix, offset in part by profit on higher sales and, to a lesser extent, favorable foreign currency exchange.

Results of Operations (continued)

Laboratory Products and Services

(Dollars in millions)	2018	2017	Change
Revenues	$ 10,035	$ 7,825	28 %
Operating Income Margin	12.5 %	12.8 %	-0.3 pt

Sales in the Laboratory Products and Services segment increased $2.21 billion to $10.04 billion in 2018. Sales increased $1.47 billion due to an acquisition, $694 million (9%) due to higher revenues at existing businesses and $50 million due to the favorable effects of currency translation. The increase in revenue at existing businesses was primarily due to increased demand in each of the segment's principal businesses with particular strength in its research and safety market channel business and its clinical trials business.

Operating income margin was 12.5% in 2018 compared to 12.8% in 2017. The decrease was primarily due to unfavorable sales mix and, to a lesser extent, strategic growth investments, offset in part by profit on higher sales.

Other Expense, Net

The company reported other expense, net, of $521 million and $531 million in 2018 and 2017, respectively (Note 5). An increase in interest expense of $75 million was offset in part by an increase in interest income of $56 million in 2018. In 2017, other expense, net included $32 million of charges related to the amortization of fees paid to obtain bridge financing commitments related to the acquisition of Patheon.

Provision for Income Taxes

The company recorded a provision for income taxes in 2018 including a net provision of $68 million to adjust the estimated initial effects of the Tax Cuts and Jobs Act of 2017 recorded in 2017, consisting of an incremental provision of $117 million offset in part by a $49 million reduction of related unrecognized tax benefits established in 2017. These adjustments were required based on new U.S. Treasury guidance and further analysis of available tax accounting methods and elections, legislative updates, regulations, earnings and profit computations and foreign taxes. In 2018, the provision for income taxes also included a $71 million charge to establish a valuation allowance against net operating losses that will not be utilized as a result of the planned sale of the Anatomical Pathology business (Note 2).

The company recorded a provision for income taxes in 2017 principally due to a net provision of $204 million from the effects of the Tax Act consisting primarily of a one-time transition tax on deemed repatriated earnings and profits of foreign subsidiaries, net of a benefit from adjusting the deferred tax balances for the U.S. statutory tax rate reduction. In 2017, the company refinanced certain long term inter-company debt which resulted in an income tax benefit of $237 million related to a foreign exchange loss recognized for income tax purposes. In addition, in 2017 the company recorded a $65 million favorable adjustment to deferred tax balances due to extension of a tax holiday agreement in Singapore. The company continued to implement tax planning initiatives related to non-U.S. subsidiaries in 2017. These non-U.S. subsidiaries incurred foreign tax obligations, and made cash and deemed distributions to the company’s U.S. operations which resulted in no net tax cost. As a result of these distributions, the company benefitted from U.S. foreign tax credits of $86 million, offset in part by additional U.S. income taxes of $53 million on the related foreign income (which reduced the benefit from the foreign rate differential in 2017) for a net benefit of $33 million. The foreign tax credits are the result of foreign earnings and profits remitted or deemed remitted to the U.S. during the reporting year and the U.S. treatment of taxes paid in the foreign jurisdictions in the years those profits were originally earned. The company also implemented foreign tax credit planning in Sweden which resulted in $20 million of foreign tax credits, with no related incremental U.S. income tax expense.

The effective tax rate in both 2018 and 2017 was also affected by relatively significant earnings in lower tax jurisdictions. Due primarily to the non-deductibility of intangible asset amortization for tax purposes, the company’s cash payments for income taxes were higher than its income tax expense for financial reporting purposes and totaled $591 million and $479 million in 2018 and 2017, respectively.

The company expects its effective tax rate in 2019 will be between 7% and 10% based on currently forecasted rates of profitability in the countries in which the company conducts business and expected generation of foreign tax credits. The effective tax rate can vary significantly from period to period as a result of discrete income tax factors and events.

Results of Operations (continued)

The company has operations and a taxable presence in approximately 50 countries outside the U.S. Some of these countries have lower tax rates than the U.S. The company's ability to obtain a benefit from lower tax rates outside the U.S. is dependent on its relative levels of income in countries outside the U.S. and on the statutory tax rates in those countries. Based on the dispersion of the company's non-U.S. income tax provision among many countries, the company believes that a change in the statutory tax rate in any individual country is not likely to materially affect the company's income tax provision or net income, aside from any resulting one-time adjustment to the company's deferred tax balances to reflect a new rate.

Recent Accounting Pronouncements

A description of recently issued accounting standards is included under the heading *"Recent Accounting Pronouncements"* in Note 1.

Contingent Liabilities

The company is contingently liable with respect to certain legal proceedings and related matters. An unfavorable outcome that differs materially from current accrual estimates, if any, for one or more of the matters described under the headings *"Product Liability, Workers Compensation and Other Personal Injury Matters,"* and *"Intellectual Property Matters"* in Note 11 could have a material adverse effect on the company's financial position as well as its results of operations and cash flows.

2017 Compared With 2016

(In millions)	2017	2016	Total Change	Currency Translation	Acquisitions	Operations
Revenues						
Life Sciences Solutions	$ 5,728	$ 5,317	$ 411	$ 12	$ 99	$ 300
Analytical Instruments	4,821	3,668	1,153	29	794	330
Specialty Diagnostics	3,486	3,339	147	12	9	126
Laboratory Products and Services	7,825	6,724	1,101	13	727	361
Eliminations	(942)	(774)	(168)	4	(4)	(168)
Consolidated Revenues	$ 20,918	$ 18,274	$ 2,644	$ 70	$ 1,625	$ 949

Sales in 2017 were $20.92 billion, an increase of $2.64 billion from 2016. Sales increased $1.63 billion due to acquisitions. The favorable effects of currency translation resulted in an increase in revenues of $70 million in 2017. Aside from the effects of acquisitions and currency translation, revenues increased $949 million (5%) primarily due to increased demand. Sales to customers in each of the company's primary end markets grew. Sales growth was moderate in North America and Europe and particularly strong in Asia.

In 2017, total company operating income and operating income margin were $2.96 billion and 14.2%, respectively, compared with $2.46 billion and 13.5%, respectively, in 2016. The increase in operating income was primarily due to profit on higher sales in local currencies, the effects of acquisitions and productivity improvements, net of inflationary cost increases, offset in part by an increase in amortization of acquisition-related intangible assets, due to recent acquisitions, and strategic growth investments.

In 2017, the company recorded restructuring and other costs, net, of $298 million, including $123 million of charges to cost of revenues primarily for the sale of inventories revalued at the date of acquisition, and, to a lesser extent, to conform the accounting policies of Patheon to the company's accounting policies. The company recorded $78 million of charges to selling, general and administrative expenses, primarily for third-party transaction and integration costs associated with recent acquisitions and changes in estimates of acquisition contingent consideration. In addition, the company recorded $97 million of cash restructuring costs, primarily to achieve acquisition synergies, including severance and abandoned facilities costs associated with the closure and consolidation of facilities in the

U.S and Europe. The company's other businesses incurred costs for continued headcount reductions and facility consolidations in an effort to streamline operations including severance at several businesses and abandoned facility expenses at businesses that have been or are being consolidated in the U.S., Europe and Asia. The company also recorded $27 million of net credits for litigation-related matters, which were mostly offset by compensation due at Patheon on the date of the acquisition, hurricane response/impairment costs, and net charges for the settlement/ curtailment of retirement plans (see Note 15).

Results of Operations (continued)

In 2016, the company recorded restructuring and other costs, net, of $395 million, including $102 million of charges to cost of revenues for the sale of inventories revalued at the date of acquisition and to conform the accounting policies of FEI and Affymetrix to the company's accounting policies; $104 million of charges to selling, general and administrative expenses primarily for third-party transaction and integration costs related to the acquisitions of FEI and Affymetrix. In addition, the company recorded $164 million of cash restructuring costs, primarily to achieve acquisition synergies, including severance and abandoned facilities costs associated with the closure and consolidation of facilities in the U.S. The company's other businesses incurred costs for continued headcount reductions and facility consolidations in an effort to streamline operations, including severance at several businesses and abandoned facility expenses at businesses that have been or are being consolidated in the U.S., Europe and Asia. The company also recorded charges for litigation and environmental remediation matters. These costs were partially offset by gains on the sales of real estate.

The restructuring actions for which charges were incurred in 2016 resulted in annual cost savings of approximately $100 million beginning in part in 2016 and to a greater extent in 2017, including $60 million in the Life Sciences Solutions segment, $25 million in the Analytical Instruments segment, $5 million in the Specialty Diagnostics segment and $10 million in the Laboratory Products and Services segment.

Segment Results

(Dollars in millions)	2017	2016	Change
Revenues			
Life Sciences Solutions	$ 5,728	$ 5,317	8 %
Analytical Instruments	4,821	3,668	31 %
Specialty Diagnostics	3,486	3,339	4 %
Laboratory Products and Services	7,825	6,724	16 %
Eliminations	(942)	(774)	22 %
Consolidated Revenues	$ 20,918	$ 18,274	14 %
Segment Income			
Life Sciences Solutions	$ 1,894	$ 1,598	19 %
Analytical Instruments	1,027	749	37 %
Specialty Diagnostics	927	910	2 %
Laboratory Products and Services	1,004	974	3 %
Subtotal Reportable Segments	4,852	4,231	15 %
Cost of Revenues Charges	(123)	(102)	
Selling, General and Administrative Costs, Net	(78)	(104)	
Restructuring and Other Income (Costs), Net	(97)	(189)	
Amortization of Acquisition-related Intangible Assets	(1,594)	(1,378)	
Consolidated Operating Income	$ 2,960	$ 2,458	20 %
Reportable Segments Operating Income Margin	23.2 %	23.2 %	

Consolidated Operating Income Margin	14.2 %	13.5 %

Income from the company's reportable segments increased 15% to $4.85 billion in 2017 due primarily to profit on higher sales in local currencies, the effects of acquisitions and productivity improvements, net of inflationary cost increases, offset in part by strategic growth investments.

Results of Operations (continued)

Life Sciences Solutions

(Dollars in millions)	2017	2016	Change
Revenues	$ 5,728	$ 5,317	8 %
Operating Income Margin	33.1 %	30.1 %	3.0 pt

Sales in the Life Sciences Solutions segment increased $411 million to $5.73 billion in 2017. Sales increased $300 million (6%) due to higher revenues at existing businesses, $99 million due to acquisitions and $12 million due to the favorable effects of currency translation. The increase in revenue at existing businesses was primarily due to increased demand for biosciences products and, to a lesser extent, bioprocess production products as well as genetic sciences products.

Operating income margin was 33.1% in 2017 compared to 30.1% in 2016. The increase in operating margin resulted primarily from productivity improvements, net of inflationary cost increases, and, to a lesser extent, profit on higher sales in local currencies and price increases. These increases were offset in part by strategic growth investments and acquisition dilution.

Analytical Instruments

(Dollars in millions)	2017	2016	Change
Revenues	$ 4,821	$ 3,668	31 %
Operating Income Margin	21.3 %	20.4 %	0.9 pt

Sales in the Analytical Instruments segment increased $1.15 billion to $4.82 billion in 2017. Sales increased $794 million due to acquisitions, $330 million (9%) due to higher revenues at existing businesses and $29 million due to the favorable effects of currency translation. The increase in revenue at existing businesses was primarily due to increased demand in each of the segment's primary businesses particularly products sold by the segment's chromatography and mass spectrometry business and materials and structural analysis business.

Operating income margin was 21.3% in 2017 compared to 20.4% in 2016. The increase resulted primarily from profit on higher sales in local currencies, productivity improvements, net of inflationary cost increases and, to a lesser extent, the effect of acquisitions, offset in part by strategic growth investments and, to a lesser extent, unfavorable foreign currency exchange and unfavorable sales mix.

Specialty Diagnostics

(Dollars in millions)	2017	2016	Change
Revenues	$ 3,486	$ 3,339	4 %
Operating Income Margin	26.6 %	27.3 %	-0.7 pt

Sales in the Specialty Diagnostics segment increased $147 million to $3.49 billion in 2017. Sales increased $126 million (4%) due to higher revenues at existing businesses, $12 million due to the favorable effects of currency translation and $9 million due to acquisitions. The increase in revenue at existing businesses was primarily due to higher demand for products sold through the segment's healthcare market channel as well as clinical diagnostics products and immunodiagnostics products.

Operating income margin was 26.6% in 2017 and 27.3% in 2016. The decrease resulted primarily from strategic growth investments and, to a lesser extent, unfavorable sales mix, offset in part by profit on higher sales in local currencies and productivity improvements, net of inflationary cost increases.

Results of Operations (continued)

Laboratory Products and Services

(Dollars in millions)	2017	2016	Change
Revenues	$ 7,825	$ 6,724	16 %
Operating Income Margin	12.8 %	14.5 %	-1.7 pt

Sales in the Laboratory Products and Services segment increased $1.10 billion to $7.83 billion in 2017. Sales increased $727 million due to acquisitions, $361 million (5%) due to higher revenues at existing businesses and $13 million due to the favorable effects of currency translation. The increase in revenue at existing businesses was primarily due to increased demand for products sold through the segment's channel business and, to a lesser extent, laboratory equipment and consumables.

Operating income margin was 12.8% in 2017 compared to 14.5% in 2016. The decrease was primarily due to unfavorable sales mix and strategic growth investments offset in part by profit on higher sales in local currencies and, to a lesser extent, the effect of acquisitions.

Other Expense, Net

The company reported other expense, net, of $531 million and $434 million in 2017 and 2016, respectively (Note 5). Interest expense increased $123 million, primarily due to an increase in outstanding debt.

Provision for Income Taxes

The company recorded a provision for income taxes in 2017 principally due to a net provision of $204 million from the effects of the Tax Act consisting primarily of a one-time transition tax on deemed repatriated earnings and profits of foreign subsidiaries, net of a benefit from adjusting the deferred tax balances for the U.S. statutory tax rate reduction. In 2017, the company refinanced certain long term inter-company debt which resulted in an income tax benefit of $237 million related to a foreign exchange loss recognized for income tax purposes. In addition, in 2017 the company recorded a $65 million favorable adjustment to deferred tax balances due to extension of a tax holiday agreement in Singapore. The company continued to implement tax planning initiatives related to non-U.S. subsidiaries in 2017. These non-U.S. subsidiaries incurred foreign tax obligations, and made cash and deemed distributions to the company’s U.S. operations which resulted in no net tax cost. As a result of these distributions, the company benefitted from U.S. foreign tax credits of $86 million, offset in part by additional U.S. income taxes of $53 million on the related foreign income (which reduced the benefit from the foreign rate differential in 2017) for a net benefit of $33 million. The foreign tax credits are the result of foreign earnings and profits remitted or deemed remitted to the U.S. during the reporting year and the U.S. treatment of taxes paid in the foreign jurisdictions in the years those profits were originally earned. The company also implemented foreign tax credit planning in Sweden which resulted in $20 million of foreign tax credits, with no related incremental U.S. income tax expense.

The company recorded a benefit from income taxes in 2016. In 2016, the company continued to implement tax planning initiatives related to non-U.S. subsidiaries. These non-U.S. subsidiaries incurred foreign tax obligations, and made cash and deemed distributions to the company’s U.S. operations which resulted in no net tax cost. As a result of these distributions, the company benefitted from U.S. foreign tax credits of $91 million, offset in part by additional U.S. taxes of $37 million on the related foreign income (which reduced the benefit from the foreign rate differential in 2016) for a net benefit of $54 million. The company also implemented foreign tax credit planning in Sweden which resulted in $100 million of foreign tax credits, with no related incremental U.S. income tax expense. In addition, the company recorded discrete benefits in 2016 totaling $39 million related to prior year tax filings and net charges of $12 million related to tax audits.

The effective tax rate in both 2017 and 2016 was also affected by relatively significant earnings in lower tax jurisdictions. Due primarily to the non-deductibility of intangible asset amortization for tax purposes, the company’s cash payments for income taxes were higher than its income tax expense for financial reporting purposes and totaled $479 million and $663 million in 2017 and 2016, respectively.

Liquidity and Capital Resources

Consolidated working capital was $4.48 billion at December 31, 2018, compared with $2.37 billion at December 31, 2017, primarily due to higher cash and lower short-term debt. Included in working capital were cash and cash equivalents of $2.10 billion at December 31, 2018 and $1.34 billion at December 31, 2017.

Liquidity and Capital Resources (continued)

2018

Cash provided by operating activities was $4.54 billion during 2018. Cash provided by income was offset in part by investments in working capital. Increases in accounts receivable and inventories used cash of $366 million and $324 million, respectively, primarily to support growth in sales. Cash payments for income taxes increased to $591 million during 2018, compared with $479 million in 2017. The company made cash contributions to its pension and postretirement benefit plans totaling $93 million during 2018. Payments for restructuring actions, principally severance costs and lease and other expenses of real estate consolidation, used cash of $83 million during 2018.

During 2018, the company's investing activities used $1.25 billion of cash. Acquisitions used cash of $536 million. The company's investing activities also included the purchase of $758 million of property, plant and equipment. On January 28, 2019, the company entered into an agreement to sell its Anatomical Pathology business to PHC Holdings Corporation for approximately $1.14 billion. The sale is subject to customary closing conditions and applicable regulatory approvals.

The company's financing activities used $2.24 billion of cash during 2018. Repayment of senior notes used cash of $2.05 billion. New long-term borrowings provided cash of $690 million. A net decrease in commercial paper obligations used cash of $194 million. The company's financing activities also included the repurchase of $500 million of the company's common stock and the payment of $266 million in cash dividends, offset in part by $136 million of net proceeds from employee stock option exercises. On July 7, 2016, the Board of Directors authorized the repurchase of up to $1.50 billion of the company's common stock. In 2018, the company repurchased $500 million of the company's common stock, depleting the 2016 authorization. On September 7, 2018, the Board of Directors authorized the repurchase of up to $2.00 billion of the company's common stock. In January 2019, the company repurchased $750 million of the company's common stock. At February 27, 2019, authorization remained for $1.25 billion of future repurchases of the company's common stock.

As of December 31, 2018, the company's short-term debt totaled $1.27 billion, including $693 million of commercial paper obligations and $573 million of senior notes due within the next twelve months. The company has a revolving credit facility with a bank group that provides up to $2.50 billion of unsecured multi-currency revolving credit. If the company borrows under this facility, it intends to leave undrawn an amount equivalent to outstanding commercial paper to provide a source of funds in the event that commercial paper markets are not available. As of December 31, 2018, no borrowings were outstanding under the company's revolving credit facility, although available capacity was reduced by approximately $82 million as a result of outstanding letters of credit.

Approximately half of the company's cash balances and cash flows from operations are from outside the U.S. The company uses its non-U.S. cash for needs outside of the U.S. including acquisitions and repayment of acquisition-related intercompany debt to the U.S. In addition, the company also transfers cash to the U.S. using non-taxable returns of capital as well as dividends where the related U.S. dividend received deduction or foreign tax credit equals any tax cost arising from the dividends. As a result of using such means of transferring cash to the U.S., the company does not expect any material adverse liquidity effects from its significant non-U.S. cash balances for the foreseeable future.

The company expects to fund the acquisition of Gatan Inc. with a combination of existing cash balances and short-term borrowings. The company believes that its existing cash and cash equivalents of $2.10 billion as of December 31, 2018 and its future cash flow from operations together with available borrowing capacity under its revolving credit agreement will be sufficient to meet the cash requirements of its existing businesses for the foreseeable future, including at least the next 24 months.

2017

Cash provided by operating activities was $4.01 billion during 2017. An increase in other liabilities provided cash of $1.02 billion primarily due to the Tax Act's one-time transition tax on deemed repatriated earnings and profits of foreign subsidiaries. Given the availability of foreign tax credits, the company does not expect the transition tax to result in significant cash requirements. An increase in accounts payable provided cash of $274 million due to the timing of payments. Increases in accounts receivable and inventories used cash of $362 million and $81 million, respectively, primarily to support growth in sales in local currencies. An increase in other assets used cash of $153 million primarily due to the timing of income tax refunds. Cash payments for income taxes decreased to $479 million

during 2017, compared with $663 million in 2016. The company made cash contributions to its pension and postretirement benefit plans totaling $200 million during 2017. Payments for restructuring actions, principally severance costs and lease and other expenses of real estate consolidation, used cash of $93 million during 2017.

Liquidity and Capital Resources (continued)

During 2017, the company's investing activities used $7.73 billion of cash. Acquisitions used cash of $7.23 billion. The company's investing activities also included the purchase of $508 million of property, plant and equipment.

The company's financing activities provided $3.85 billion of cash during 2017. Issuance of senior notes and borrowings under a term loan provided cash of $6.46 billion. The company also issued 10 million shares of its common stock for net proceeds of $1.69 billion. Repayment of senior notes and term loans used cash of $3.30 billion and a net decrease in commercial paper obligations used cash of $134 million. The company's financing activities also included the repurchase of $750 million of the company's common stock and the payment of $237 million in cash dividends, offset in part by $128 million of net proceeds from employee stock option exercises.

2016

Cash provided by operating activities was $3.26 billion during 2016. An increase in accounts receivable used cash of $352 million primarily to support growth in sales in local currencies and due to the mid-month timing of the acquisition of FEI when receivables are commonly lower than at quarter-end. Inventories provided cash of $98 million due to a reduction associated with fourth quarter 2016 sales. An increase in other assets used cash of $153 million primarily due to the timing of payments. An increase in other liabilities provided cash of $216 million primarily due to the timing of payments for income taxes and incentive compensation. Cash payments for income taxes increased to $663 million during 2016, compared with $477 million in 2015. The company made cash contributions to its pension and postretirement benefit plans totaling $43 million during 2016. Payments for restructuring actions, principally severance costs and lease and other expenses of real estate consolidation, used cash of $122 million during 2016.

During 2016, the company's investing activities used $5.52 billion of cash. Acquisitions used cash of $5.18 billion. The company's investing activities also included the purchase of $444 million of property, plant and equipment.

The company's financing activities provided $2.76 billion of cash during 2016. Issuance of senior notes and borrowings under term loans provided cash of $7.60 billion and an increase in commercial paper obligations provided cash of $904 million. Repayment of senior notes, the 364-day term loan and acquired debt used cash of $4.33 billion. The company's financing activities also included the repurchase of $1.25 billion of the company's common stock and the payment of $238 million in cash dividends, offset in part by $87 million of proceeds from employee stock option exercises.

Off-Balance Sheet Arrangements

The company did not use special purpose entities or other off-balance-sheet financing arrangements in 2016, 2017 or 2018, except for letters of credit, bank guarantees, residual value guarantees under three lease agreements, surety bonds and other guarantees disclosed in the table or discussed below. The amounts disclosed in the table below for letters of credit, bank guarantees, surety bonds and other guarantees relate to guarantees of the company's performance, primarily in the ordinary course of business.

Liquidity and Capital Resources (continued)

Contractual Obligations and Other Commercial Commitments

The table below summarizes, by period due or expiration of commitment, the company's contractual obligations and other commercial commitments as of December 31, 2018.

	Payments due by Period or Expiration of Commitment				
(In millions)	2019	2020 and 2021	2022 and 2023	2024 and Thereafter	Total
Contractual Obligations and Other Commercial Commitments					
Debt principal, including short-term debt (a)	$ 1,268	$ 4,727	$ 3,175	$ 10,004	$ 19,174
Interest	522	915	621	1,990	4,048
Capital lease obligations	3	6	3	—	12
Operating lease obligations	192	276	144	177	789
Unconditional purchase obligations (b)	673	46	21	5	745
Letters of credit and bank guarantees	183	19	13	3	218
Surety bonds and other guarantees	27	1	—	—	28
Pension obligations on balance sheet	43	91	97	274	505
Asset retirement obligations accrued on balance sheet	6	15	11	13	45
Acquisition-related contingent consideration accrued on balance sheet	3	13	5	16	37
	$ 2,920	$ 6,109	$ 4,090	$ 12,482	$ 25,601

(a) Amounts represent the expected cash payments for debt and do not include any deferred issuance costs.

(b) Unconditional purchase obligations include agreements to purchase goods, services or fixed assets that are enforceable and legally binding and that specify all significant terms, including: fixed or minimum quantities to be purchased; fixed, minimum or variable price provisions; and the approximate timing of the transaction. Purchase obligations exclude agreements that are cancelable at any time without penalty.

The contractual obligation at December 31, 2018 to acquire Gatan Inc. for approximately $925 million has been omitted from the above table. The transaction is subject to customary closing conditions, including regulatory approvals.

Reserves for unrecognized tax benefits of $1.44 billion have not been included in the above table due to the inability to predict the timing of tax audit resolutions.

The company has no material commitments for purchases of property, plant and equipment, other than those included in the above table, but expects that for 2019, such expenditures will be between $800 and $850 million.

Guarantees of residual value under lease arrangements for three facilities have not been included in the above table due to the inability to predict if and when the guarantees may require payment (see Note 11). The residual value guarantees become operative at the end of the leases for up to a maximum of $147 million. The initial terms of these leases end in 2019, 2020 and 2023, although renewal options exist for each.

A guarantee of pension plan obligations of a divested business has not been included in the preceding table due to the inability to predict if and when the guarantee may require payment. The purchaser of the divested business has agreed to pay for the pension benefits, however the company was required to guarantee payment of these pension benefits should the purchaser fail to do so. The amount of the guarantee at December 31, 2018 was $38 million.

In disposing of assets or businesses, the company often provides representations, warranties and/or indemnities to cover various risks including, for example, unknown damage to the assets, environmental risks involved in the sale of real estate, liability to investigate and remediate environmental contamination at waste facilities, and unidentified tax liabilities and related legal fees. The company does not have the ability to estimate the potential liability from such indemnities because they relate to unknown conditions. However, the company has no reason to believe that these uncertainties would have a material adverse effect on its financial position, annual results of operations or cash flows.

Liquidity and Capital Resources (continued)

The company has recorded liabilities for known indemnifications included as part of environmental liabilities. See Item 1. Business – Environmental Matters for a discussion of these liabilities.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

The company is exposed to market risk from changes in interest rates and currency exchange rates, which could affect its future results of operations and financial condition. The company manages its exposure to these risks through its regular operating and financing activities. The company has periodically hedged interest rate risks of fixed-rate instruments with offsetting interest rate swaps. Additionally, the company uses short-term forward and option contracts primarily to hedge certain balance sheet and operational exposures resulting from changes in currency exchange rates. Such exposures result from purchases, sales, cash and intercompany loans that are denominated in currencies other than the functional currencies of the respective operations. The currency-exchange contracts principally hedge transactions denominated in euro, British pounds sterling, Swiss franc, Norwegian kroner, Canadian dollars, Japanese yen and Swedish kronor. Income and losses arising from these derivative contracts are recognized as offsets to losses and income resulting from the underlying exposure being hedged. The company does not enter into speculative derivative agreements.

Interest Rates

The company is exposed to changes in interest rates while conducting normal business operations as a result of ongoing investing and financing activities, which affect the company's debt as well as cash and cash equivalents. As of December 31, 2018, the company's debt portfolio was comprised primarily of fixed rate borrowings. The fair market value of the company's fixed interest rate debt is subject to interest rate risk. Generally, the fair market value of fixed interest rate debt will increase as interest rates fall and decrease as interest rates rise. The total estimated fair value of the company's debt at December 31, 2018 was $19.04 billion (see Note 13). Fair values were determined from available market prices using current interest rates and terms to maturity. If interest rates were to decrease by 100 basis points, the fair value of the company's debt at December 31, 2018 would increase by approximately $1.06 billion. If interest rates were to increase by 100 basis points, the fair value of the company's debt at December 31, 2018 would decrease by approximately $0.98 billion.

In addition, interest rate changes would result in a change in the company's interest expense due to variable-rate debt instruments including swap arrangements. In 2018, a 100 basis point increase in interest rates on the swap arrangements and variable-rate debt would have increased the company's annual pre-tax interest expense by approximately $43 million.

Currency Exchange Rates

The company views its investment in international subsidiaries with a functional currency other than the U.S. dollar as permanent. The company's investment in international subsidiaries is sensitive to fluctuations in currency exchange rates. The functional currencies of the company's international subsidiaries are principally denominated in British pounds sterling, Swedish kronor, euro, Canadian dollars, Swiss franc, Norwegian kroner and Danish kroner. The effect of a change in the period ending currency exchange rates on the company's net investment in international subsidiaries is reflected in the "accumulated other comprehensive items" component of shareholders' equity. The company also uses foreign currency-denominated debt to partially hedge its net investments in foreign operations against adverse movements in exchange rates. A 10% depreciation in year-end 2018 functional currencies, relative to the U.S. dollar, would result in a reduction of shareholders' equity of $0.84 billion.

The fair value of forward currency-exchange contracts is sensitive to changes in currency exchange rates. The fair value of forward currency-exchange contracts is the estimated amount that the company would pay or receive upon termination of the contract, taking into account the change in currency exchange rates. A 10% depreciation in year-end 2018 non-functional currency exchange rates related to the company's contracts would result in an additional unrealized loss on forward currency-exchange contracts of $145 million. A 10% appreciation in year-end 2018 non-functional currency exchange rates related to the company's contracts would result in an unrealized gain on forward currency-exchange contracts of $138 million. The unrealized gains or losses on forward currency-exchange

contracts resulting from changes in currency exchange rates are expected to approximately offset losses or gains on the exposures being hedged.

Certain of the company's cash and cash equivalents are denominated in currencies other than the functional currency of the depositor and are sensitive to changes in currency exchange rates. A 10% depreciation in the related year-end 2018 non-functional currency exchange rates applied to such cash balances would result in a negative impact of $25 million on the company's net income.

Item 8. Financial Statements and Supplementary Data

This data is submitted as a separate section to this report. See Item 15 "Exhibits and Financial Statement Schedules."

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

Not applicable.

Item 9A. Controls and Procedures

Management's Evaluation of Disclosure Controls and Procedures

The company's management, with the participation of the company's chief executive officer and chief financial officer, has evaluated the effectiveness of the company's disclosure controls and procedures (as such term is defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act) as of the end of the period covered by this report. Based on such evaluation, the company's chief executive officer and chief financial officer concluded that, as of the end of such period, the company's disclosure controls and procedures were effective at the reasonable assurance level.

Changes in Internal Control over Financial Reporting

There have been no changes in the company's internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) during the fiscal quarter ended December 31, 2018, that have materially affected or are reasonably likely to materially affect the company's internal control over financial reporting.

Management's Annual Report on Internal Control Over Financial Reporting

The company's management, including the company's chief executive officer and chief financial officer, is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the company. Internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. The company's management conducted an assessment of the effectiveness of the company's internal control over financial reporting as of December 31, 2018 based on criteria established in "Internal Control - Integrated Framework" (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on this assessment, the company's management concluded that, as of December 31, 2018, the company's internal control over financial reporting was effective.

The company's independent registered public accounting firm, PricewaterhouseCoopers LLP, has audited the effectiveness of the company's internal control over financial reporting as of December 31, 2018, as stated in their report that appears on page F-2 of this Annual Report on Form 10-K.

Item 9B. Other Information

Not applicable.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

The information with respect to directors required by this Item will be contained in our definitive proxy statement to be filed with the SEC not later than 120 days after the close of business of the fiscal year (2019 Definitive Proxy Statement) and is incorporated in this report by reference.

The information with respect to executive officers required by this Item is included in Item 1 of Part I of this report.

The other information required by this Item will be contained in our 2019 Definitive Proxy Statement and is incorporated in this report by reference.

Item 11. Executive Compensation

The information required by this Item will be contained in our 2019 Definitive Proxy Statement and is incorporated in this report by reference.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

The information required by this Item will be contained in our 2019 Definitive Proxy Statement and is incorporated in this report by reference.

Item 13. Certain Relationships and Related Transactions, and Director Independence

The information required by this Item will be contained in our 2019 Definitive Proxy Statement and is incorporated in this report by reference.

Item 14. Principal Accountant Fees and Services

The information required by this Item will be contained in our 2019 Definitive Proxy Statement and is incorporated in this report by reference.

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a) The following documents are filed as part of this report:

(1) Consolidated Financial Statements (see Index on page F-1 of this report)

(2) All schedules are omitted because they are not applicable or not required, or because the required information is included either in the consolidated financial statements or in the notes thereto.

(b) Exhibits

See the Exhibit Index on page 44.

Item 16. Form 10-K Summary

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this Report to be signed on its behalf by the undersigned, thereunto duly authorized.

Date: February 27, 2019

THERMO FISHER SCIENTIFIC INC.

By: /s/ Marc N. Casper
Marc N. Casper
President and Chief Executive Officer

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the Registrant and in the capacities indicated, as of February 27, 2019.

By: /s/ Marc N. Casper
Marc N. Casper
President, Chief Executive Officer and Director
(Principal Executive Officer)

By: /s/ Judy C. Lewent
Judy C. Lewent
Director

By: /s/ Jim P. Manzi
Jim P. Manzi
Chairman of the Board and Director

By: /s/ Thomas J. Lynch
Thomas J. Lynch
Director

By: /s/ Stephen Williamson
Stephen Williamson
Senior Vice President and Chief Financial Officer
(Principal Financial Officer)

By: /s/ James C. Mullen
James C. Mullen
Director

By: /s/ Peter E. Hornstra
Peter E. Hornstra
Vice President and Chief Accounting Officer
(Principal Accounting Officer)

By: /s/ Lars R. Sørensen
Lars R. Sørensen
Director

By: /s/ Nelson J. Chai
Nelson J. Chai
Director

By: /s/ Scott M. Sperling
Scott M. Sperling
Director

By: /s/ C. Martin Harris
C. Martin Harris
Director

By: /s/ Elaine S. Ullian
Elaine S. Ullian
Director

By: /s/ Tyler E. Jacks
Tyler E. Jacks
Director

By: /s/ Dion J. Weisler
Dion J. Weisler
Director

THERMO FISHER SCIENTIFIC INC.

EXHIBIT INDEX

Exhibit Number	Description of Exhibit
2.1	Purchase Agreement, dated as of May 15, 2017, by and between Thermo Fisher Scientific Inc., Thermo Fisher (CN) Luxembourg S.à r.l. and Patheon N.V. (filed as Exhibit 99.(D)(1) to the Registrant's Tender Offer Statement on Schedule TO-T filed May 31, 2017 and incorporated in this document by reference).
3.1	Amended and Restated Certificate of Incorporation of the Registrant (filed as Exhibit 3.1 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2005 [File No. 1-8002] and incorporated in this document by reference).
3.2	Amendment to Thermo Fisher Scientific Inc.'s Third Amended and Restated Certificate of Incorporation (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed November 14, 2006 [File No. 1-8002] and incorporated in this document by reference).
3.3	Certificate of Elimination of the Series B Junior Participating Preferred Stock of the Company, dated November 13, 2015 (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed November 16, 2015 [File No. 1-8002] and incorporated in this document by reference).
3.4	By-Laws of the Registrant, as amended and effective as of March 1, 2017 (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed March 2, 2017 [File No. 1-8002] and incorporated in this document by reference).
	The Registrant agrees, pursuant to Item 601(b)(4)(iii)(A) of Regulation S-K, to furnish to the Commission, upon request, a copy of each instrument with respect to long-term debt of the Registrant or its consolidated subsidiaries.
4.1	Indenture dated as of November 20, 2009 between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 99.1 to the Registrant's Current Report on Form 8-K filed November 20, 2009 [File No. 1-8002] and incorporated in this document by reference).
4.2	Second Supplemental Indenture dated as of April 27, 2010 between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 99.2 to the Registrant's Current Report on Form 8-K filed April 27, 2010 [File No. 1-8002] and incorporated in this document by reference).
4.3	Third Supplemental Indenture dated as of February 22, 2011 between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 99.2 to the Registrant's Current Report on Form 8-K filed February 22, 2011 [File No. 1-8002] and incorporated in this document by reference).
4.4	Fourth Supplemental Indenture dated as of August 16, 2011 between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 99.2 to the Registrant's Current Report on Form 8-K filed August 16, 2011 [File No. 1-8002] and incorporated in this document by reference).
4.5	Fifth Supplemental Indenture dated as of August 22, 2012 between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 99.2 to the Registrant's Current Report on Form 8-K filed August 22, 2012 [File No. 1-8002] and incorporated in this document by reference).
4.6	Sixth Supplemental Indenture, dated as of December 11, 2013, between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 99.2 to the Registrant's Current Report on Form 8-K filed December 11, 2013 [File No. 1-8002] and incorporated in this document by reference).
4.7	Seventh Supplemental Indenture, dated as of November 14, 2014, between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 99.2 to the Registrant's Current Report on Form 8-K filed November 14, 2014 [File No. 1-8002] and incorporated in this document by reference).
4.8	Eighth Supplemental Indenture, dated as of November 24, 2014, among the Company, The Bank of New York Mellon Trust Company, N.A., as trustee, and The Bank of New York Mellon, London Branch, as paying agent (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed November 24, 2014 [File No. 1-8002] and incorporated in this document by reference).
4.9	Ninth Supplemental Indenture, dated as of July 21, 2015, among the Company, The Bank of New York Mellon Trust Company, N.A., as trustee, and The Bank of New York Mellon, London Branch, as paying agent (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed July 21, 2015 [File No. 1-8002] and incorporated in this document by reference).
4.10	Tenth Supplemental Indenture, dated as of November 24, 2015, among the Company, The Bank of New York Mellon Trust Company, N.A., as trustee, and The Bank of New York Mellon, London Branch, as paying agent (filed

	as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed November 24, 2015 [File No. 1-8002] and incorporated in this document by reference).
4.11	Eleventh Supplemental Indenture, dated as of December 9, 2015, between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed December 9, 2015 [File No. 1-8002] and incorporated in this document by reference).
4.12	Twelfth Supplemental Indenture, dated as of April 13, 2016, between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed April 13, 2016 [File No. 1-8002] and incorporated in this document by reference).
4.13	Thirteenth Supplemental Indenture, dated as of September 12, 2016, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed September 12, 2016 [File No. 1-8002] and incorporated in this document by reference).
4.14	Fourteenth Supplemental Indenture, dated as of September 19, 2016, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed September 19, 2016 [File No. 1-8002] and incorporated in this document by reference).

THERMO FISHER SCIENTIFIC INC.

EXHIBIT INDEX

Exhibit Number	Description of Exhibit
4.15	Fifteenth Supplemental Indenture, dated as of March 16, 2017, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed March 16, 2017 [File No. 1-8002] and incorporated in this document by reference).
4.16	Sixteenth Supplemental Indenture, dated as of July 24, 2017, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed July 24, 2017 [File No. 1-8002] and incorporated in this document by reference).
4.17	Seventeenth Supplemental Indenture, dated as of August 14, 2017, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed August 14, 2017 [File No. 1-8002] and incorporated in this document by reference).
4.18	Indenture, dated as of August 9, 2016, among Thermo Fisher Scientific (Finance I) B.V., as issuer, the Company, as guarantor, and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.1 to the Registrant's Current Report on Form 8-K filed August 9, 2016 [File No. 1-8002] and incorporated in this document by reference).
4.19	First Supplemental Indenture, dated as of August 9, 2016, among Thermo Fisher Scientific (Finance I) B.V., as issuer, the Company, as guarantor, and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed August 9, 2016 [File No. 1-8002] and incorporated in this document by reference).
4.20	Second Supplemental Indenture, dated as of August 8, 2018, among Thermo Fisher Scientific (Finance I) B.V., as issuer, the Company, as guarantor, and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed August 8, 2018 [File No. 1-8002] and incorporated in this document by reference).
4.21	Indenture between Life Technologies and U.S. Bank National Association., as trustee, dated as of February 19, 2010 (filed as Exhibit 4.1 to Life Technologies Corporation's Current Report on Form 8-K, filed on February 19, 2010 [File No. 000-25317] and incorporated in this document by reference).
4.22	First Supplemental Indenture between Life Technologies and U.S. Bank National Association., as trustee, dated as of February 19, 2010, including the forms of the Life Technologies 3.375% Senior Notes due 2013, 4.400% Senior Notes due 2015 and 6.000% Senior Notes due 2020 (filed as Exhibit 4.2 to Life Technologies Corporation's Current Report on Form 8-K filed February 19, 2010 [File No. 000-25317] and incorporated in this document by reference).
4.23	Second Supplemental Indenture between Life Technologies and U.S. Bank National Association., as trustee, dated as of December 14, 2010, including the forms of the Life Technologies 3.50% Senior Notes due 2016 and 5.00% Senior Notes due 2021 (filed as Exhibit 4.2 to Life Technologies Corporation's Current Report on Form 8-K filed December 14, 2010 [File No. 000-25317] and incorporated in this document by reference).
10.1	Thermo Fisher Scientific Inc. Deferred Compensation Plan for Directors of the Registrant, as amended and restated on September 12, 2007 (filed as Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 29, 2007 [File No. 1-8002] and incorporated in this document by reference).*
10.2	Thermo Electron Corporation Deferred Compensation Plan, effective November 1, 2001 (filed as Exhibit 10.13 to the Registrant's Annual Report on Form 10-K for the fiscal year ended December 29, 2001 [File No. 1-8002] and incorporated in this document by reference).*
10.3	Form of Amended and Restated Indemnification Agreement between the Registrant and its directors and officers (filed as Exhibit 10.2 to the Registrant's Registration Statement on Form S-4 [Reg. No. 333-90661] and incorporated in this document by reference).*
10.4	Executive Registry Program at the Massachusetts General Hospital (filed as Exhibit 10.74 to the Registrant's Annual Report on Form 10-K for the fiscal year ended December 28, 2002 [File No. 1-8002] and incorporated in this document by reference).*
10.5	Thermo Fisher Scientific Inc. Executive Severance Policy (filed as Exhibit 10.2 to the Registrant's Current Report on Form 8-K filed May 19, 2008 [File No. 1-8002] and incorporated in this document by reference).*
10.6	

	Summary of Thermo Fisher Scientific Inc. Annual Director Compensation (filed as Exhibit 10.7 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2016 [File No. 1-8002] and incorporated in this document by reference).*
10.7	Summary of 2018 Annual Cash Incentive Plan Matters (set forth in Item 5.02 to the Registrant's Current Report on Form 8-K filed March 1, 2018 [File No.1-8002] under the heading "Compensatory Arrangements of Certain Officers" and incorporated in this document by reference).*
10.8	Form of Noncompetition Agreement between the Registrant and certain key employees and executive officers (filed as Exhibit 10.25 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.9	Retirement Plan for Non-Employee Directors of Fisher Scientific International Inc. (filed as Exhibit 10.12 to Fisher Scientific International Inc.'s Annual Report on Form 10-K for the year ended December 31, 1992 [File No. 1-10920] and incorporated in this document by reference).*
10.10	First Amendment to the Fisher Scientific International Inc. Retirement Plan for Non-Employee Directors (filed as Exhibit 10.04 to Fisher Scientific International Inc.'s Quarterly Report on Form 10-Q for the quarter ended March 31, 2005 [File No. 1-10920] and incorporated in this document by reference).*

THERMO FISHER SCIENTIFIC INC.

EXHIBIT INDEX

Exhibit Number	Description of Exhibit
10.11	Amendment to Retirement Plan for Non-Employee Directors of Fisher Scientific International Inc. (filed as Exhibit 10.02 to Fisher Scientific International Inc.'s Current Report on Form 8-K filed March 7, 2006 [File No. 1-10920] and incorporated in this document by reference).*
10.12	Thermo Fisher Scientific Inc. Amended and Restated 2005 Deferred Compensation Plan, effective January 1, 2009 (filed as Exhibit 10.43 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2008 [File No. 1-8002] and incorporated in this document by reference).*
10.13	Thermo Fisher Scientific Inc. 2008 Stock Incentive Plan (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed May 22, 2008 [File No. 1-8002] and incorporated in this document by reference).*
10.14	Amendment No. 1 to Thermo Fisher Scientific Inc. Amended and Restated 2005 Deferred Compensation Plan (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 27, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.15	2009 Restatement of Executive Severance Agreement, between Marc Casper and the Registrant, dated November 21, 2009 (filed as Exhibit 10.5 to the Registrant's Current Report on Form 8-K filed November 25, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.16	Executive Change In Control Retention Agreement, between Marc Casper and the Registrant, dated November 21, 2009 (filed as Exhibit 10.6 to the Registrant's Current Report on Form 8-K filed November 25, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.17	Noncompetition Agreement, between Marc Casper and the Registrant, dated November 21, 2009 (filed as Exhibit 10.7 to the Registrant's Current Report on Form 8-K filed November 25, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.18	Amendment No. 1 to Executive Severance Policy, dated February 25, 2010 (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed February 25, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.19	Amendment No. 1 to 2009 Restatement of Executive Severance Agreement, dated February 25, 2010, between the Registrant and Marc N. Casper (filed as Exhibit 10.2 to the Registrant's Current Report on Form 8-K filed February 25, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.20	Amendment No. 2 to Executive Severance Policy, dated November 10, 2010 (filed as Exhibit 10.54 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.21	Amendment No. 2 to 2009 Restatement of Executive Severance Agreement, dated November 10, 2010, between the Registrant and Marc N. Casper (filed as Exhibit 10.55 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.22	Amendment No. 1 to Executive Change In Control Retention Agreement, dated November 10, 2010, between Marc N. Casper and the Registrant (filed as Exhibit 10.56 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.23	Amendment No. 2 to Executive Change in Control Retention Agreement, dated March 16, 2018, between Marc N. Casper and the Registrant (filed as Exhibit 10.3 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 31, 2018 [File No. 1-8002] and incorporated in this document by reference).*
10.24	Form of Executive Change in Control Retention Agreement for Officers (other than Marc Casper) (filed as Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 31, 2018 [File No. 1-8002] and incorporated in this document by reference).*
10.25	Amendment to 2008 Stock Incentive Plan dated November 10, 2010 (filed as Exhibit 10.57 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.26	Form of Thermo Fisher Scientific Inc.'s Restricted Stock Unit Agreement for Directors (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended April 2, 2011 [File No. 1-8002] and incorporated in this document by reference).*

10.27	Form of Thermo Fisher Scientific Inc.'s Performance Restricted Stock Unit Agreement (filed as Exhibit 10.4 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.28	Form of Thermo Fisher Scientific Inc.'s Restricted Stock Unit Agreement (filed as Exhibit 10.2 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.29	Form of Thermo Fisher Scientific Inc.'s Stock Option Agreement (filed as Exhibit 10.6 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.30	Form of Performance Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc Casper (filed as Exhibit 10.3 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.31	Form of Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc Casper (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.32	Form of Stock Option Agreement between Thermo Fisher Scientific Inc. and Marc Casper (filed as Exhibit 10.5 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*

THERMO FISHER SCIENTIFIC INC.

EXHIBIT INDEX

Exhibit Number	Description of Exhibit
10.33	Thermo Fisher Scientific Inc. 2013 Stock Incentive Plan (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed May 23, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.34	Supplemental Executive Retirement Plan effective as of December 31, 2005, as amended and restated as of August 28, 2006 (filed as Exhibit 10.3 to Applera Corporation's Quarterly Report on Form 10-Q for the quarter ended September 30, 2006 [File No. 1-04389] and incorporated in this document by reference).*
10.35	Amendment to Supplemental Executive Retirement Plan, effective as of January 1, 2010 (filed as Exhibit 10.1 to Life Technologies Corporation's Current Report on Form 8-K filed December 18, 2009 [File No. 000-25317] and incorporated in this document by reference).*
10.36	Noncompetition Agreement between the Registrant and Mark Stevenson, dated September 10, 2015 (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 26, 2015 [File No. 1-8002] and incorporated in this document by reference).*
10.37	Form of Thermo Fisher Scientific Inc.'s Stock Option Agreement for Officers (filed as Exhibit 10.44 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2016 [File No. 1-8002] and incorporated in this document by reference).*
10.38	Patheon N.V. 2016 Omnibus Incentive Plan (filed as Exhibit 10.2 to the Current Report on Form 8-K filed by Patheon N.V. on July 26, 2016 [File No. 001-37837] and incorporated in this document by reference).*
10.39	Amendment to Patheon N.V. 2016 Omnibus Incentive Plan, dated March 7, 2017 (filed as exhibit 4.5 to the Registrant's Registration Statement on Form S-8 filed August 29, 2017 [File No. 1-8002] and incorporated in this document by reference).*
10.40	Amendment to Patheon N.V. 2016 Omnibus Incentive Plan, dated August 23, 2017 (filed as exhibit 4.6 to the Registrant's Registration Statement on Form S-8 filed August 29, 2017 [File No. 1-8002] and incorporated in this document by reference).*
10.41	Credit Agreement, dated July 1, 2016, among the Company, certain Subsidiaries of the Company from time to time party thereto, each lender from time to time party thereto, and Bank of America, N.A. (filed as Exhibit 10.3 to the Registrant's Current Report on Form 8-K filed July 1, 2016 [File No. 1-8002] and incorporated in this document by reference).
21	Subsidiaries of the Registrant.
23.1	Consent of PricewaterhouseCoopers LLP, an Independent Registered Public Accounting Firm.
31.1	Certification of Chief Executive Officer required by Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification of Chief Financial Officer required by Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1	Certification of Chief Executive Officer required by Exchange Act Rules 13a-14(b) and 15d-14(b), as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.**
32.2	Certification of Chief Financial Officer required by Exchange Act Rules 13a-14(b) and 15d-14(b), as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.**
101.INS	XBRL Instance Document.
101.SCH	XBRL Taxonomy Extension Schema Document.
101.CAL	XBRL Taxonomy Calculation Linkbase Document.
101.DEF	XBRL Taxonomy Definition Linkbase Document.
101.LAB	XBRL Taxonomy Label Linkbase Document.
101.PRE	XBRL Taxonomy Presentation Linkbase Document.

*Indicates management contract or compensatory plan, contract or arrangement.

** Certification is not deemed "filed" for purposes of Section 18 of the Exchange Act or otherwise subject to the liability of that section. Such certification is not deemed to be incorporated by reference into any filing under the Securities Act or the Exchange Act except to the extent that the registrant specifically incorporates it by reference.

Attached as Exhibit 101 to this report are the following formatted in XBRL (Extensible Business Reporting Language): (i) Consolidated Balance Sheet at December 31, 2018, and 2017, (ii) Consolidated Statement of Income for the years ended December 31, 2018, 2017 and 2016, (iii) Consolidated Statement of Comprehensive Income for the years ended December 31, 2018, 2017 and 2016 (iv) Consolidated Statement of Cash Flows for the years ended December 31, 2018, 2017 and 2016, (v) Consolidated Statement of Shareholders' Equity for the years ended December 31, 2018, 2017 and 2016 and (vi) Notes to Consolidated Financial Statements.

THERMO FISHER SCIENTIFIC INC.

INDEX OF CONSOLIDATED FINANCIAL STATEMENTS AND SCHEDULE

The following Consolidated Financial Statements of the Registrant and its subsidiaries are required to be included in Item 15:

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Shareholders of Thermo Fisher Scientific Inc.

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Thermo Fisher Scientific Inc. and its subsidiaries (the "Company") as of December 31, 2018 and December 31, 2017, and the related consolidated statements of income, comprehensive income, shareholders' equity and cash flows for each of the three years in the period ended December 31, 2018, including the related notes (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 2018, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and December 31, 2017, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2018 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2018, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the COSO.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in Management's Annual Report on Internal Control Over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ PricewaterhouseCoopers LLP
Boston, Massachusetts
February 27, 2019

We have served as the Company's auditor since 2002.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED BALANCE SHEET

(In millions except share and per share amounts)	December 31, 2018	December 31, 2017
Assets		
Current Assets:		
Cash and cash equivalents	$ 2,103	$ 1,335
Accounts receivable, less allowances of $117 and $109	4,136	3,879
Inventories	3,005	2,971
Other current assets	1,381	1,236
Total current assets	10,625	9,421
Property, Plant and Equipment, Net	4,165	4,047
Acquisition-related Intangible Assets, Net	14,978	16,684
Other Assets	1,117	1,227
Goodwill	25,347	25,290
Total Assets	$ 56,232	$ 56,669
Liabilities and Shareholders' Equity		
Current Liabilities:		
Short-term obligations and current maturities of long-term obligations	$ 1,271	$ 2,135
Accounts payable	1,615	1,428
Accrued payroll and employee benefits	982	918
Contract liabilities	809	—
Deferred revenue	—	719
Other accrued expenses	1,470	1,848
Total current liabilities	6,147	7,048
Deferred Income Taxes	2,265	2,766
Other Long-term Liabilities	2,515	2,569
Long-term Obligations	17,719	18,873
Commitments and Contingencies (Note 11)		
Shareholders' Equity:		
Preferred stock, $100 par value, 50,000 shares authorized; none issued		
Common stock, $1 par value, 1,200,000,000 shares authorized; 431,566,561 and 428,327,873 shares issued	432	428
Capital in excess of par value	14,621	14,177
Retained earnings	18,696	15,914
Treasury stock at cost, 29,444,882 and 27,013,311 shares	(3,665)	(3,103)
Accumulated other comprehensive items	(2,498)	(2,003)
Total shareholders' equity	27,586	25,413

Total Liabilities and Shareholders' Equity	$ 56,232	$ 56,669

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF INCOME

(In millions except per share amounts)	Year Ended December 31, 2018	December 31, 2017	December 31, 2016
Revenues			
Product revenues	$ 18,868	$ 17,374	$ 15,712
Service revenues	5,490	3,544	2,562
Total revenues	24,358	20,918	18,274
Costs and Operating Expenses:			
Cost of product revenues	9,682	8,975	8,212
Cost of service revenues	3,819	2,495	1,690
Selling, general and administrative expenses	6,057	5,504	4,971
Research and development expenses	967	887	754
Restructuring and other costs, net	50	97	189
Total costs and operating expenses	20,575	17,958	15,816
Operating Income	3,783	2,960	2,458
Other Expense, Net	(521)	(531)	(434)
Income from Continuing Operations Before Income Taxes	3,262	2,429	2,024
(Provision for) Benefit from Income Taxes	(324)	(201)	1
Income from Continuing Operations	2,938	2,228	2,025
Loss from Discontinued Operations (net of income tax benefit of $0, $2 and $2)	—	(3)	(3)
Net Income	$ 2,938	$ 2,225	$ 2,022
Earnings per Share from Continuing Operations			
Basic	$ 7.31	$ 5.65	$ 5.13
Diluted	$ 7.24	$ 5.60	$ 5.10
Earnings per Share			
Basic	$ 7.31	$ 5.64	$ 5.12
Diluted	$ 7.24	$ 5.59	$ 5.09
Weighted Average Shares			
Basic	402	395	395
Diluted	406	398	397

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF COMPREHENSIVE INCOME

(In millions)	Year Ended December 31, 2018	December 31, 2017	December 31, 2016
Comprehensive Income			
Net Income	$ 2,938	$ 2,225	$ 2,022
Other Comprehensive Items:			
Currency translation adjustment (net of tax provision (benefit) of $84, ($145) and $0)	(434)	588	(566)
Unrealized gains and losses on available-for-sale investments:			
Unrealized holding losses arising during the period (net of tax benefit of $0, $0 and $0)	—	(1)	(2)
Reclassification adjustment for (gains) losses included in net income (net of tax (provision) benefit of $0, ($1) and $0)	—	(1)	1
Unrealized gains and losses on hedging instruments:			
Unrealized losses on hedging instruments (net of tax benefit of $0, $0 and $22)	—	—	(37)
Reclassification adjustment for losses included in net income (net of tax benefit of $3, $5 and $4)	9	7	6
Pension and other postretirement benefit liability adjustments:			
Pension and other postretirement benefit liability adjustments arising during the period (net of tax provision (benefit) of $2, $7 and ($17))	3	23	(47)
Amortization of net loss and prior service benefit included in net periodic pension cost (net of tax benefit of $5, $5 and $2)	15	17	6
Total other comprehensive items	(407)	633	(639)
Comprehensive Income	$ 2,531	$ 2,858	$ 1,383

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF CASH FLOWS

(In millions)	Year Ended December 31, 2018	December 31, 2017	December 31, 2016
Operating Activities			
Net income	$ 2,938	$ 2,225	$ 2,022
Loss from discontinued operations	—	3	3
Income from continuing operations	2,938	2,228	2,025
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization	2,267	2,033	1,758
Change in deferred income taxes	(379)	(1,098)	(620)
Non-cash stock-based compensation	181	159	133
Other non-cash expenses, net	106	190	142
Changes in assets and liabilities, excluding the effects of acquisitions:			
Accounts receivable	(366)	(362)	(352)
Inventories	(324)	(81)	98
Other assets	54	(153)	(153)
Accounts payable	201	274	56
Other liabilities	(42)	1,016	216
Contributions to retirement plans	(93)	(200)	(43)
Net cash provided by continuing operations	4,543	4,006	3,260
Net cash used in discontinued operations	—	(1)	(2)
Net cash provided by operating activities	4,543	4,005	3,258
Investing Activities			
Acquisitions, net of cash acquired	(536)	(7,226)	(5,178)
Purchase of property, plant and equipment	(758)	(508)	(444)
Proceeds from sale of property, plant and equipment	50	7	26
Other investing activities, net	(9)	(2)	76
Net cash used in investing activities	(1,253)	(7,729)	(5,520)
Financing Activities			
Net proceeds from issuance of debt	690	6,459	7,604
Repayment of debt	(2,052)	(3,299)	(4,334)
Proceeds from issuance of commercial paper	5,060	8,380	9,182
Repayments of commercial paper	(5,254)	(8,514)	(8,278)
Purchases of company common stock	(500)	(750)	(1,250)
Dividends paid	(266)	(237)	(238)
Net proceeds from issuance of company common stock	—	1,690	—
Net proceeds from issuance of company common stock under employee stock plans	136	128	87

Other financing activities	(51)	(3)	(14)
Net cash (used in) provided by financing activities	(2,237)	3,854	2,759
Exchange Rate Effect on Cash	(297)	420	(152)
Increase in Cash, Cash Equivalents and Restricted Cash	756	550	345
Cash, Cash Equivalents and Restricted Cash at Beginning of Period	1,361	811	466
Cash, Cash Equivalents and Restricted Cash at End of Period	$ 2,117	$ 1,361	$ 811

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF SHAREHOLDERS' EQUITY

(In millions)	Common Stock Shares	Common Stock Amount	Capital in Excess of Par Value	Retained Earnings	Treasury Stock Shares	Treasury Stock Amount	Accumulated Other Comprehensive Items	Total Shareholders' Equity
Balance at December 31, 2015	412	$ 412	$ 11,801	$ 12,142	12	$ (1,008)	$ (1,997)	$ 21,350
Issuance of shares under employees' and directors' stock plans	3	3	153	—	1	(48)	—	108
Stock-based compensation	—	—	133	—	—	—	—	133
Tax benefit related to employees' and directors' stock plans	—	—	53	—	—	—	—	53
Purchases of company common stock	—	—	—	—	9	(1,250)	—	(1,250)
Dividends declared ($0.60 per share)	—	—	—	(237)	—	—	—	(237)
Net income	—	—	—	2,022	—	—	—	2,022
Other comprehensive items	—	—	—	—	—	—	(639)	(639)
Balance at December 31, 2016	415	415	12,140	13,927	22	(2,306)	(2,636)	21,540
Issuance of shares under employees' and directors' stock plans	3	3	196	—	—	(47)	—	152
Issuance of shares	10	10	1,680	—	—	—	—	1,690
Stock-based compensation	—	—	159	—	—	—	—	159
Purchases of company common stock	—	—	—	—	5	(750)	—	(750)
Dividends declared ($0.60 per share)	—	—	—	(238)	—	—	—	(238)
Net income	—	—	—	2,225	—	—	—	2,225
Other comprehensive items	—	—	—	—	—	—	633	633
Other	—	—	2	—	—	—	—	2
Balance at December 31, 2017	428	428	14,177	15,914	27	(3,103)	(2,003)	25,413
Cumulative effect of accounting changes	—	—	—	118	—	—	(88)	30
Issuance of shares under employees' and directors' stock plans	4	4	236	—	—	(62)	—	178
Stock-based compensation	—	—	181	—	—	—	—	181
Purchases of company common stock	—	—	—	—	2	(500)	—	(500)
Dividends declared ($0.68 per share)	—	—	—	(274)	—	—	—	(274)
Net income	—	—	—	2,938	—	—	—	2,938
Other comprehensive items	—	—	—	—	—	—	(407)	(407)
Other	—	—	27	—	—	—	—	27
Balance at December 31, 2018	432	$ 432	$ 14,621	$ 18,696	29	$ (3,665)	$ (2,498)	$ 27,586

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Note 1. Nature of Operations and Summary of Significant Accounting Policies

Nature of Operations

Thermo Fisher Scientific Inc. (the company or Thermo Fisher) enables customers to make the world healthier, cleaner and safer by helping them accelerate life sciences research, solve complex analytical challenges, improve patient diagnostics, deliver medicines to market and increase laboratory productivity. Markets served include pharmaceutical and biotech, academic and government, industrial and applied, as well as healthcare and diagnostics.

Principles of Consolidation

The accompanying financial statements include the accounts of the company and its wholly and majority-owned subsidiaries. All material intercompany accounts and transactions have been eliminated. The company accounts for investments in businesses using the equity method when it has significant influence but not control (generally between 20% and 50% ownership) and is not the primary beneficiary.

Presentation

Certain reclassifications of prior year amounts have been made to conform to the current year presentation.

Revenue Recognition

Prior to 2018, the company recognized revenue after all significant obligations had been met, collectability was probable and title had passed, which typically occurred upon shipment, delivery, completion of services, or ratably over the contract period. Beginning in 2018, the company recognizes revenue for the transfer of promised goods or services to customers in an amount that reflects the consideration to which the company expects to be entitled in exchange for those goods or services. See recent accounting pronouncements below for a discussion of the change in revenue recognition accounting that became effective in 2018.

Consumables revenues consist of single-use products and are recognized at a point in time following the transfer of control of such products to the customer, which generally occurs upon shipment. Instruments revenues typically consist of longer-lived assets that, for the substantial majority of sales, are recognized at a point in time in a manner similar to consumables. Service revenues (clinical trial logistics, pharmaceutical development and manufacturing services, asset management, diagnostic testing, training, service contracts, and field services including related time and materials) are recognized over time as customers receive and consume the benefits of such services. For revenues recognized over time, the company generally uses costs accumulated as inputs to measure progress. For contracts that contain multiple performance obligations, the company allocates the consideration to which it expects to be entitled to each performance obligation based on relative standalone selling prices and recognizes the related revenue when or as control of each individual performance obligation is transferred to customers. The company exercises judgment in determining the timing of revenue by analyzing the point in time or the period over which the customer has the ability to direct the use of and obtain substantially all of the remaining benefits of the asset. The company immediately expenses contract costs that would otherwise be capitalized and amortized over a period of less than one year.

Payments from customers for most instruments, consumables and services are typically due in a fixed number of days after shipment or delivery of the product. Service arrangements commonly call for payments in advance of performing the work (e.g. extended service contracts), upon completion of the service (e.g. pharmaceutical development and manufacturing) or a mix of both.

See Note 3 for revenue disaggregated by type and by geographic region as well as further information about remaining performance obligations.

Contract-related Balances

Accounts receivable include amounts that have been billed and are currently due from customers. They are recorded at the invoiced amount and do not bear interest. The company maintains allowances for doubtful accounts for estimated losses resulting from the inability of its customers to pay amounts due. The allowance for doubtful accounts is the company’s best estimate of the amount of probable credit losses in existing accounts receivable. The

company determines the allowance based on the age of the receivable, the creditworthiness of the customer and any other information that is relevant to the judgment. Account balances are charged off against the allowance when the company believes it is probable the receivable will not be recovered. The company does not have any off-balance-sheet credit exposure related to customers.

The changes in the allowance for doubtful accounts are as follows:

	Year Ended December 31,		
(In millions)	2018	2017	2016
Beginning Balance	$ 109	$ 77	$ 70
Provision charged to expense	18	32	16
Accounts written off	(12)	(10)	(9)
Acquisitions, currency translation and other	2	10	—
Ending Balance	$ 117	$ 109	$ 77

Contract assets include revenues recognized in advance of billings and are recorded net of estimated losses resulting from the inability to invoice customers. Contract assets are classified as current or noncurrent based on the amount of time expected to lapse until the company's right to consideration becomes unconditional. Current contract assets and noncurrent contract assets are included within other current assets and other assets, respectively, in the accompanying balance sheet.

Contract liabilities include billings in excess of revenues recognized, such as those resulting from customer advances and deposits and unearned revenue on service contracts. Contract liabilities are classified as current or noncurrent based on the periods over which remaining performance obligations are expected to be transferred to customers. Noncurrent contract liabilities are included within other long-term liabilities in the accompanying balance sheet.

Contract asset and liability balances are as follows:

(In millions)	December 31, 2018	January 1, 2018
Current Contract Assets, Net	$ 459	$ 329
Noncurrent Contract Assets, Net	15	18
Current Contract Liabilities	809	736
Noncurrent Contract Liabilities	355	322

Substantially all of the current contract liabilities balance at January 1, 2018 was recognized in revenue during 2018.

Warranty Obligations

The company provides for the estimated cost of standard product warranties, primarily from historical information, in cost of product revenues at the time product revenue is recognized. While the company engages in extensive product quality programs and processes, including actively monitoring and evaluating the quality of its component supplies, the company’s warranty obligation is affected by product failure rates, utilization levels, material usage, service delivery costs incurred in correcting a product failure and supplier warranties on parts delivered to the company. Should actual product failure rates, utilization levels, material usage, service delivery costs or supplier warranties on parts differ from the company’s estimates, revisions to the estimated warranty liability would be required. The liability for warranties is included in other accrued expenses in the accompanying balance

sheet. Extended warranty agreements are considered service contracts, which are discussed above. Costs of service contracts are recognized as incurred. The changes in the carrying amount of standard product warranty obligations are as follows:

(In millions)	Year Ended December 31, 2018	Year Ended December 31, 2017
Beginning Balance	$ 87	$ 78
Provision charged to income	121	110
Usage	(109)	(101)
Adjustments to previously provided warranties, net	(4)	(4)
Currency translation	(3)	4
Ending Balance	$ 92	$ 87

Research and Development

The company conducts research and development activities to increase its depth of capabilities in technologies, software and services. Research and development costs include employee compensation and benefits, consultants, facilities related costs, material costs, depreciation and travel. Research and development costs are expensed as incurred.

Restructuring Costs

Accounting for the timing and amount of termination benefits provided by the company to employees is determined based on whether: (a) the company has a substantive plan to provide such benefits, (b) the company has a written employment contract with the affected employees that includes a provision for such benefits, (c) the termination benefits are due to the occurrence of an event specified in an existing plan or agreement, or (d) the termination benefits are a one-time benefit. In certain circumstances, employee termination benefits may meet more than one of the characteristics listed above and therefore, may have individual elements that are subject to different accounting models.

From time to time when executing a restructuring or exit plan, the company also incurs costs other than termination benefits, such as lease termination costs, that are not associated with or will not be incurred to generate revenues. These include costs that represent amounts under contractual obligations that exist prior to the restructuring plan communication date and will either continue after the restructuring plan is completed with no economic benefit or result in a penalty to cancel a contractual obligation. Such costs are recognized when incurred, which generally occurs at the contract termination or cease-use date but may continue over the remainder of the original contractual period.

Income Taxes

The company recognizes deferred income taxes based on the expected future tax consequences of differences between the financial statement basis and the tax basis of assets and liabilities, calculated using enacted tax rates in effect for the year in which the differences are expected to be reflected in the tax return.

The financial statements reflect expected future tax consequences of uncertain tax positions that the company has taken or expects to take on a tax return presuming the taxing authorities' full knowledge of the positions and all relevant facts, but without discounting for the time value of money (Note 8).

Earnings per Share

Basic earnings per share has been computed by dividing net income by the weighted average number of shares outstanding during the year. Except where the result would be antidilutive to income from continuing operations, diluted earnings per share has been computed using the treasury stock method for outstanding stock options and restricted units (Note 9).

Cash and Cash Equivalents

Cash equivalents consists principally of money market funds, commercial paper and other marketable securities purchased with an original maturity of three months or less. These investments are carried at cost, which approximates market value.

Inventories

Inventories are valued at the lower of cost or net realizable value, cost being determined principally by the first-in, first-out (FIFO) method with certain of the company's businesses utilizing the last-in, first-out (LIFO) method. The company periodically reviews quantities of inventories on hand and compares these amounts to the expected use of each product or product line. In addition, the company has certain inventory that is subject to fluctuating market pricing. The company assesses the carrying value of this inventory based on a lower of cost or net realizable value analysis. The company records a charge to cost of sales for the amount required to reduce the carrying value of inventory to net realizable value. Costs associated with the procurement of inventories, such as inbound freight charges, purchasing and receiving costs, and internal transfer costs, are included in cost of revenues in the accompanying statement of income. The components of inventories are as follows:

(In millions)	December 31, 2018	December 31, 2017
Raw Materials	$ 812	$ 708
Work in Process	430	505
Finished Goods	1,763	1,758
Inventories	$ 3,005	$ 2,971

The value of inventories maintained using the LIFO method was $244 million and $219 million at December 31, 2018 and 2017, respectively, which was below estimated replacement cost by $34 million and $31 million, respectively. Reductions to cost of revenues as a result of the liquidation of LIFO inventories were nominal during the three years ended December 31, 2018.

Property, Plant and Equipment

Property, plant and equipment are recorded at cost. The costs of additions and improvements are capitalized, while maintenance and repairs are charged to expense as incurred. The company provides for depreciation and amortization using the straight-line method over the estimated useful lives of the property as follows: buildings and improvements, 25 to 40 years; machinery and equipment (including software), 3 to 10 years; and leasehold improvements, the shorter of the term of the lease or the life of the asset. When assets are retired or otherwise disposed of, the assets and related accumulated depreciation are eliminated from the accounts and the resulting gain or loss is reflected in the accompanying statement of income. Property, plant and equipment consists of the following:

(In millions)	December 31, 2018	December 31, 2017
Land	$ 397	$ 401
Buildings and Improvements	1,729	1,662
Machinery, Equipment and Leasehold Improvements	4,694	4,276
Property, Plant and Equipment, at Cost	6,820	6,339
Less: Accumulated Depreciation and Amortization	2,655	2,292
Property, Plant and Equipment, Net	$ 4,165	$ 4,047

Depreciation and amortization expense of property, plant and equipment was $526 million, $439 million and $380 million in 2018, 2017 and 2016, respectively.

Acquisition-related Intangible Assets

Acquisition-related intangible assets include the costs of acquired customer relationships, product technology, tradenames and other specifically identifiable intangible assets, and are being amortized using the straight-line method over their estimated useful lives, which range from 3 to 20 years. In addition, the company has tradenames and in-process research and development that have indefinite lives and which are not amortized. The company reviews intangible assets for impairment when indication of potential impairment exists, such as a significant reduction in cash flows associated with the assets. Intangible assets with indefinite lives are reviewed for impairment annually or whenever events or changes in circumstances indicate they may be impaired. Acquisition-related intangible assets are as follows:

(In millions)	Balance at December 31, 2018 Gross	Accumulated Amortization	Net	Balance at December 31, 2017 Gross	Accumulated Amortization	Net
Definite Lived:						
Customer relationships	$ 17,120	$ (6,833)	$ 10,287	$ 17,356	$ (5,902)	$ 11,454
Product technology	6,036	(3,178)	2,858	6,046	(2,811)	3,235
Tradenames	1,495	(929)	566	1,538	(817)	721
Other	33	(33)	—	34	(34)	—
	24,684	(10,973)	13,711	24,974	(9,564)	15,410
Indefinite Lived:						
Tradenames	1,235	N/A	1,235	1,235	N/A	1,235
In-process research and development	32	N/A	32	39	N/A	39
	1,267	N/A	1,267	1,274	N/A	1,274
Acquisition-related Intangible Assets	$ 25,951	$ (10,973)	$ 14,978	$ 26,248	$ (9,564)	$ 16,684

The estimated future amortization expense of acquisition-related intangible assets with definite lives is as follows:

(In millions)	
2019	$ 1,691
2020	1,610
2021	1,496
2022	1,348
2023	1,273
2024 and Thereafter	6,293
Estimated Future Amortization Expense of Definite-lived Intangible Assets	$ 13,711

Amortization of acquisition-related intangible assets was $1.74 billion, $1.59 billion and $1.38 billion in 2018, 2017 and 2016, respectively.

Other Assets

Other assets in the accompanying balance sheet include deferred tax assets, cash surrender value of life insurance, insurance recovery receivables related to product liability matters, pension assets, investments, notes receivable, restricted cash and other assets.

Prior to January 1, 2018, investments for which there are not readily determinable market values were accounted for under the cost method of accounting. The company periodically evaluated the carrying value of its investments accounted for under the cost method of accounting, which provided that they are recorded at the lower of cost or estimated net realizable value. Effective January 1, 2018, equity investments that do not have readily determinable fair values are measured at cost minus impairment, if any, plus or minus changes resulting from observable price changes in orderly transactions for the identical or similar investments of the same issuer. The company performs qualitative assessments to identify impairments of these investments. At December 31, 2018 and 2017, the company

had such investments with carrying amounts of $36 million and $32 million, respectively, which are included in other assets.

Goodwill

The company assesses goodwill for impairment at the reporting unit level annually and whenever events occur or circumstances change that would more-likely-than-not reduce the fair value of a reporting unit below its carrying amount. Such events or circumstances generally include the occurrence of operating losses or a significant decline in earnings associated with one or more of the company's reporting units. The company is permitted to first assess qualitative factors to determine whether the goodwill impairment test is necessary. If the qualitative assessment results in a determination that the fair value of a

reporting unit is more-likely-than-not less than its carrying amount, the company performs the goodwill impairment test. The company may bypass the qualitative assessment for the reporting unit in any period and proceed directly to the goodwill impairment test. The company estimates the fair value of its reporting units by using forecasts of discounted future cash flows and peer market multiples. The company would record an impairment charge based on the excess of a reporting unit's carrying amount over its fair value. The company determined that no impairments existed in 2018, 2017 or 2016.

The changes in the carrying amount of goodwill by segment are as follows:

(In millions)	Life Sciences Solutions	Analytical Instruments	Specialty Diagnostics	Laboratory Products and Services	Total
Balance at December 31, 2016	$ 8,246	$ 4,686	$ 3,659	$ 4,737	$ 21,328
Acquisitions	136	99	27	3,256	3,518
Finalization of purchase price allocations for 2016 acquisitions	(4)	68	—	(1)	63
Currency translation	14	174	171	25	384
Other	(1)	—	(1)	(1)	(3)
Balance at December 31, 2017	8,391	5,027	3,856	8,016	25,290
Acquisitions	161	—	—	—	161
Finalization of purchase price allocations for 2017 acquisitions	—	1	—	20	21
Currency translation	(5)	(77)	(121)	79	(124)
Other	1	(1)	—	(1)	(1)
Balance at December 31, 2018	$ 8,548	$ 4,950	$ 3,735	$ 8,114	$ 25,347

Loss Contingencies

Accruals are recorded for various contingencies, including legal proceedings, environmental, workers' compensation, product, general and auto liabilities, self-insurance and other claims that arise in the normal course of business. The accruals are based on management's judgment, historical claims experience, the probability of losses and, where applicable, the consideration of opinions of internal and/or external legal counsel and actuarial estimates. Additionally, the company records receivables from third-party insurers up to the amount of the loss when recovery has been determined to be probable. Liabilities acquired in acquisitions have been recorded at fair value and, as such, were discounted to present value at the dates of acquisition.

Currency Translation

All assets and liabilities of the company's non-U.S. subsidiaries are translated at year-end exchange rates. Resulting translation adjustments are reflected in the "accumulated other comprehensive items" component of shareholders' equity. Revenues and expenses are translated at average exchange rates for the year. Currency transaction (losses) gains are included in the accompanying statement of income and in aggregate were $19 million, $(31) million and $19 million in 2018, 2017 and 2016, respectively.

Derivative Contracts

The company is exposed to certain risks relating to its ongoing business operations including changes to interest rates and currency exchange rates. The company uses derivative instruments primarily to manage currency exchange and interest rate risks. The company recognizes derivative instruments as either assets or liabilities and measures those instruments at fair value. If a derivative is a hedge, depending on the nature of the hedge, changes in the fair value of the derivative are either offset against the change in fair value of the hedged item through earnings or

recognized in other comprehensive items until the hedged item is recognized in earnings. Derivatives that are not designated as hedges are recorded at fair value through earnings.

The company uses short-term forward and option currency exchange contracts primarily to hedge certain balance sheet and operational exposures resulting from changes in currency exchange rates, predominantly intercompany loans and cash balances that are denominated in currencies other than the functional currencies of the respective operations. The currency-exchange contracts principally hedge transactions denominated in euro, British pounds sterling, Swiss franc, Norwegian kroner, Canadian

dollars, Japanese yen and Swedish kronor. The company does not hold or engage in transactions involving derivative instruments for purposes other than risk management.

Cash flow hedges. For derivative instruments that are designated and qualify as a cash flow hedge, the gain or loss on the derivative is reported as a component of other comprehensive items and reclassified into earnings in the same period or periods during which the hedged transaction affects earnings and is presented in the same income statement line item as the earnings effect of the hedged item.

Fair value hedges. For derivative instruments that are designated and qualify as a fair value hedge, the gain or loss on the derivative, as well as the offsetting loss or gain on the hedged item attributable to the hedged risk, are recognized in earnings. During 2016, in connection with new debt issuances, the company entered into interest rate swap arrangements. The company includes the gain or loss on the hedged items (fixed-rate debt) in the same line item (interest expense) as the offsetting effective portion of the loss or gain on the related interest rate swaps.

Net investment hedges. The company also uses foreign currency-denominated debt and cross-currency interest rate swaps to partially hedge its net investments in foreign operations against adverse movements in exchange rates. The majority of the company's euro-denominated senior notes and cross-currency interest rate swaps have been designated as, and are effective as, economic hedges of part of the net investment in a foreign operation. Accordingly, foreign currency transaction gains or losses due to spot rate fluctuations on the euro-denominated debt instruments and contract fair value changes on the cross-currency interest rate swaps, excluding interest accruals, are included in currency translation adjustment within other comprehensive items and shareholders' equity.

Use of Estimates

The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. In addition, significant estimates were made in estimating future cash flows to assess potential impairment of assets and in determining the fair value of acquired intangible assets (Note 2) and the ultimate loss from abandoning leases at facilities being exited (Note 15). Actual results could differ from those estimates.

Recent Accounting Pronouncements

In August 2018, the FASB issued new guidance to align the accounting for implementation costs incurred in a hosting arrangement that is a service contract with the accounting for implementation costs incurred to develop or obtain internal-use software and hosting arrangements that include an internal-use software license. Under the new guidance, certain implementation costs that previously were required to be expensed will be capitalized and amortized over the term of the hosting arrangement. The company adopted the guidance in the fourth quarter of 2018, prospectively to all implementation costs incurred after the date of adoption. The adoption of this guidance did not have a material impact on the company's consolidated financial statements.

In August 2018, the FASB issued new guidance to modify the disclosure requirements for employers that sponsor defined benefit pension or other postretirement plans. The company expects to adopt the guidance when it is effective in 2020 using a retrospective method. The adoption of this guidance is not expected to have a material impact on the company's disclosures.

In August 2018, the FASB issued new guidance to modify the disclosure requirements on fair value measurements. The company expects to adopt the guidance when it is effective in 2020 with some items requiring a prospective method and others requiring a retrospective method. The adoption of this guidance is not expected to have a material impact on the company's disclosures.

In February 2018, the FASB issued new guidance to allow reclassifications from accumulated other comprehensive items (AOCI) to retained earnings for certain tax effects on items within AOCI resulting from the Tax Cuts and Jobs Act of 2017 (the Tax Act). The company adopted this guidance in January 2018 and recorded the reclassifications in the period of adoption. The balance sheet impact of adopting this guidance is included in the table below. This guidance only relates to the effects of the Tax Act. For all other tax law changes that have occurred or

may occur in the future, the company reclassifies the tax effects to the consolidated statement of income on an item-by-item basis when the pre-tax item in AOCI is reclassified to income.

In December 2017, the SEC staff issued guidance to address the application of accounting guidance in situations when a registrant does not have the necessary information available, prepared, or analyzed (including computations) in reasonable detail to complete the accounting for certain income tax effects of the Tax Act enacted on December 22, 2017. The company reported provisional amounts in its 2017 financial statements for certain income tax effects of the Tax Act for which a

reasonable estimate could be determined. Adjustments to provisional amounts identified during the measurement period, which ended December 22, 2018, are included as adjustments to Provision for Income Taxes in 2018 (Note 8).

In August 2017, the FASB issued new guidance to simplify the application of hedge accounting guidance. Among other things, the new guidance will permit more hedging strategies to qualify for hedge accounting, allow for additional time to perform an initial assessment of a hedge's effectiveness, and permit a qualitative effectiveness test for certain hedges after initial qualification. The company adopted this guidance in January 2018. The balance sheet impact of adopting this guidance is included in the table below.

In March 2017, the FASB issued new guidance intended to improve the presentation of net periodic pension cost and net periodic postretirement benefit cost. The new guidance requires the service cost component of net periodic cost be reported in the same line item(s) as other employee compensation costs and all other components of the net periodic cost be reported in the income statement below operating income. The company adopted this guidance on January 1, 2018 and applied the changes to the statement of income retrospectively. As a result of adoption of this guidance, the accompanying 2017 and 2016 statements of income reflect the following changes from previously reported amounts:

(In millions)	2017	2016
Increase (Decrease) in Total Costs and Operating Expenses (principally Selling, General and Administrative Expenses)	$ 8	$ (9)
(Decrease) Increase in Operating Income	(8)	9
Increase (Decrease) in Other Income (Expense)	8	(9)

In January 2017, the FASB issued new guidance clarifying the definition of a business and providing criteria to determine when an integrated set of assets and activities is not defined as a business. The new guidance requires such integrated sets to be defined as an asset (and not a business) if substantially all of the fair value of the gross assets acquired or disposed is concentrated in a single identifiable asset or a group of similar identifiable assets. The adoption of this guidance as of January 1, 2018 did not have a material impact on the company's consolidated financial statements.

In October 2016, the FASB issued new guidance eliminating the deferral of the tax effects of intra-entity asset transfers. The impact of this guidance in future periods will be dependent on the extent of future asset transfers which usually occur in connection with planning around acquisitions and other business structuring activities. The balance sheet impact of adopting this guidance as of January 1, 2018 is included in the table below.

In June 2016, the FASB issued new guidance to require a financial asset measured at amortized cost basis, such as accounts receivable, to be presented at the net amount expected to be collected based on relevant information about past events, including historical experience, current conditions, and reasonable and supportable forecasts that affect the collectability of the reported amount. During 2018, the FASB issued additional guidance and clarification. The company expects to adopt the guidance when it is effective in 2020 using a modified retrospective method. The adoption of this guidance is not expected to have a material impact on the company's consolidated financial statements.

In February 2016, the FASB issued new guidance which requires lessees to record most leases on their balance sheets as lease liabilities, initially measured at the present value of the future lease payments, with corresponding right-of-use assets. The new guidance also sets forth new disclosure requirements related to leases. During 2017 and 2018, the FASB issued additional guidance and clarification. The guidance is effective for the company in 2019. The company has elected to adopt the guidance using a modified retrospective method, by applying the transition approach as of the beginning of the period of adoption. Comparative periods will not be restated. The company has substantially completed its analysis of the new guidance by considering which practical expedients and policies to elect, deploying a software tool to assist in the accounting calculations, surveying functional groups that oversee vendor relationships, and developing processes and controls to manage the new lease accounting guidance and gather information for the required disclosures. The company expects the impact to the balance sheet of recording right-of-use assets and lease liabilities will be less than 2% of total assets and less than 3% of total liabilities. The company

also expects that the impact of adoption of the guidance to its results of operations and cash flows will be nominal. The company's future commitments under lease obligations are summarized in Note 11.

In January 2016, the FASB issued new guidance which affects the accounting for equity investments, financial liabilities under the fair value option, and the presentation and disclosure requirements for financial instruments. This guidance requires equity investments to be measured at fair value with subsequent changes recognized in net income, except for those accounted for under the equity method or requiring consolidation. The guidance also changes the accounting for investments without a

readily determinable fair value and that do not qualify for the practical expedient permitted by the guidance to estimate fair value. The balance sheet impact of adopting this guidance as of January 1, 2018 is included in the table below.

In May 2014, the FASB issued new revenue recognition guidance which provides a single comprehensive model for entities to use in accounting for revenue arising from contracts with customers and supersedes most previous revenue recognition guidance. The new standard also requires significantly expanded disclosures regarding the qualitative and quantitative information of an entity's nature, amount, timing, and uncertainty of revenue and cash flows arising from contracts with customers. During 2016 and 2017, the FASB issued additional guidance and clarification, including the elimination of certain SEC Staff Guidance. The guidance is effective for the company in 2018. The company elected to adopt this guidance through application of the modified retrospective method by applying it to contracts that were not completed as of December 31, 2017 (in addition to new contracts in 2018).

Adoption of new guidance that became effective on January 1, 2018, impacted the company's Consolidated Balance Sheet as follows:

(In millions)	December 31, 2017 as Reported	Impact of Adopting New Revenue Guidance	Impact of Adopting New Equity Investment Guidance	Impact of Adopting New Intra-entity Tax Guidance	Impact of Adopting New Hedge Accounting Guidance	Impact of Adopting New Tax Effects on Items in AOCI Guidance	January 1, 2018 as Adopted
Accounts Receivable, Less Allowances	$ 3,879	$ (8)	$ —	$ —	$ —	$ —	$ 3,871
Inventories	2,971	(252)	—	—	—	—	2,719
Other Current Assets	1,236	229	—	—	—	—	1,465
Other Assets	1,227	18	—	(77)	—	—	1,168
Deferred Revenue	719	(719)	—	—	—	—	—
Contract Liabilities	—	736	—	—	—	—	736
Other Accrued Expenses	1,848	(153)	—	—	—	—	1,695
Deferred Income Taxes	2,766	—	—	(57)	—	2	2,711
Other Long-term Liabilities	2,569	74	—	—	—	—	2,643
Long-term Obligations	18,873	—	—	—	(3)	—	18,870
Retained Earnings	15,914	49	(1)	(20)	3	87	16,032
Accumulated Other Comprehensive Items	(2,003)	—	1	—	—	(89)	(2,091)

Had the company continued to use the revenue recognition guidance in effect prior to 2018, no material changes would have resulted to the consolidated statements of income, comprehensive income, or cash flows for the year ended December 31, 2018, from amounts reported therein. However, inventories would have been $357 million higher and other current assets would have been $359 million lower as of December 31, 2018, primarily as a result of differences in the accounting for pharmaceutical development and manufacturing services under the new revenue guidance. Under the prior guidance, costs of these services were recorded in inventory and revenues were recognized generally when the products were delivered to customers. Under the new guidance, costs are expensed and revenues are recognized as the manufacturing service is performed and the company's rights to consideration are recorded as contract assets and included in other current assets.

Note 2. Acquisitions and Dispositions

The company’s acquisitions have historically been made at prices above the determined fair value of the acquired identifiable net assets, resulting in goodwill, due to expectations of the synergies that will be realized by

combining the businesses. These synergies include the elimination of redundant facilities, functions and staffing; use of the company's existing commercial infrastructure to expand sales of the acquired businesses' products; and use of the commercial infrastructure of the acquired businesses to cost-effectively expand sales of company products.

Acquisitions have been accounted for using the purchase method of accounting, and the acquired companies' results have been included in the accompanying financial statements from their respective dates of acquisition. Acquisition transaction costs are recorded in selling, general and administrative expenses as incurred.

2018

The company has entered into an agreement to acquire Gatan, Inc., a wholly owned subsidiary of Roper Technologies, Inc., for approximately $925 million in cash. Gatan is a leading manufacturer of instrumentation and software used to enhance and extend the operation and performance of electron microscopes. The transaction is subject to customary closing conditions, including regulatory approvals.

On October 25, 2018, the company acquired, within the Life Sciences Solutions segment, Becton Dickinson and Company's Advanced Bioprocessing business for $477 million in cash. This North America-based business adds complementary cell culture products that expand the segment's bioproduction offerings to help customers increase yield during production of biologic drugs. Revenues of the Advanced Bioprocessing business were $100 million in 2017. The purchase price exceeded the fair value of the identifiable net assets and, accordingly, $146 million was allocated to goodwill, all of which is tax deductible.

In 2018, the company acquired, within the Life Sciences Solutions segment, IntegenX Inc., a North America-based provider of a rapid DNA platform for use in forensics and law enforcement applications, for an aggregate purchase price of $65 million.

The components of the purchase price and net assets acquired for 2018 acquisitions are as follows:

(In millions)	Advanced Bioprocessing business	IntegenX	Total
Purchase Price			
Cash paid	$ 476	$ 55	$ 531
Fair value of contingent consideration	—	11	11
Purchase price payable	1	—	1
Cash acquired	—	(1)	(1)
	$ 477	$ 65	$ 542
Net Assets Acquired			
Current assets	$ 53	$ 4	$ 57
Property, plant and equipment	42	—	42
Definite-lived intangible assets:			
Customer relationships	108	—	108
Product technology	132	31	163
Tradenames and other	8	—	8
Indefinite-lived intangible assets:			
In-process research and development	—	10	10
Goodwill	146	15	161
Other assets	—	14	14
Deferred tax liabilities	(7)	—	(7)
Other liabilities assumed	(5)	(9)	(14)
	$ 477	$ 65	$ 542

The weighted-average amortization periods for definite-lived intangible assets acquired in 2018 are 14 years for customer relationships, 13 years for product technology and 6 years for tradenames and other. The weighted average amortization period for all definite-lived intangible assets acquired in 2018 is 13 years.

2017

On August 29, 2017, the company acquired, within the Laboratory Products and Services segment, Patheon N.V., a leading global provider of high-quality drug development and delivery solutions to the pharmaceutical and biopharma sectors, for

$35.00 per share in cash, or $7.36 billion, including the assumption of net debt. The company financed the purchase price, including the repayment of indebtedness of Patheon, with issuances of debt and equity.

Patheon provides comprehensive, integrated and highly customizable solutions as well as the expertise to help biopharmaceutical companies of all sizes satisfy complex development and manufacturing needs. The acquisition provided entry into the pharmaceutical contract development and manufacturing organization market and added a complementary service to the company's existing pharmaceutical services portfolio. Patheon's revenues totaled $1.87 billion for the year ended October 31, 2016. The purchase price exceeded the fair market value of the identifiable net assets and, accordingly, $3.28 billion was allocated to goodwill, $125 million of which is tax deductible.

On March 2, 2017, the company acquired, within the Analytical Instruments segment, Core Informatics, a North America-based provider of cloud-based platforms supporting scientific data management, for a total purchase price of $94 million, net of cash acquired. The acquisition enhanced the company's existing informatics solutions. Revenues of Core Informatics were approximately $10 million in 2016. The purchase price exceeded the fair market value of the identifiable net assets and, accordingly, $63 million was allocated to goodwill, $50 million of which is tax deductible.

On February 14, 2017, the company acquired, within the Life Sciences Solutions segment, Finesse Solutions, Inc., a North America-based developer of scalable control automation systems and software for bioproduction, for a total purchase price of $221 million, net of cash acquired. The acquisition expanded the company's bioproduction offerings. Revenues of Finesse Solutions were approximately $50 million in 2016. The purchase price exceeded the fair market value of the identifiable net assets and, accordingly, $136 million was allocated to goodwill, none of which is tax deductible.

In addition, in 2017 the company acquired, within the Specialty Diagnostics segment, a North America-based molecular diagnostics company offering qPCR tests to the transplant community and, within the Analytical Instruments segment, a provider of desktop scanning electron microscopy solutions and a manufacturer of volatile organic compound monitoring instruments and integrated systems, for an aggregate purchase price of $110 million.

The components of the purchase price and net assets acquired for 2017 acquisitions are as follows:

(In millions)	Patheon	Core Informatics	Finesse Solutions	Other	Total
Purchase Price					
Cash paid	$ 6,911	$ 95	$ 223	$ 103	$ 7,332
Debt assumed	488	—	—	—	488
Fair value of contingent consideration	—	9	—	8	17
Fair value of equity awards exchanged	6	—	—	—	6
Fair value of previously held interest	—	—	—	11	11
Purchase price payable	—	—	—	1	1
Cash acquired	(47)	(10)	(2)	(13)	(72)
	$ 7,358	$ 94	$ 221	$ 110	$ 7,783
Net Assets Acquired					
Current assets	$ 1,062	$ 2	$ 17	$ 20	$ 1,101
Property, plant and equipment	1,242	—	1	3	1,246
Definite-lived intangible assets:					
Customer relationships	3,641	6	68	16	3,731
Product technology	—	29	32	35	96
Tradenames and other	112	3	2	—	117
Indefinite-lived intangible assets:					

In-process research and development	—	—	2	—	2
Goodwill	3,276	63	136	64	3,539
Other assets	54	—	—	—	54
Deferred tax liabilities	(1,093)	(4)	(22)	(14)	(1,133)
Other liabilities assumed	(936)	(5)	(15)	(14)	(970)
	$ 7,358	$ 94	$ 221	$ 110	$ 7,783

The weighted-average amortization periods for definite-lived intangible assets acquired in 2017 are 17 years for customer relationships, 9 years for product technology and 4 years for tradenames and other. The weighted average amortization period for all definite-lived intangible assets acquired in 2017 is 16 years.

2016

On September 19, 2016, the company acquired, within the Analytical Instruments segment, FEI Company, a North America-based provider of high-performance electron microscopy, for a total purchase price of $4.08 billion, net of cash acquired. The acquisition strengthened the company's analytical instrument portfolio with the addition of high-end electron microscopes. Revenues of FEI were $930 million in 2015. The purchase price exceeded the fair value of the identifiable net assets and, accordingly, $2.13 billion was allocated to goodwill, approximately $65 million of which is tax deductible.

On March 31, 2016, the company acquired, primarily within the Life Sciences Solutions segment, Affymetrix, Inc., a North America-based provider of cellular and genetic analysis products, for a total purchase price of $1.34 billion, net of cash acquired, including the assumption of $254 million of debt. The acquisition expanded the company's existing portfolio of antibodies and assays for flow cytometry and single-cell biology applications. Additionally, the acquisition expanded the company's genetic analysis portfolio through the addition of microarrays. Revenues of Affymetrix were $360 million in 2015. The purchase price exceeded the fair value of the identifiable net assets and, accordingly, $615 million was allocated to goodwill, none of which is tax deductible.

In addition, in 2016, the company acquired, within the Life Sciences Solutions segment, a manufacturer of transfection reagents and cell-related products and selected assets of an existing channel partner, within the Analytical Instruments segment, a provider of X-ray diffraction solutions for material science and industrial applications and, within the Specialty Diagnostics segment, an existing channel partner for its microbiology media products, for an aggregate purchase price of $33 million.

The components of the purchase price and net assets acquired for 2016 acquisitions are as follows:

(In millions)	FEI	Affymetrix	Other	Total
Purchase Price				
Cash paid	$ 4,451	$ 1,166	$ 32	$ 5,649
Debt assumed	—	254	1	255
Cash acquired	(369)	(78)	—	(447)
	$ 4,082	$ 1,342	$ 33	$ 5,457
Net Assets Acquired				
Current assets	$ 619	$ 161	$ 3	$ 783
Property, plant and equipment	153	19	—	172
Definite-lived intangible assets:				
Customer relationships	1,051	501	9	1,561
Product technology	740	253	7	1,000
Tradenames and other	42	46	—	88
Indefinite-lived intangible assets:				
In-process research and development	105	14	—	119
Goodwill	2,125	615	16	2,756
Other assets	72	8	—	80
Liabilities assumed	(825)	(275)	(2)	(1,102)

	$ 4,082	$ 1,342	$ 33	$ 5,457

The weighted-average amortization periods for definite-lived intangible assets acquired in 2016 are 16 years for customer relationships, 8 years for product technology and 8 years for tradenames and other. The weighted average amortization period for all definite-lived intangible assets acquired in 2016 is 13 years.

The company recorded a deferred tax liability of $156 million in the acquisition accounting related to the outside basis difference of the Affymetrix Singapore operations as the company does not intend to permanently reinvest the pre-acquisition Singapore earnings. This deferred tax liability was reversed in 2017 as a result of the enactment of the Tax Act.

Unaudited Pro Forma Information

The following unaudited pro forma information provides the effect of the company's 2017 acquisition of Patheon as if the acquisition had occurred on January 1, 2016, and the effects of the company's 2016 acquisitions of FEI and Affymetrix as if the acquisitions had occurred on January 1, 2015:

(In millions)	2017	2016
Revenues	$ 22,144	$ 20,807
Net Income	$ 2,258	$ 1,791

The historical consolidated financial information of the company, Patheon, FEI, and Affymetrix has been adjusted in the pro forma information to give effect to pro forma events that are directly attributable to the acquisitions and related financing arrangements, are expected to have a continuing impact on the company, and are factually supportable.

To reflect the acquisition of Patheon as if it had occurred on January 1, 2016, and the acquisitions of FEI and Affymetrix as if they had occurred on January 1, 2015, the unaudited pro forma results include adjustments to reflect, among other things, the incremental intangible asset amortization to be incurred based on the preliminary values of each identifiable intangible asset and the interest expense from debt financings obtained to partially fund the cash consideration transferred. Pro forma adjustments were tax effected at the company's historical statutory rates in effect for the respective periods. The unaudited pro forma amounts are not necessarily indicative of the combined results of operations that would have been realized had the acquisitions and related financings occurred on the aforementioned dates, nor are they meant to be indicative of any anticipated combined results of operations that the company will experience after the transaction. In addition, the amounts do not include any adjustments for actions that may be taken following the completion of the transaction, such as expected cost savings, operating synergies, or revenue enhancements that may be realized subsequent to the transaction.

Pro forma net income for the year ended December 31, 2017, excludes certain items associated with the Patheon acquisition that were included in the determination of net income for that period. These items have been included in the determination of pro forma net income for the year ended December 31, 2016, and are as follows: $54 million of direct transaction costs, $39 million of accounting policy conformity adjustments, $21 million of initial restructuring costs, $40 million reduction of revenues for revaluing the deferred revenue obligations to fair value, and $55 million of expense related to the fair value adjustment to acquisition-date inventories.

Pro forma net income for the year ended December 31, 2016, excludes certain items associated with the FEI and Affymetrix acquisitions that were included in the determination of net income for that period. These items have been included in the determination of pro forma net income for the year ended December 31, 2015 (not presented), and are as follows: $102 million of direct transaction costs, $33 million of accounting policy conformity adjustments, $46 million of initial restructuring costs, $6 million reduction of revenues for revaluing the deferred revenue obligations to fair value, and $99 million of expense related to the fair value adjustment to acquisition-date inventories.

The company’s results would not have been materially different from its pro forma results had the company’s other 2018, 2017 or 2016 acquisitions occurred at the beginning of 2017, 2016 or 2015, respectively.

Disposition

On January 28, 2019, the company entered into an agreement to sell its Anatomical Pathology business to PHC Holdings Corporation for approximately $1.14 billion. The business is part of the Specialty Diagnostics segment. Revenues in 2018 of the business to be sold were approximately $344 million. The sale is subject to customary closing conditions and applicable regulatory approvals. The assets and liabilities of the Anatomical Pathology business were as follows on December 31, 2018:

(In millions)	December 31, 2018

Current Assets	$ 81
Long-term Assets	528
Current Liabilities	34
Long-term Liabilities	24

Note 3. Revenue

Disaggregated Revenue

Revenue by type is as follows:

(In millions)	2018
Revenues	
Consumables	$ 12,576
Instruments	6,292
Services	5,490
Consolidated revenues	$ 24,358

Revenue by geographic region is as follows:

(In millions)	2018
Revenues (a)	
North America	$ 12,143
Europe	6,215
Asia-Pacific	5,250
Other regions	750
Consolidated revenues	$ 24,358

(a) Revenues are attributed to regions based on customer location.

Each reportable segment earns revenues from consumables, instruments and services in North America, Europe, Asia-Pacific and other regions. See note 4 for revenue by reportable segment and other geographic data.

Remaining Performance Obligations

The aggregate amount of the transaction price allocated to the remaining performance obligations for all open customer contracts as of December 31, 2018 was $5.09 billion. The company will recognize revenue for these performance obligations as they are satisfied, approximately 90% of which is expected to occur within the next twelve months.

Note 4. Business Segment and Geographical Information

The company's financial performance is reported in four segments. A description of each segment follows.

Life Sciences Solutions: provides an extensive portfolio of reagents, instruments and consumables used in biological and medical research, discovery and production of new drugs and vaccines as well as diagnosis of disease. These products and services are used by customers in pharmaceutical, biotechnology, agricultural, clinical, academic, and government markets.

Analytical Instruments: provides a broad offering of instruments, consumables, software and services that are used for a range of applications in the laboratory, on the production line and in the field. These products and services

are used by customers in pharmaceutical, biotechnology, academic, government, environmental and other research and industrial markets, as well as the clinical laboratory.

Specialty Diagnostics: provides a wide range of diagnostic test kits, reagents, culture media, instruments and associated products used to increase the speed and accuracy of diagnoses. These products are used by customers in healthcare, clinical, pharmaceutical, industrial and food safety laboratories.

Laboratory Products and Services: provides virtually everything needed for the laboratory, including a combination of self-manufactured and sourced products for customers in research, academic, government, industrial and healthcare settings. The segment also includes a comprehensive offering of outsourced services used by the pharmaceutical and biotech industries for drug development, clinical trials logistics and commercial drug manufacturing.

The company's management evaluates segment operating performance based on operating income before certain charges/credits to cost of revenues and selling, general and administrative expenses, principally associated with acquisition accounting; restructuring and other costs/income including costs arising from facility consolidations such as severance and abandoned lease expense and gains and losses from the sale of real estate and product lines as well as from significant litigation-related matters; and amortization of acquisition-related intangible assets. The company uses this measure because it helps management understand and evaluate the segments' core operating results and facilitates comparison of performance for determining compensation.

Business Segment Information

(In millions)	2018	2017	2016
Revenues			
Life Sciences Solutions	$ 6,269	$ 5,728	$ 5,317
Analytical Instruments	5,469	4,821	3,668
Specialty Diagnostics	3,724	3,486	3,339
Laboratory Products and Services	10,035	7,825	6,724
Eliminations	(1,139)	(942)	(774)
Consolidated revenues	24,358	20,918	18,274
Segment Income (a)			
Life Sciences Solutions	2,158	1,894	1,598
Analytical Instruments	1,247	1,027	749
Specialty Diagnostics	952	927	910
Laboratory Products and Services	1,258	1,004	974
Subtotal reportable segments (a)	5,615	4,852	4,231
Cost of revenues charges, net	(12)	(123)	(102)
Selling, general and administrative charges, net	(29)	(78)	(104)
Restructuring and other costs, net	(50)	(97)	(189)
Amortization of acquisition-related intangible assets	(1,741)	(1,594)	(1,378)
Consolidated operating income	3,783	2,960	2,458
Other expense, net (b)	(521)	(531)	(434)
Income from continuing operations before income taxes	$ 3,262	$ 2,429	$ 2,024
Depreciation			
Life Sciences Solutions	$ 119	$ 129	$ 142
Analytical Instruments	73	71	50
Specialty Diagnostics	76	72	70
Laboratory Products and Services	258	167	118
Consolidated depreciation	$ 526	$ 439	$ 380

(a) Represents operating income before certain charges to cost of revenues and selling, general and administrative expenses; restructuring and other costs, net; and amortization of acquisition-related intangibles.

(b) The company does not allocate other expense, net to its segments.

(In millions)	2018	2017	2016
Total Assets			
Life Sciences Solutions	$ 18,774	$ 19,063	$ 19,065
Analytical Instruments	9,907	9,960	9,520
Specialty Diagnostics	6,663	7,095	6,802
Laboratory Products and Services	19,051	19,181	9,405
Corporate/Other (c)	1,837	1,370	1,116
Consolidated total assets	$ 56,232	$ 56,669	$ 45,908
Capital Expenditures			
Life Sciences Solutions	$ 107	$ 118	$ 122
Analytical Instruments	85	56	34
Specialty Diagnostics	103	87	72
Laboratory Products and Services	374	178	111
Corporate/Other	89	69	105
Consolidated capital expenditures	$ 758	$ 508	$ 444

(c) Corporate assets consist primarily of cash and cash equivalents, short-term investments, property and equipment at the company's corporate offices.

Geographical Information

(In millions)	2018	2017	2016
Revenues (d)			
United States	$ 11,629	$ 10,129	$ 9,086
China	2,504	2,060	1,730
Other	10,225	8,729	7,458
Consolidated revenues	$ 24,358	$ 20,918	$ 18,274
Long-lived Assets (e)			
United States	$ 2,444	$ 2,349	$ 1,630
Other	1,721	1,698	948
Consolidated long-lived assets	$ 4,165	$ 4,047	$ 2,578

(d) Revenues are attributed to countries based on customer location.

(e) Includes property, plant and equipment, net.

Note 5.

Other Expense, Net

The components of other expense, net, in the accompanying statement of income are as follows:

(In millions)	2018	2017	2016
Interest Income	$ 137	$ 81	$ 48
Interest Expense	(667)	(592)	(469)
Other Items, Net	9	(20)	(13)
Other Expense, Net	$ (521)	$ (531)	$ (434)

Other Items, Net

In all periods, other items, net includes currency transaction gains and losses on monetary assets and liabilities and net periodic pension benefit cost/income, excluding the service cost component which is included in operating expenses on the accompanying statement of income. In 2018, other items, net also includes $15 million of net losses on investments.

In 2017, other items, net includes $32 million of charges related to amortization of fees paid to obtain bridge financing commitments related to the Patheon acquisition (Note 2) and $4 million of losses on the early extinguishment of debt, offset in part by $17 million of gains on investments.

In 2016, other items, net includes $22 million of charges related to amortization of fees paid to obtain bridge financing commitments for the acquisition of FEI (Note 2) and $9 million of losses on the early extinguishment of debt, offset in part by $13 million of gains on investments. The investment gains include an $8 million gain on the sale of a joint venture for net proceeds of $65 million.

Note 6. Stock-based Compensation Expense

The company has stock-based compensation plans for its key employees, directors and others. These plans permit the grant of a variety of stock and stock-based awards, including restricted stock units, stock options or performance-based shares, as determined by the compensation committee of the company's Board of Directors or, for certain non-officer grants, by the company's employee equity committee, which consists of its chief executive officer. The company generally issues new shares of its common stock to satisfy option exercises and restricted unit vestings. Grants of stock options and restricted units generally provide that in the event of both a change in control of the company and a qualifying termination of an option or unit holder's employment, all options and service-based restricted unit awards held by the recipient become immediately vested (unless an employment or other agreement with the employee provides for different treatment).

Compensation cost is based on the grant-date fair value and is recognized ratably over the requisite vesting period or to the date based on qualifying retirement eligibility, if earlier.

The components of stock-based compensation expense are primarily included in selling, general and administrative expenses and are as follows:

(In millions)	2018	2017	2016
Stock Option Awards	$ 57	$ 53	$ 41
Restricted Unit Awards	124	106	92
Total Stock-based Compensation Expense	$ 181	$ 159	$ 133

Stock Options

The company's practice is to grant stock options at fair market value. Options vest over 3-5 years with terms of 7-10 years, assuming continued employment with certain exceptions. Vesting of the option awards is contingent upon meeting certain service conditions. The fair value of most option grants is estimated using the Black-Scholes option pricing model. For option grants that require the achievement of both service and market conditions, a lattice model is used to estimate fair value. The fair value is then amortized on a straight-line basis over the requisite service periods of the awards, which is generally the vesting period. Use of a valuation model requires management to make certain assumptions with respect to selected model inputs. Expected volatility was calculated based on the historical volatility of the company's stock. Historical data on exercise patterns is the basis for estimating the expected life of an option. The risk-free interest rate is based on U.S. Treasury zero-coupon issues with a remaining term which approximates the expected life assumed at the date of grant. The expected annual dividend rate was calculated by dividing the company's annual dividend, based on the most recent quarterly dividend rate, by the closing stock price

on the grant date. The compensation expense recognized for all stock-based awards is net of estimated forfeitures. Forfeitures are estimated based on an analysis of actual option forfeitures.

The weighted average assumptions used in the Black-Scholes option pricing model are as follows:

	2018	2017	2016
Expected Stock Price Volatility	20%	20%	21%
Risk Free Interest Rate	2.6%	1.9%	1.2%
Expected Life of Options (years)	4.3	4.3	4.3
Expected Annual Dividend	0.3%	0.4%	0.5%

The weighted average per share grant-date fair values of options granted during 2018, 2017 and 2016 were $43.45, $30.73 and $24.54, respectively. The total intrinsic value of options exercised during the same periods was $312 million, $199 million and $176 million, respectively. The intrinsic value is the difference between the market value of the shares on the exercise date and the exercise price of the option.

A summary of the company's option activity for the year ended December 31, 2018 is presented below:

	Shares (in millions)	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term (in years)	Aggregate Intrinsic Value (a) (in millions)
Outstanding at December 31, 2017	9.0	$ 121.78		
Granted	1.6	211.38		
Exercised	(2.3)	86.88		
Canceled/Expired	(0.3)	164.58		
Outstanding at December 31, 2018	8.0	$ 148.09	4.2	
Vested and Unvested Expected to Vest at December 31, 2018	7.7	$ 146.24	4.2	$ 595
Exercisable at December 31, 2018	3.5	$ 114.93	2.8	$ 382

(a) Market price per share on December 31, 2018 was $223.79. The intrinsic value is zero for options with exercise prices above the market price.

As of December 31, 2018, there was $101 million of total unrecognized compensation cost related to unvested stock options granted. The cost is expected to be recognized through 2022 with a weighted average amortization period of 2.4 years.

Restricted Share/Unit Awards

Awards of restricted units convert into an equivalent number of shares of common stock. The awards generally vest over 3-4 years, assuming continued employment, with some exceptions. Vesting of the awards is contingent upon meeting certain service conditions and may also be contingent upon meeting certain performance and/or market conditions. The fair market value of the award at the time of the grant is amortized to expense over the requisite service period of the award, which is generally the vesting period. Recipients of restricted units have no voting rights but are entitled to accrue dividend equivalents. The fair value of service- and performance-based restricted unit awards is determined based on the number of units granted and the market value of the company's shares on the

grant date. For awards with market-based vesting conditions, the company uses a lattice model to estimate the grant-date fair value of the award.

A summary of the company's restricted unit activity for the year ended December 31, 2018 is presented below:

	Units (in millions)	Weighted Average Grant-Date Fair Value
Unvested at December 31, 2017	1.4	$ 150.23
Granted	0.6	204.72
Vested	(0.7)	150.28
Forfeited	(0.1)	166.95
Unvested at December 31, 2018	1.2	$ 177.04

The total fair value of shares vested during 2018, 2017 and 2016 was $114 million, $97 million and $91 million, respectively.

As of December 31, 2018, there was $144 million of total unrecognized compensation cost related to unvested restricted stock unit awards. The cost is expected to be recognized through 2022 with a weighted average amortization period of 1.9 years.

Employee Stock Purchase Plans

Qualifying employees are eligible to participate in an employee stock purchase plan sponsored by the company. Shares may be purchased under the program at 95% of the fair market value at the end of the purchase period and the shares purchased are not subject to a holding period. Shares are purchased through payroll deductions of up to 10% of each participating employee's qualifying gross wages. The company issued 0.1 million, 0.1 million and 0.2 million shares, respectively, of its common stock in 2018, 2017 and 2016 under the employee stock purchase plan.

Note 7. Pension and Other Postretirement Benefit Plans

401(k) Savings Plan and Other Defined Contribution Plans

The company's 401(k) savings and other defined contribution plans cover the majority of the company's eligible U.S. and certain non-U.S. employees. Contributions to the plans are made by both the employee and the company. Company contributions are based on the level of employee contributions. Company contributions to these plans are based on formulas determined by the company. In 2018, 2017 and 2016, the company charged to expense $204 million, $161 million and $140 million, respectively, related to its defined contribution plans.

Defined Benefit Pension Plans

Employees of a number of the company's non-U.S. and certain U.S. subsidiaries participate in defined benefit pension plans covering substantially all full-time employees at those subsidiaries. Some of the plans are unfunded, as permitted under the plans and applicable laws. The company also maintains postretirement healthcare programs at several acquired businesses where certain employees are eligible to participate. The costs of the postretirement healthcare programs are generally funded on a self-insured and insured-premium basis.

The company recognizes the funded status of defined benefit pension and other postretirement benefit plans as an asset or liability. This amount is defined as the difference between the fair value of plan assets and the benefit obligation. The company is required to recognize as a component of other comprehensive items, net of tax, the actuarial gains/losses and prior service costs/credits that arise but were not previously required to be recognized as components of net periodic benefit cost. Other comprehensive items is adjusted as these amounts are later recognized in income as components of net periodic benefit cost.

When a company with a pension plan is acquired, any excess of projected benefit obligation over the plan assets is recognized as a liability and any excess of plan assets over the projected benefit obligation is recognized as an asset. The recognition of a new liability or a new asset results in the elimination of (a) previously existing unrecognized net gain or loss and (b) unrecognized prior service cost or credits.

The company funds annually, at a minimum, the statutorily required minimum amount as actuarially determined. During 2018, 2017 and 2016, the company made cash contributions of approximately $93 million, $200 million and $43 million, respectively. Additionally, in 2016, the company contributed insurance contracts valued at $16 million to two of its German

defined benefit plans. Contributions to the plans included in the following table are estimated at between $35 and $65 million for 2019.

The following table provides a reconciliation of benefit obligations and plan assets of the company's domestic and non-U.S. pension plans and postretirement benefit plans:

	Domestic Pension Benefits		Non-U.S. Pension Benefits		Postretirement Benefits	
(In millions)	2018	2017	2018	2017	2018	2017
Change in Projected Benefit Obligations						
Benefit Obligation at Beginning of Year	$ 1,300	$ 1,249	$ 1,324	$ 1,116	$ 63	$ 50
Business combinations	8	—	—	185	1	6
Service costs	—	—	26	26	1	1
Interest costs	41	43	23	21	2	2
Settlements	—	—	(33)	(60)	—	—
Plan participants' contributions	—	—	5	5	—	1
Actuarial (gains) losses	(87)	92	(48)	(34)	(8)	6
Benefits paid	(83)	(84)	(34)	(37)	(2)	(4)
Currency translation and other	—	—	(70)	102	(7)	1
Benefit Obligation at End of Year	$ 1,179	$ 1,300	$ 1,193	$ 1,324	$ 50	$ 63
Change in Fair Value of Plan Assets						
Fair Value of Plan Assets at Beginning of Year	$ 1,181	$ 944	$ 1,011	$ 853	$ 9	$ 8
Business combinations	7	—	—	101	—	—
Actual return on plan assets	(49)	161	(21)	32	(1)	1
Employer contribution	35	160	56	37	2	3
Settlements	—	—	(33)	(60)	—	—
Plan participants' contributions	—	—	5	5	—	1
Benefits paid	(83)	(84)	(34)	(37)	(2)	(4)
Currency translation and other	—	—	(52)	80	—	—
Fair Value of Plan Assets at End of Year	$ 1,091	$ 1,181	$ 932	$ 1,011	$ 8	$ 9
Funded Status	$ (88)	$ (119)	$ (261)	$ (313)	$ (42)	$ (54)
Accumulated Benefit Obligation	$ 1,179	$ 1,300	$ 1,136	$ 1,256		
Amounts Recognized in Balance Sheet						
Non-current asset	$ —	$ —	$ 106	$ 100	$ 8	$ 6
Current liability	(6)	(7)	(8)	(10)	(3)	(3)
Non-current liability	(82)	(112)	(359)	(403)	(47)	(57)
Net amount recognized	$ (88)	$ (119)	$ (261)	$ (313)	$ (42)	$ (54)

Amounts Recognized in Accumulated Other Comprehensive Items						
Net actuarial loss	$ 168	$ 156	$ 106	$ 126	$ 4	$ 11
Prior service credits	—	—	5	10	(5)	—
Net amount recognized	$ 168	$ 156	$ 111	$ 136	$ (1)	$ 11

The actuarial assumptions used to compute the funded status for the plans are based upon information available as of December 31, 2018 and 2017 and are as follows:

	Domestic Pension Benefits		Non-U.S. Pension Benefits		Postretirement Benefits	
	2018	2017	2018	2017	2018	2017
Weighted Average Assumptions Used to Determine Projected Benefit Obligations						
Discount rate	4.21 %	3.55 %	2.34 %	2.10 %	3.81 %	3.43 %
Average rate of increase in employee compensation	N/A	N/A	2.47 %	2.59 %	N/A	N/A
Initial healthcare cost trend rate					6.35 %	6.73 %
Ultimate healthcare cost trend rate					4.89 %	5.04 %

The actuarial assumptions used to compute the net periodic pension benefit cost (income) are based upon information available as of the beginning of the year, as presented in the following table:

	Domestic Pension Benefits			Non-U.S. Pension Benefits		
	2018	2017	2016	2018	2017	2016
Weighted Average Assumptions Used to Determine Net Benefit Cost (Income)						
Discount rate	3.54 %	4.06 %	4.25 %	2.10 %	1.95 %	2.83 %
Average rate of increase in employee compensation	N/A	N/A	N/A	2.59 %	3.10 %	3.06 %
Expected long-term rate of return on assets	5.75 %	6.50 %	7.00 %	3.31 %	3.11 %	3.74 %

The ultimate healthcare cost trend rates for the postretirement benefit plans are expected to be reached between 2019 and 2040.

The discount rate reflects the rate the company would have to pay to purchase high-quality investments that would provide cash sufficient to settle its current pension obligations. The discount rate is determined based on a range of factors, including the rates of return on high-quality, fixed-income corporate bonds and the related expected duration of the obligations or, in certain instances, the company has used a hypothetical portfolio of high quality instruments with maturities that mirror the benefit obligation in order to accurately estimate the discount rate relevant to a particular plan.

The company utilizes a full yield curve approach in the estimation of these components by applying the specific spot-rates along the yield curve used in the determination of the benefit obligation to the relevant projected cash flows.

The expected long-term rate of return on plan assets reflects the average rate of earnings expected on the funds invested, or to be invested, to provide for the benefits included in the projected benefit obligations. In determining the expected long-term rate of return on plan assets, the company considers the relative weighting of plan assets, the historical performance of total plan assets and individual asset classes and economic and other indicators of future performance. In addition, the company may consult with and consider the opinions of financial and other professionals in developing appropriate return benchmarks.

Asset management objectives include maintaining an adequate level of diversification to reduce interest rate and market risk and providing adequate liquidity to meet immediate and future benefit payment requirements.

The expected rate of compensation increase reflects the long-term average rate of salary increases and is based on historic salary increase experience and management's expectations of future salary increases.

The amounts in accumulated other comprehensive items expected to be recognized as components of net periodic benefit cost in 2019 are not material.

The projected benefit obligation and fair value of plan assets for the company's qualified and non-qualified pension plans with projected benefit obligations in excess of plan assets are as follows:

	Pension Plans	
(In millions)	2018	2017
Pension Plans with Projected Benefit Obligations in Excess of Plan Assets		
Projected benefit obligation	$ 1,876	$ 2,059
Fair value of plan assets	1,421	1,527

The accumulated benefit obligation and fair value of plan assets for the company's qualified and non-qualified pension plans with accumulated benefit obligations in excess of plan assets are as follows:

	Pension Plans	
(In millions)	2018	2017
Pension Plans with Accumulated Benefit Obligations in Excess of Plan Assets		
Accumulated benefit obligation	$ 1,792	$ 1,962
Fair value of plan assets	1,393	1,495

The measurement date used to determine benefit information is December 31 for all plan assets and benefit obligations.

The net periodic pension benefit cost (income) includes the following components:

	Domestic Pension Benefits			Non-U.S. Pension Benefits		
(In millions)	2018	2017	2016	2018	2017	2016
Components of Net Benefit Cost (Income)						
Service cost-benefits earned	$ —	$ —	$ —	$ 26	$ 26	$ 24
Interest cost on benefit obligation	41	43	51	23	21	27
Expected return on plan assets	(55)	(56)	(49)	(32)	(29)	(28)
Amortization of actuarial net loss	3	2	—	7	9	7
Settlement/curtailment loss	—	1	—	7	5	—
Net periodic benefit cost (income)	$ (11)	$ (10)	$ 2	$ 31	$ 32	$ 30

The net periodic postretirement benefit cost was not material in 2018, 2017 and 2016.

Expected benefit payments are estimated using the same assumptions used in determining the company's benefit obligation at December 31, 2018. Benefit payments will depend on future employment and compensation levels, average years employed and average life spans, among other factors, and changes in any of these factors could significantly affect these estimated future benefit payments. Estimated future benefit payments during the next five years and in the aggregate for the five fiscal years thereafter, are as follows:

(In millions)	Domestic Pension Benefits	Non-U.S. Pension Benefits	Post-retirement Benefits

Expected Benefit Payments			
2019	$ 92	$ 34	$ 3
2020	85	36	3
2021	86	37	3
2022	84	39	3
2023	83	42	3
2024-2028	393	244	12

A change in the assumed healthcare cost trend rate by one percentage point effective January 2018 would not have caused a material change in the accumulated postretirement benefit obligation as of December 31, 2018 and the 2018 aggregate of service and interest costs.

Domestic Pension Plan Assets

The company's overall objective is to manage the assets in a liability framework where investments are selected that are expected to have similar changes in fair value as the related liabilities will have upon changes in interest rates. The company invests in a portfolio of both return-seeking and liability-hedging assets, primarily through the use of institutional collective funds, to achieve long-term growth and to insulate the funded position from interest rate volatility. The strategic asset allocation uses a combination of risk controlled and index strategies in fixed income and global equities. The company also has a small portfolio (comprising less than 1% of invested assets) of private equity investments. The target allocations for the remaining investments are approximately 10% to funds investing in U.S. equities, approximately 10% to funds investing in international equities and approximately 80% to funds investing in fixed income securities. The portfolio maintains enough liquidity at all times to meet the near-term benefit payments.

Non-U.S. Pension Plan Assets

The company maintains specific plan assets for many of the individual pension plans outside the U.S. The investment strategy of each plan has been uniquely established based on the country specific standards and characteristics of the plans. Several of the plans have contracts with insurance companies whereby the market risks of the benefit obligations are borne by the insurance companies. When assets are held directly in investments, generally the objective is to invest in a portfolio of diversified assets with a variety of fund managers. The investments may include hedge funds, multi-asset funds, alternative investments and derivative funds with the target asset allocations ranging from approximately 0% - 25% for equities, 0% - 55% for fixed income, 0% - 20% for hedge funds, 0% - 100% for multi-asset funds, 0% to 15% for alternative investments and 0% - 22% for funds holding derivatives. The derivatives held by the funds are primarily interest rate swaps intended to match the movements in the plan liabilities as well as equity futures in a synthetic equity fund which provide targeted exposure to equity markets without the fund holding individual equity positions. Each plan maintains enough liquidity at all times to meet the near-term benefit payments.

The fair values of the company's plan assets at December 31, 2018 and 2017, by asset category are as follows:

(In millions)	December 31, 2018	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Not Subject to Leveling (1)
Domestic Pension Plan Assets					
U.S. equity funds	$ 104	$ —	$ —	$ —	$ 104
International equity funds	103	—	—	—	103
Fixed income funds	868	—	—	—	868
Money market funds	16	—	—	—	16
Total Domestic Pension Plans	$ 1,091	$ —	$ —	$ —	$ 1,091
Non-U.S. Pension Plan Assets					
Equity funds	$ 43	$ —	$ —	$ —	$ 43
Fixed income funds	299	—	—	—	299
Hedge funds	61	—	—	—	61
Multi-asset funds	97	—	—	—	97
Derivative funds	169	—	—	—	169

Alternative investments	20	—	—	—	20
Insurance contracts	237	—	237	—	—
Cash / money market funds	6	5	—	—	1
Total Non-U.S. Pension Plans	$ 932	$ 5	$ 237	$ —	$ 690

(1) Investments measured at the net asset value per share (or its equivalent) practical expedient have not been classified in the fair value hierarchy.

(In millions)	December 31, 2017	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Not Subject to Leveling (1)
Domestic Pension Plan Assets					
U.S. equity funds	$ 163	$ —	$ —	$ —	$ 163
International equity funds	180	—	—	—	180
Fixed income funds	761	—	—	—	761
Private equity funds	2	—	—	—	2
Money market funds	75	—	—	—	75
Total Domestic Pension Plans	$ 1,181	$ —	$ —	$ —	$ 1,181
Non-U.S. Pension Plan Assets					
Equity funds	$ 75	$ —	$ —	$ —	$ 75
Fixed income funds	312	—	—	—	312
Hedge funds	77	—	—	—	77
Multi-asset funds	79	—	—	—	79
Derivative funds	194	—	—	—	194
Alternative investments	17	—	—	—	17
Insurance contracts	202	—	202	—	—
Cash / money market funds	55	40	—	—	15
Total Non-U.S. Pension Plans	$ 1,011	$ 40	$ 202	$ —	$ 769

(1) Investments measured at the net asset value per share (or its equivalent) practical expedient have not been classified in the fair value hierarchy.

The tables above present the fair value of the company's plan assets in accordance with the fair value hierarchy (Note 13). Certain investments that are measured at fair value using the net asset value per share practical expedient have not been classified in the fair value hierarchy. The fair value amounts of these investments presented in the above tables are intended to permit reconciliation of the fair value hierarchy to the amounts presented for the total pension plan assets. These investments were also redeemable at the balance sheet date or within limited time restrictions.

Note 8. Income Taxes

The components of income from continuing operations before provision for income taxes are as follows:

(In millions)	2018	2017	2016
U.S.	$ 1,329	$ 655	$ 493
Non-U.S.	1,933	1,774	1,531
Income from Continuing Operations	$ 3,262	$ 2,429	$ 2,024

The components of the provision for income taxes of continuing operations are as follows:

(In millions)	2018	2017	2016
Current Income Tax Provision			
Federal	$ 165	$ 1,259	$ 280
Non-U.S.	574	576	349
State	59	62	9
	798	1,897	638
Deferred Income Tax Provision (Benefit)			
Federal	$ (258)	$ (1,437)	$ (510)
Non-U.S.	(187)	(271)	(104)
State	(29)	12	(25)
	(474)	(1,696)	(639)
Provision for (benefit from) income taxes	$ 324	$ 201	$ (1)

The provision for income taxes in the accompanying statement of income differs from the provision calculated by applying the statutory federal income tax rate to income from continuing operations before provision for income taxes due to the following:

(In millions)	2018	2017	2016
Statutory Federal Income Tax Rate	21%	35%	35%
Provision for Income Taxes at Statutory Rate	$ 685	$ 850	$ 708
Increases (Decreases) Resulting From:			
Foreign rate differential	(375)	(380)	(322)
Foreign exchange loss on inter-company debt refinancing	—	(237)	—
Income tax credits	(349)	(273)	(318)
Manufacturing deduction	—	(42)	(38)
Withholding taxes	31	55	—
Global intangible low-taxed income	167	—	—
Foreign-derived intangible income	(47)	—	—
Singapore tax holiday	(28)	(25)	(23)
Impact of change in tax laws and apportionment on deferred taxes	(12)	(1,121)	2
Transition tax and other initial impacts of U.S. tax reform	117	1,250	—
(Reversal of) provision for tax reserves, net	(49)	99	12
Excess tax benefits from stock options and restricted stock units	(77)	(65)	—
Tax return reassessments and settlements	(26)	8	(41)
Valuation allowance	260	7	—
Other, net	27	75	19

Provision for (benefit from) income taxes	$ 324	$ 201	$ (1)

The company has operations and a taxable presence in approximately 50 countries outside the U.S. The company's effective income tax rate differs from the U.S. federal statutory rate each year due to certain operations that are subject to tax incentives, state and local taxes, and foreign taxes that are different than the U.S. federal statutory rate.

U.S. Tax Reform Impacts

On December 22, 2017, the Tax Cuts and Jobs Act of 2017 was enacted. The Tax Act includes significant changes to existing U.S. tax laws that affect the company, including a reduction of the U.S. corporate income tax rate from 35% to 21% beginning in 2018 and creation of a territorial tax system with a one-time transition tax on deemed repatriated earnings and

profits of foreign subsidiaries (transition tax). As detailed below, the company recognized a net charge of $204 million for certain aspects of the Tax Act in its 2017 financial statements for which the accounting was provisional, but a reasonable estimate could be determined. During 2018, the company completed its accounting for the income tax effects of the Tax Act and recognized net adjustments (detailed below) to the provisional amounts, totaling a net charge of $68 million, as a component of income tax expense.

The transition tax is based on the company's total post-1986 earnings and profits, the tax on which was previously deferred from U.S. income taxes under U.S. law. The company recorded a provisional amount for the transition tax liability for each of the foreign subsidiaries, resulting in a total transition liability of $1.25 billion at December 31, 2017. After further analysis of new U.S. Treasury guidance, available tax accounting methods and elections, legislative updates, regulations, earnings and profits computations and foreign taxes, the company finalized the calculations of the transition tax liability during 2018. The increase in the liability for the transition tax in 2018 consisted of an incremental provision of $117 million offset in part by a $49 million reduction of related unrecognized tax benefits established in 2017.

In 2017, as a result of the Tax Act, the company remeasured certain deferred tax assets and liabilities based on the rates at which they were expected to reverse in the future (which was generally 21%), by recording a provisional tax benefit of $1.06 billion. During 2018, no material changes to this provisional amount were made.

The Tax Act included a provision for global intangible low-taxed income. The company has adopted a policy to account for this provision as a period cost.

Other Tax Impacts

In 2018, the provision for income taxes also included a $71 million charge to establish a valuation allowance against net operating losses that will not be utilized as a result of the planned sale of the Anatomical Pathology business (Note 2).

The foreign tax credits discussed below are the result of foreign earnings and profits remitted or deemed remitted to the U.S. during the reporting year and the U.S. treatment of taxes paid in the foreign jurisdictions in the years those profits were originally earned.

In 2017, the company continued to implement tax planning initiatives related to non U.S. subsidiaries. These non-U.S. subsidiaries incurred foreign tax obligations, and made cash and deemed distributions to the company’s U.S. operations which resulted in no net tax cost. As a result of these distributions, the company benefitted from U.S. foreign tax credits of $86 million, offset in part by additional U.S. income taxes of $53 million on the related foreign income (which reduced the benefit from the foreign rate differential in 2017). The company also implemented foreign tax credit planning in Sweden which resulted in $20 million of foreign tax credits, with no related incremental U.S. income tax expense. In 2017 the company refinanced certain long term inter-company debt which resulted in an income tax benefit of $237 million related to a foreign exchange loss recognized for income tax purposes.

In 2016, the company continued to implement tax planning initiatives related to non-U.S. subsidiaries. These non-U.S. subsidiaries incurred foreign tax obligations, and made cash and deemed distributions to the company’s U.S. operations which resulted in no net tax cost. As a result of these distributions, the company benefitted from U.S. foreign tax credits of $91 million, offset in part by additional U.S. income taxes of $37 million on the related foreign income (which reduced the benefit from the foreign rate differential in 2016). The company also implemented foreign tax credit planning in Sweden which resulted in $100 million of foreign tax credits, with no related incremental U.S. income tax expense.

The company generally receives a tax deduction upon the exercise of non-qualified stock options by employees, or the vesting of restricted stock units held by employees, for the difference between the exercise price and the market price of the underlying common stock on the date of exercise. The company uses the incremental tax benefit approach for utilization of tax attributes. Prior to 2017, the amount of the tax deduction in excess of compensation cost recognized was allocated to capital in excess of par value. Beginning in 2017, these excess tax benefits reduce the tax provision. In 2018 and 2017, the company's tax provision was reduced by $77 million and $65 million, respectively, of such benefits. In 2016, $53 million of such benefits were allocated to capital in excess of par value.

The company has significant activities in Singapore and has received considerable tax incentives. The local taxing authority granted the company pioneer company status which provides an incentive encouraging companies to undertake activities that have the effect of promoting economic or technological development in Singapore. This incentive equates to a tax exemption on earnings associated with most of the company's manufacturing activities in Singapore and continues through December 31, 2026. In 2018, 2017 and 2016, the impact of this tax holiday decreased the annual effective tax rates by 0.9 percentage points, 1.0 percentage points and 1.1 percentage points, respectively, and increased diluted earnings per share by approximately $0.07, $0.06 and $0.06, respectively. In connection with the March 2017 extension of this agreement until 2026,

the company recorded a benefit in the first quarter of 2017 of approximately $65 million ($0.16 per diluted share) for the effect on deferred tax balances of the extended tax holiday.

Net deferred tax asset (liability) in the accompanying balance sheet consists of the following:

(In millions)	2018	2017
Deferred Tax Asset (Liability)		
Depreciation and amortization	$ (3,444)	$ (3,957)
Net operating loss and credit carryforwards	1,311	1,150
Reserves and accruals	148	139
Accrued compensation	250	265
Inventory basis difference	105	81
Other capitalized costs	103	61
Unrealized losses on hedging instruments	23	125
Other, net	143	126
Deferred tax assets (liabilities), net before valuation allowance	(1,361)	(2,010)
Less: Valuation allowance	471	256
Deferred tax assets (liabilities), net	$ (1,832)	$ (2,266)

The company estimates the degree to which tax assets and loss and credit carryforwards will result in a benefit based on expected profitability by tax jurisdiction and provides a valuation allowance for tax assets and loss and credit carryforwards that it believes will more likely than not expire unutilized. At December 31, 2018, all of the company's valuation allowance relates to deferred tax assets, primarily net operating losses, for which any subsequently recognized tax benefits will reduce income tax expense.

The changes in the valuation allowance are as follows:

	Year Ended December 31,		
(In millions)	2018	2017	2016
Beginning Balance	$ 256	$ 113	$ 109
Additions charged to income tax provision	223	28	—
Additions due to acquisitions	17	108	25
Deductions	(15)	—	—
Currency translation and other	(10)	7	(21)
Ending Balance	$ 471	$ 256	$ 113

At December 31, 2018, the company had federal, state and non-U.S. net operating loss carryforwards of $412 million, $1.69 billion and $4.41 billion, respectively. Use of the carryforwards is limited based on the future income of certain subsidiaries. The federal and state net operating loss carryforwards expire in the years 2019 through 2038. Of the non-U.S. net operating loss carryforwards, $2.15 billion expire in the years 2019 through 2038, and the remainder do not expire.

The company operates in various jurisdictions around the world. A provision has not been made for certain U.S. state income taxes or additional non-U.S. taxes on $14.4 billion of undistributed earnings of international subsidiaries that could be subject to taxation if remitted to the U.S. because such amounts are intended to be reinvested outside the United States indefinitely. It is not practicable to estimate the unrecognized tax liability due to i) the extent of

uncertainty as to which remittance structure would be used (among several possibilities) should a decision be made to repatriate; and ii) the implications of indirect taxes, including withholding taxes that could potentially be required depending on the repatriation structure. The company's intent is to only make distributions from non-U.S. subsidiaries in the future when they can be made at no net tax costs.

Unrecognized Tax Benefits

As of December 31, 2018, the company had $1.44 billion of unrecognized tax benefits which, if recognized, would reduce the effective tax rate.

A reconciliation of the beginning and ending amounts of unrecognized tax benefits is as follows:

(In millions)	2018	2017	2016
Balance at beginning of year	$ 1,409	$ 802	$ 350
Additions due to acquisitions	—	31	54
Reductions due to acquisitions	(5)	—	—
Additions for tax positions of current year	48	565	342
Additions for tax positions of prior years	82	51	94
Closure of tax years	(5)	—	(28)
Settlements	(87)	(40)	(10)
Balance at end of year	$ 1,442	$ 1,409	$ 802

During 2018, the company's unrecognized tax benefits increased $85 million as a result of uncertain tax positions relating to foreign tax positions and $45 million relating to U.S. federal and state tax positions. All of the total $1.44 billion liability is classified as a long-term liability. The company does not expect its unrecognized tax benefits to change significantly over the next twelve months.

During 2017, the company’s unrecognized tax benefits provisionally increased $511 million as a result of uncertain tax positions relating to the scope of the Tax Act’s one-time transition tax, $54 million relating to foreign tax positions, $43 million as a result of a foreign exchange loss recognized on the refinancing of certain long term inter-company debt and $31 million due to an acquisition.

During 2016, the company’s unrecognized tax benefits increased $342 million due to the uncertainty around the deductibility of a foreign exchange loss on intercompany investments, $54 million due to acquisitions, $43 million due to tax planning related to prior years that resulted in amended tax filings, $35 million relating to foreign tax positions and $14 million due to the utilization of deferred tax assets. In 2016, the company also settled the Life Technologies tax audit for the 2012 to 2014 tax years which reduced the reserve on unrecognized tax benefits by $10 million.

The company classified interest and penalties related to unrecognized tax benefits as income tax expense. The total amount of interest and penalties related to uncertain tax positions and recognized in the balance sheet as of December 31, 2018 and 2017 was $59 million and $31 million, respectively.

The company conducts business globally and, as a result, Thermo Fisher or one or more of its subsidiaries files income tax returns in the U.S. federal jurisdiction and various state and foreign jurisdictions. In the normal course of business, the company is subject to examination by taxing authorities throughout the world, including such major jurisdictions as Australia, Canada, China, Denmark, Finland, France, Germany, Japan, Singapore, Sweden, the United Kingdom and the United States. With few exceptions, the company is no longer subject to U.S. federal, state and local, or non-U.S., income tax examinations for years before 2011.

Note 9. Earnings per Share

(In millions except per share amounts)	2018	2017	2016
Income from Continuing Operations	$ 2,938	$ 2,228	$ 2,025
Loss from Discontinued Operations	—	(3)	(3)
Net Income	$ 2,938	$ 2,225	$ 2,022
Basic Weighted Average Shares	402	395	395
Plus Effect of:			
Stock options and restricted units	4	3	2
Diluted Weighted Average Shares	406	398	397
Basic Earnings per Share:			
Continuing operations	$ 7.31	$ 5.65	$ 5.13
Discontinued operations	—	(0.01)	(0.01)
Basic Earnings per Share	$ 7.31	$ 5.64	$ 5.12
Diluted Earnings per Share:			
Continuing operations	$ 7.24	$ 5.60	$ 5.10
Discontinued operations	—	(0.01)	(0.01)
Diluted Earnings per Share	$ 7.24	$ 5.59	$ 5.09
Antidilutive Stock Options Excluded from Diluted Weighted Average Shares	2	2	2

Note 10. Debt and Other Financing Arrangements

(Dollars in millions)	Effective Interest Rate at December 31, 2018	December 31, 2018	December 31, 2017
Commercial Paper	0.74 %	$ 693	$ 960
Floating Rate 2-Year Senior Notes, Due 8/9/2018 (euro-denominated)		—	721
2.15% 3-Year Senior Notes, Due 12/14/2018		—	450
2.40% 5-Year Senior Notes, Due 2/1/2019		—	900
Floating Rate 2-Year Senior Notes, Due 7/24/2019 (euro-denominated)	0.10 %	574	600
6.00% 10-Year Senior Notes, Due 3/1/2020	2.96 %	750	750
4.70% 10-Year Senior Notes, Due 5/1/2020	4.23 %	300	300
Floating Rate 2-Year Senior Notes, Due 8/7/2020 (euro-denominated)	0.17 %	688	—
1.50% 5-Year Senior Notes, Due 12/1/2020 (euro-denominated)	1.62 %	487	510
5.00% 10-Year Senior Notes, Due 1/15/2021	3.24 %	400	400
4.50% 10-Year Senior Notes, Due 3/1/2021	6.89 %	1,000	1,000
3.60% 10-Year Senior Notes, Due 8/15/2021	6.66 %	1,100	1,100
3.30% 7-Year Senior Notes, Due 2/15/2022	3.42 %	800	800
2.15% 7-Year Senior Notes, Due 7/21/2022 (euro-denominated)	2.28 %	574	600
3.15% 10-Year Senior Notes, Due 1/15/2023	3.31 %	800	800
3.00% 7-Year Senior Notes, Due 4/15/2023	6.84 %	1,000	1,000
4.15% 10-Year Senior Notes, Due 2/1/2024	4.16 %	1,000	1,000
0.75% 8-Year Senior Notes, Due 9/12/2024 (euro-denominated)	0.94 %	1,147	1,201
2.00% 10-Year Senior Notes, Due 4/15/2025 (euro-denominated)	2.10 %	734	768
3.65% 10-Year Senior Notes, Due 12/15/2025	3.77 %	350	350
1.40% 8.5-Year Senior Notes, Due 1/23/2026 (euro-denominated)	1.53 %	802	840
2.95% 10-Year Senior Notes, Due 9/19/2026	3.19 %	1,200	1,200
1.45% 10-Year Senior Notes, Due 3/16/2027 (euro-denominated)	1.66 %	574	600
3.20% 10-Year Senior Notes, Due 8/15/2027	3.39 %	750	750
1.375% 12-Year Senior Notes, Due 9/12/2028 (euro-denominated)	1.46 %	688	721
1.95% 12-Year Senior Notes, Due 7/24/2029 (euro-denominated)	2.08 %	802	840
2.875% 20-Year Senior Notes, Due 7/24/2037 (euro-denominated)	2.94 %	802	840
5.30% 30-Year Senior Notes, Due 2/1/2044	5.37 %	400	400
4.10% 30-Year Senior Notes, Due 8/15/2047	4.23 %	750	750
Other		21	24
Total Borrowings at Par Value		19,186	21,175
Fair Value Hedge Accounting Adjustments		(93)	(70)
Unamortized Discount, Net		(21)	(2)
Unamortized Debt Issuance Costs		(82)	(95)
Total Borrowings at Carrying Value		18,990	21,008

Less: Short-term Obligations and Current Maturities	1,271	2,135
Long-term Obligations	$ 17,719	$ 18,873

The effective interest rates for the fixed-rate debt include the stated interest on the notes, the accretion of any discount or amortization of any premium, the amortization of any debt issuance costs and, if applicable, adjustments related to hedging.

See Note 13 for fair value information pertaining to the company's long-term obligations.

As of December 31, 2018, the annual repayment requirements for debt obligations are as follows:

(In millions)	
2019	$ 1,271
2020	2,229
2021	2,504
2022	1,377
2023	1,801
2024 and Thereafter	10,004
	$ 19,186

As of December 31, 2018 and 2017, short-term obligations and current maturities of long-term obligations in the accompanying balance sheet included $693 million and $960 million, respectively, of commercial paper, short-term bank borrowings and borrowings under lines of credit of certain of the company's subsidiaries. The weighted average interest rate for short-term borrowings was 0.74% and slightly below 0% at December 31, 2018 and 2017, respectively. In addition to available borrowings under the company's revolving credit agreements, discussed below, the company had unused lines of credit of $68 million as of December 31, 2018. These unused lines of credit generally provide for short-term unsecured borrowings at various interest rates.

Credit Facilities

The company has a revolving credit facility with a bank group that provides for up to $2.50 billion of unsecured multi-currency revolving credit. The facility expires in July 2021. The agreement calls for interest at either a LIBOR-based rate, a EURIBOR-based rate (for funds drawn in Euro) or a rate based on the prime lending rate of the agent bank, at the company's option. The agreement contains affirmative, negative and financial covenants, and events of default customary for facilities of this type. The covenants in our revolving credit facility (the Facility) include a Consolidated Leverage Ratio (total debt-to-Consolidated EBITDA) and a Consolidated Interest Coverage Ratio (Consolidated EBITDA to Consolidated Interest Expense), as such terms are defined in the Facility. Specifically, the company has agreed that, so long as any lender has any commitment under the Facility, any letter of credit is outstanding under the Facility, or any loan or other obligation is outstanding under the Facility, it will maintain a maximum Consolidated Leverage Ratio of 3.5:1.0. The company has also agreed that so long as any lender has any commitment under the Facility or any letter of credit is outstanding under the Facility, or any loan or other obligation is outstanding under the Facility, it will maintain a minimum Consolidated Interest Coverage Ratio of 3.0:1.0 as of the last day of any fiscal quarter. As of December 31, 2018, no borrowings were outstanding under the Facility, although available capacity was reduced by approximately $82 million as a result of outstanding letters of credit.

Commercial Paper Programs

The company has commercial paper programs pursuant to which it may issue and sell unsecured, short-term promissory notes (CP Notes). Under the U.S. program, a) maturities may not exceed 397 days from the date of issue and b) the CP Notes are issued on a private placement basis under customary terms in the commercial paper market and are not redeemable prior to maturity nor subject to voluntary prepayment. Under the euro program, maturities may not exceed 183 days and may be denominated in euro, U.S. dollars, Japanese yen, British pounds sterling, Swiss franc, Canadian dollars or other currencies. Under both programs, the CP Notes are issued at a discount from par (or premium to par, in the case of negative interest rates), or, alternatively, are sold at par and bear varying interest rates on a fixed or floating basis. As of December 31, 2018, outstanding borrowings under these programs were $693 million, with a weighted average remaining period to maturity of 51 days and are classified as short-term obligations in the accompanying balance sheet.

Senior Notes

Interest on the floating rate senior notes is payable quarterly. Interest is payable annually on the other euro-denominated senior notes and semi-annually on all other senior notes. Each of the notes may be redeemed at a redemption price of 100% of the principal amount plus a specified make-whole premium and accrued interest. The

company is subject to certain affirmative and negative covenants under the indentures governing the senior notes, the most restrictive of which limits the ability of the company to pledge principal properties as security under borrowing arrangements.

In 2018, Thermo Fisher Scientific (Finance I) B.V., a wholly-owned finance subsidiary of the company, issued the Floating Rate Senior Notes due 2020 included in the table above. This subsidiary has no independent function other than financing

activities. The Floating Rate Senior Notes due 2020 are fully and unconditionally guaranteed by the company and no other subsidiaries of the company have guaranteed the obligations.

Prior to issuing the 3.00% Senior Notes due 2023, the company had entered into an agreement to hedge its exposure related to the interest rate on the anticipated borrowings (described under the heading *"Cash Flow Hedge Arrangements"* in Note 13) that was terminated in April 2016. The company had a cash outlay of $75 million in 2016 associated with termination of the arrangement, included in other financing activities, net, in the accompanying statement of cash flows.

Interest Rate Swap Arrangements

In 2016, the company terminated certain of its fixed to floating rate swap arrangements. The terminated swaps were accounted for as fair value hedges. As a result of terminating these arrangements, the company received $61 million (excluding accrued interest) in cash in 2016, included in other financing activities, net, in the accompanying statement of cash flows. The proceeds were recorded as part of the carrying value of the underlying debt and will be amortized as a reduction to interest expense over the remaining terms of the respective debt instruments. Subsequently, the company entered into new swap arrangements which are included in the table below.

The company has entered into LIBOR-based interest rate swap arrangements with various banks on several of its outstanding senior notes. The aggregate amounts of the swaps are equal to the principal amounts of the notes and the payment dates of the swaps coincide with the interest payment dates of the notes. The swap contracts provide for the company to pay a variable interest rate and receive a fixed rate. The variable interest rates reset monthly. The swaps have been accounted for as fair value hedges of the notes. See Note 13 for additional information on the interest rate swap arrangements and related cross-currency interest rate swap arrangements. The following table summarizes the outstanding interest rate swap arrangements on the company's senior notes at December 31, 2018:

(Dollars in millions)	Aggregate Notional Amount	Pay Rate	Pay Rate as of December 31, 2018	Receive Rate
4.50% Senior Notes due 2021 (a)	1,000	1-month LIBOR + 3.4420%	5.7913 %	4.50 %
3.60% Senior Notes due 2021	1,100	1-month LIBOR + 2.5150%	4.9701 %	3.60 %
3.00% Senior Notes due 2023 (a)	1,000	1-month LIBOR + 1.7640%	4.2191 %	3.00 %

(a) The payments on $1.5 billion notional value of these interest rate swaps are offset in part by cross-currency interest rate swaps which effectively reduced the pay rate as of December 31, 2018 from a weighted average of 5.00% to a weighted average of 1.96%.

In 2018, the company entered into $1.5 billion notional value of cross-currency interest rate swaps, which effectively convert a portion of the semi-annual payments related to the variable rate, U.S. dollar denominated, LIBOR-based interest rate swaps to payments on variable rate, euro denominated, EURIBOR-based cross-currency interest rate swaps.

Note 11. Commitments and Contingencies

Operating Leases

The company leases certain logistics, office, and manufacturing facilities. Income from continuing operations includes expense from operating leases of $211 million, $198 million and $182 million in 2018, 2017 and 2016, respectively. The following is a summary of annual future minimum lease and rental commitments under noncancelable operating leases as of December 31, 2018:

(In millions)	

2019	$ 192
2020	158
2021	118
2022	86
2023	58
2024 and Thereafter	177
	$ 789

Purchase Obligations

The company has entered into unconditional purchase obligations, in the ordinary course of business, that include agreements to purchase goods, services or fixed assets and to pay royalties that are enforceable and legally binding and that specify all significant terms including: fixed or minimum quantities to be purchased; fixed, minimum or variable price provisions; and the approximate timing of the transaction. Purchase obligations exclude agreements that are cancelable at any time without penalty. The aggregate amount of the company's unconditional purchase obligations totaled $745 million at December 31, 2018 and the majority of these obligations are expected to be settled during 2019.

Letters of Credit, Guarantees and Other Commitments

Outstanding letters of credit and bank guarantees totaled $218 million at December 31, 2018. Substantially all of these letters of credit and guarantees expire before 2025.

Outstanding surety bonds and other guarantees totaled $28 million at December 31, 2018. The expiration of these bonds and guarantees ranges through 2020.

The letters of credit, bank guarantees and surety bonds principally secure performance obligations, and allow the holder to draw funds up to the face amount of the letter of credit, bank guarantee or surety bond if the applicable business unit does not perform as contractually required.

The company is a guarantor of pension plan obligations of a divested business. The purchaser of the divested business has agreed to pay for the pension benefits, however the company was required to guarantee payment of these pension benefits should the purchaser fail to do so. The amount of the guarantee at December 31, 2018 was $38 million.

In connection with the sale of businesses of the company, the buyers have assumed certain contractual obligations of such businesses and have agreed to indemnify the company with respect to those assumed liabilities. In the event a third-party to a transferred contract does not recognize the transfer of obligations or a buyer defaults on its obligations under the transferred contract, the company could be liable to the third-party for such obligations. However, in such event, the company would be entitled to seek indemnification from the buyer.

The company has guaranteed the residual value of three leased operating facilities with initial lease terms ending in 2019, 2020 and 2023. The company has agreed with the lessor to comply with certain financial covenants consistent with its other debt arrangements (Note 10). The aggregate maximum guarantee under these three lease arrangements is $147 million.

Indemnifications

In conjunction with certain transactions, primarily divestitures, the company has agreed to indemnify the other parties with respect to certain liabilities related to the businesses that were sold or leased properties that were abandoned (e.g., retention of certain environmental, tax, employee and product liabilities). The scope and duration of such indemnity obligations vary from transaction to transaction. Where probable, an obligation for such indemnifications is recorded as a liability. Generally, a maximum obligation cannot be reasonably estimated. Other than obligations recorded as liabilities at the time of divestiture, historically the company has not made significant payments for these indemnifications.

In connection with the company's efforts to reduce the number of facilities that it occupies, the company has vacated some of its leased facilities or sublet them to third parties. When the company sublets a facility to a third-party, it remains the primary obligor under the master lease agreement with the owner of the facility. As a result, if a third-party vacates the sublet facility, the company would be obligated to make lease or other payments under the master lease agreement. The company believes that the financial risk of default by sublessors is individually and in the aggregate not material to the company's financial position or results of operations.

In connection with the sale of products in the ordinary course of business, the company often makes representations affirming, among other things, that its products do not infringe on the intellectual property rights of others and agrees to indemnify customers against third-party claims for such infringement. The company has not been required to make material payments under such provisions.

Environmental Matters

The company is currently involved in various stages of investigation and remediation related to environmental matters. The company cannot predict all potential costs related to environmental remediation matters and the possible impact on future operations given the uncertainties regarding the extent of the required cleanup, the complexity and interpretation of applicable laws and regulations, the varying costs of alternative cleanup methods and the extent of the company's responsibility. Expenses for environmental remediation matters related to the costs of installing, operating and maintaining groundwater-treatment

systems and other remedial activities related to historical environmental contamination at the company's domestic and international facilities were not material in any period presented. The company records accruals for environmental remediation liabilities, based on current interpretations of environmental laws and regulations, when it is probable that a liability has been incurred and the amount of such liability can be reasonably estimated. The company calculates estimates based upon several factors, including reports prepared by environmental specialists and management's knowledge of and experience with these environmental matters. The company includes in these estimates potential costs for investigation, remediation and operation and maintenance of cleanup sites. At December 31, 2018, the company's total environmental liability was approximately $69 million. While management believes the accruals for environmental remediation are adequate based on current estimates of remediation costs, the company may be subject to additional remedial or compliance costs due to future events such as changes in existing laws and regulations, changes in agency direction or enforcement policies, developments in remediation technologies or changes in the conduct of the company's operations, which could have a material adverse effect on the company's financial position, results of operations or cash flows.

Litigation and Related Contingencies

There are various lawsuits and claims pending against the company including matters involving product liability, intellectual property, employment and commercial issues. The company determines the probability and range of possible loss based on the current status of each of these matters. A liability is recorded in the financial statements if it is believed to be probable that a loss has been incurred and the amount of the loss can be reasonably estimated. The company establishes a liability that is an estimate of amounts expected to be paid in the future for events that have already occurred. The company accrues the most likely amount or at least the minimum of the range of probable loss when a range of probable loss can be estimated. The accrued liabilities are based on management's judgment as to the probability of losses for asserted and unasserted claims and, where applicable, actuarially determined estimates. Accrual estimates are adjusted as additional information becomes known or payments are made. The amount of ultimate loss may differ from these estimates. Due to the inherent uncertainties associated with pending litigation or claims, the company cannot predict the outcome, nor, with respect to certain pending litigation or claims where no liability has been accrued, make a meaningful estimate of the reasonably possible loss or range of loss that could result from an unfavorable outcome. The company has no material accruals for pending litigation or claims for which accrual amounts are not disclosed below, nor are material losses deemed probable for such matters. It is reasonably possible, however, that an unfavorable outcome that exceeds the company's current accrual estimate, if any, for one or more of the matters described below could have a material adverse effect on the company's results of operations, financial position and cash flows.

Product Liability, Workers Compensation and Other Personal Injury Matters

The range of probable loss for product liability, workers compensation and other personal injury matters of the company's continuing operations at December 31, 2018, was approximately $215 million to $349 million on an undiscounted basis. The portion of these liabilities assumed in the 2006 merger with Fisher was recorded at its fair (present) value at the date of merger. The company's accrual for all such matters in total, including the discounted liabilities, was $204 million at December 31, 2018 (or $221 million undiscounted). The accrual includes estimated defense costs and is gross of estimated amounts due from insurers of $86 million at December 31, 2018 (or $97 million undiscounted) that are included in other assets in the accompanying balance sheet. The portion of these insurance assets assumed in the merger with Fisher was also recorded at its fair value at the date of merger. In addition to the above accrual, as of December 31, 2018, the company had a product liability accrual of $10 million (undiscounted) relating to divested businesses.

The assets and liabilities assumed at the Fisher merger date were ascribed a fair value based on the present value of expected future cash flows, using a discount rate equivalent to the risk free rate of interest for monetary assets with comparable maturities (weighted average discount rate of 4.67%). The discount on the liabilities of approximately $17 million and the discount on the assets of approximately $11 million (net discount $6 million) are being accreted to interest expense over the expected settlement period.

Although the company believes that the amounts accrued and estimated recoveries are probable and appropriate based on available information, including actuarial studies of loss estimates, the process of estimating losses and insurance recoveries involves a considerable degree of judgment by management and the ultimate amounts could vary materially. Insurance contracts do not relieve the company of its primary obligation with respect to any losses

incurred. The collectability of amounts due from its insurers is subject to the solvency and willingness of the insurer to pay, as well as the legal sufficiency of the insurance claims. Management monitors the payment history as well as the financial condition and ratings of its insurers on an ongoing basis.

Intellectual Property Matters

On June 3, 2013, Unisone Strategic IP filed a complaint against Life Technologies in the United States District Court for the Southern District of California alleging patent infringement by Life Technologies' supply chain management system software, which operates with product "supply centers" installed at customer sites. Plaintiff seeks damages for alleged willful infringement, attorneys' fees, costs, and injunctive relief. On August 24, 2017, Unisone filed an appeal from a decision by the Patent Trial and Appeal Board that found the challenged patent claims invalid. The United States Court of Appeals for the Federal Circuit upheld the Patent Trial and Appeal Board's ruling finding the challenged claims in the Unisone patent invalid. Unisone has until March 11, 2019 to file an appeal with the United States Supreme Court.

Note 12. Comprehensive Income and Shareholders' Equity

Comprehensive Income (Loss)

Comprehensive income (loss) combines net income and other comprehensive items. Other comprehensive items represent certain amounts that are reported as components of shareholders' equity in the accompanying balance sheet.

In the fourth quarter of 2017, the company recorded an out of period adjustment to correct an error in the accounting for income taxes associated with the partial hedge of its net investment in a foreign operation in 2014 through the third quarter of 2017. The adjustment affected deferred income taxes and other comprehensive income and, in the aggregate, increased comprehensive income by $101 million for the year ended December 31, 2017. The adjustment does not have any impact on the company's statements of income or cash flows. The company determined that the adjustment was not material to the consolidated financial statements for any previously reported annual or interim periods.

Changes in each component of accumulated other comprehensive items, net of tax are as follows:

(In millions)	Currency Translation Adjustment	Unrealized Losses on Available-for-Sale Investments	Unrealized Losses on Hedging Instruments	Pension and Other Postretirement Benefit Liability Adjustment	Total
Balance at December 31, 2017	(1,755)	(1)	(50)	(197)	(2,003)
Cumulative effect of accounting changes (Note 1)	(54)	1	(11)	(24)	(88)
Other comprehensive income (loss) before reclassifications	(434)	—	—	3	(431)
Amounts reclassified from accumulated other comprehensive items	—	—	9	15	24
Net other comprehensive items	(434)	—	9	18	(407)
Balance at December 31, 2018	(2,243)	—	(52)	(203)	(2,498)

Shareholders' Equity

At December 31, 2018, the company had reserved 30 million unissued shares of its common stock for possible issuance under stock-based compensation plans.

Note 13. Fair Value Measurements and Fair Value of Financial Instruments

Fair Value Measurements

The company uses the market approach technique to value its financial instruments and there were no changes in valuation techniques during 2018. The company's financial assets and liabilities carried at fair value are primarily comprised of insurance contracts, investments in money market funds, derivative contracts, mutual funds holding publicly traded securities and other

investments in unit trusts held as assets to satisfy outstanding deferred compensation and retirement liabilities; and acquisition-related contingent consideration.

The fair value accounting guidance requires that assets and liabilities carried at fair value be classified and disclosed in one of the following three categories:

Level 1: Quoted market prices in active markets for identical assets or liabilities that the company has the ability to access.

Level 2: Observable market based inputs or unobservable inputs that are corroborated by market data such as quoted prices, interest rates and yield curves.

Level 3: Inputs are unobservable data points that are not corroborated by market data.

The following tables present information about the company's financial assets and liabilities measured at fair value on a recurring basis as of December 31, 2018 and December 31, 2017:

(In millions)	December 31, 2018	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets				
Cash equivalents	$ 769	$ 769	$ —	$ —
Bank time deposits	2	2	—	—
Investments in mutual funds and other similar instruments	10	10	—	—
Warrants	8	—	8	—
Insurance contracts	113	—	113	—
Derivative contracts	31	—	31	—
Total Assets	$ 933	$ 781	$ 152	$ —
Liabilities				
Derivative contracts	$ 145	$ —	$ 145	$ —
Contingent consideration	37	—	—	37
Total Liabilities	$ 182	$ —	$ 145	$ 37

(In millions)	December 31, 2017	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets				
Cash equivalents	$ 22	$ 22	$ —	$ —
Bank time deposits	2	2	—	—
Investments in mutual funds and other similar instruments	13	13	—	—
Warrants	2	—	2	—
Insurance contracts	116	—	116	—

Derivative contracts	10	—	10	—
Total Assets	$ 165	$ 37	$ 128	$ —
Liabilities				
Derivative contracts	$ 139	$ —	$ 139	$ —
Contingent consideration	35	—	—	35
Total Liabilities	$ 174	$ —	$ 139	$ 35

The company uses the Black-Scholes model to value its warrants. The company determines the fair value of its insurance contracts by obtaining the cash surrender value of the contracts from the issuer. The fair value of derivative contracts is the estimated amount that the company would receive/pay upon liquidation of the contracts, taking into account the change in interest rates and currency exchange rates. The company determines the fair value of acquisition-related contingent consideration based on the probability-weighted discounted cash flows associated with such future payments. Changes to the fair value of contingent consideration are recorded in selling, general and administrative expense. The following table provides a rollforward of the fair value, as determined by level 3 inputs, of the contingent consideration.

(In millions)	2018	2017
Contingent Consideration		
Beginning Balance	$ 35	$ 6
Acquisitions	11	17
Payments	(8)	(3)
Change in fair value included in earnings	(1)	15
Ending Balance	$ 37	$ 35

Derivative Contracts

The following table provides the aggregate notional value of outstanding derivative contracts.

(In millions)	December 31, 2018	December 31, 2017
Notional Amount		
Interest rate swaps (described in Note 10)	$ 3,100	$ 3,100
Cross-currency interest rate swaps - designated as net investment hedges	1,500	—
Currency exchange contracts	3,424	2,921

While certain derivatives are subject to netting arrangements with counterparties, the company does not offset derivative assets and liabilities within the consolidated balance sheet. The following tables present the fair value of derivative instruments in the consolidated balance sheet and statement of income.

	Fair Value – Assets		Fair Value – Liabilities	
(In millions)	December 31, 2018	December 31, 2017	December 31, 2018	December 31, 2017
Derivatives Designated as Hedging Instruments				
Interest rate swaps (a)	$ —	$ —	$ 129	$ 124
Cross-currency interest rate swaps (b)	28	—	—	—
Derivatives Not Designated as Hedging Instruments				
Currency exchange contracts (c)	3	10	16	15
Total Derivatives	$ 31	$ 10	$ 145	$ 139

(a) The fair value of the interest rate swaps is included in the consolidated balance sheet under the caption other long-term liabilities.

(b) The fair value of the cross-currency interest rate swaps is included in the consolidated balance sheet under the caption other assets.

(c) The fair value of the currency exchange contracts is included in the consolidated balance sheet under the captions other current assets or other accrued expenses.

The following amounts related to cumulative basis adjustments for fair value hedges were included in the consolidated balance sheet under the caption long-term obligations:

	Carrying Amount of the Hedged Liability		Cumulative Amount of Fair Value Hedging Adjustment - Increase (Decrease) Included in Carrying Amount of Liability (d)	
(In millions)	December 31, 2018	December 31, 2017	December 31, 2018	December 31, 2017
Long-term Obligations	$ 3,291	$ 3,309	$ (93)	$ (70)

(d) Includes increases in the carrying amount of $30 million and $43 million at December 31, 2018 and December 31, 2017, respectively, on discontinued hedging relationships.

	Gain (Loss) Recognized	
(In millions)	2018	2017
Fair Value Hedging Relationships		
Interest rate swaps		
Hedged long-term obligations - included in other expense, net	$ (5)	$ (14)
Derivatives designated as hedging instruments - included in other expense, net	7	19
Derivatives Designated as Cash Flow Hedges		
Interest rate swaps		
Amount reclassified from accumulated other comprehensive items to other expense, net	(12)	(12)
Derivatives Designated as Net Investment Hedges		
Foreign currency-denominated debt		
Included in currency translation adjustment within other comprehensive items	336	(664)
Cross-currency interest rate swaps		
Included in currency translation adjustment within other comprehensive items	28	—
Included in other expense, net	21	—
Derivatives Not Designated as Hedging Instruments		
Currency exchange contracts		
Included in cost of revenues	2	(1)
Included in other expense, net	37	92

Gains and losses recognized on currency exchange contracts and the interest rate swaps designated as fair value hedges are included in the consolidated statement of income together with the corresponding, offsetting losses and gains on the underlying hedged transactions.

The company also uses foreign currency-denominated debt and cross-currency interest rate swaps to partially hedge its net investments in foreign operations against adverse movements in exchange rates. The majority of the company’s euro-denominated senior notes and cross-currency interest rate swaps have been designated as, and are effective as, economic hedges of part of the net investment in a foreign operation. Accordingly, foreign currency transaction gains or losses due to spot rate fluctuations on the euro-denominated debt instruments and contract fair value changes on the cross-currency interest rate swaps, excluding interest accruals, are included in currency translation adjustment within other comprehensive items and shareholders’ equity.

See Note 1 and Note 10 for additional information on the company's risk management objectives and strategies.

Cash Flow Hedge Arrangements

In 2015, the company entered into interest rate swap arrangements to mitigate the risk of interest rates rising prior to completion of a debt offering in 2016. Based on the company's conclusion that a debt offering was probable as a result of debt maturing in 2016 and that such debt would carry semi-annual interest payments over a 10-year term, the swaps hedged the cash flow risk for each of the semi-annual fixed-rate interest payments on $1.00 billion of principal amount of the planned fixed-rate debt issue. The hedge was terminated in advance of completing a debt offering in April 2016 (Note 10). The fair value of the hedge at that time, $46 million, net of tax, was classified as a reduction to accumulated other comprehensive items and is being amortized to interest expense over the term of the debt.

Fair Value of Other Financial Instruments

The carrying value and fair value of the company's notes receivable and debt obligations are as follows:

	December 31, 2018		December 31, 2017	
(In millions)	Carrying Value	Fair Value	Carrying Value	Fair Value
Notes Receivable	$ 92	$ 92	$ 89	$ 93
Debt Obligations:				
Senior notes	$ 18,276	$ 18,322	$ 20,024	$ 20,639
Commercial paper	693	693	960	960
Other	21	21	24	24
	$ 18,990	$ 19,036	$ 21,008	$ 21,623

The fair value of debt obligations was determined based on quoted market prices and on borrowing rates available to the company at the respective period ends which represent level 2 measurements.

Note 14. Supplemental Cash Flow Information

(In millions)	2018	2017	2016
Cash Paid For:			
Interest	$ 687	$ 533	$ 458
Income Taxes	591	479	663
Non-cash Investing and Financing Activities			
Declared but unpaid dividends	69	61	60
Issuance of stock upon vesting of restricted stock units	170	125	127
Fair value of investments contributed to defined benefit plans	—	—	16

Cash, cash equivalents and restricted cash is included in the consolidated balance sheet as follows:

(In millions)	December 31, 2018	December 31, 2017
Cash and Cash Equivalents	$ 2,103	$ 1,335
Restricted Cash Included in Other Current Assets	12	24
Restricted Cash Included in Other Assets	2	2
Cash, Cash Equivalents and Restricted Cash	$ 2,117	$ 1,361

Amounts included in restricted cash represent funds held as collateral for bank guarantees and incoming cash in China awaiting government administrative clearance.

Note 15. Restructuring and Other Costs, Net

Restructuring and other costs in 2018 included continuing charges for headcount reductions and facility consolidations in an effort to streamline operations, including the closure and consolidation of operations within several facilities in the U.S. and Europe; third-party transaction/integration costs primarily related to recent acquisitions; sales of inventories revalued at the date of acquisition; and environmental remediation charges. These charges were partially offset by gains on sales of real estate and favorable results of litigation. In 2018, severance actions associated with facility consolidations and cost reduction measures affected approximately 1% of the company's workforce.

Restructuring and other costs in 2017 included continuing charges for headcount reductions and facility consolidations in an effort to streamline operations, including the closure and consolidation of operations within several facilities in the U.S., Europe and Asia; costs to achieve synergies related to acquisitions, including severance and abandoned facility costs; third-party acquisition transaction and integration costs primarily associated with the acquisitions of FEI and Patheon; sales of inventories revalued at the date of acquisition; charges to conform the accounting policies of Patheon to the company's accounting policies; charges for changes in estimates of acquisition contingent consideration; hurricane response/impairment costs; net charges for the settlement/curtailment of retirement plans; and net credits for litigation matters. In 2017, severance actions associated with facility consolidations and cost reduction measures affected less than 2% of the company's workforce.

Restructuring and other costs in 2016 included continuing charges for headcount reductions and facility consolidations in an effort to streamline operations, including the closure and consolidation of operations within several facilities in the U.S., Europe and Asia; third-party acquisition transaction and integration costs primarily associated with the acquisitions of FEI and Affymetrix; sales of inventories revalued at the date of acquisition; costs to conform the accounting policies of FEI and Affymetrix to the company's accounting policies; costs to achieve synergies related to acquisitions, including severance and abandoned facility costs; and net charges for environmental and litigation-related matters. These charges were partially offset by gains on sales of assets. In 2016, severance actions associated with facility consolidations and cost reduction measures affected less than 3% of the company's workforce.

As of February 27, 2019, the company has identified restructuring actions that will result in additional charges of approximately $65 million, primarily in 2019, which will be recorded when specified criteria are met, such as communication of benefit arrangements and abandonment of leased facilities.

2018

During 2018, the company recorded net restructuring and other costs by segment as follows:

(In millions)	Cost of Revenues	Selling, General and Administrative Expenses	Restructuring and Other Costs, Net	Total
Life Sciences Solutions	$ 4	$ 12	$ (17)	$ (1)
Analytical Instruments	3	8	28	39
Specialty Diagnostics	—	3	(1)	2
Laboratory Products and Services	5	16	31	52
Corporate	—	(10)	9	(1)
	$ 12	$ 29	$ 50	$ 91

The principal components of net restructuring and other costs by segment are as follows:

Life Sciences Solutions

In 2018, the Life Sciences Solutions segment recorded $1 million of net restructuring and other income. The segment recorded charges to cost of revenues of $4 million for the sales of inventory revalued at the date of acquisition, as well as $12 million of charges to selling, general, and administrative expenses, primarily third-party transaction/integration costs related to recent acquisitions. The segment also recorded $17 million of net restructuring and other income, principally for a $46 million net gain on the resolution of litigation, partially offset by charges for severance other costs associated with facility consolidations in the U.S.

Analytical Instruments

In 2018, the Analytical Instruments segment recorded $39 million of net restructuring and other charges. The segment recorded net charges to cost of revenues of $3 million for the sales of inventory revalued at the date of acquisition; $8 million of net charges to selling, general, and administrative expense, principally third-party transaction costs related to the acquisition of Gatan; and $28 million of restructuring and other costs, primarily for employee severance and other costs associated with facility consolidations in the U.S. and Europe, as well as abandoned facilities costs associated with the remediation and closure of a manufacturing facility in the U.S.

Specialty Diagnostics

In 2018, the Specialty Diagnostics segment recorded $2 million of net restructuring and other charges, including $3 million of net charges to selling, general, and administrative expense, principally third-party transaction costs in connection with the planned sale of the Anatomical Pathology business. The segment also recorded $1 million of net restructuring and other income, including a $6 million gain on the sale of real estate, mostly offset by cash charges for severance and other costs associated with facility consolidations in the U.S. and Europe.

Laboratory Products and Services

In 2018, the Laboratory Products and Services segment recorded $52 million of net restructuring and other charges. The segment recorded charges to cost of revenues of $5 million, principally for the sales of inventory revalued at the date of acquisition, and $16 million of charges to selling, general, and administrative expenses for third-party transaction/integration costs related to the acquisition of Patheon. The segment also recorded $31 million of restructuring and other costs, primarily charges for environmental remediation associated with a Superfund site in the U.S., employee severance, and, to a lesser extent, hurricane response costs.

Corporate

In 2018, the company recorded $1 million of net restructuring and other income, principally income from favorable results of product liability litigation, mostly offset by charges for environmental remediation at an abandoned facility and, to a lesser extent, severance at its corporate operations.

2017

During 2017, the company recorded net restructuring and other costs by segment as follows:

(In millions)	Cost of Revenues	Selling, General and Administrative Expenses	Restructuring and Other Costs, Net	Total
Life Sciences Solutions	$ 1	$ 29	$ (16)	$ 14
Analytical Instruments	31	(2)	30	59
Specialty Diagnostics	1	(2)	39	38
Laboratory Products and Services	90	61	41	192
Corporate	—	(8)	3	(5)
	$ 123	$ 78	$ 97	$ 298

The principal components of net restructuring and other costs by segment are as follows:

Life Sciences Solutions

In 2017, the Life Sciences Solutions segment recorded $14 million of net restructuring and other charges. The segment recorded $29 million of charges to selling, general and administrative expenses, principally for changes in estimates of acquisition contingent consideration. The segment also recorded $16 million of restructuring and other income, net, including $64 million of net credits principally for pre-acquisition litigation-related matters, and, to a lesser extent, net gains on the settlement of retirement plans. These credits were largely offset by $48 million of cash

restructuring costs, including $23 million of severance and related costs primarily to achieve acquisition synergies, and $25 million of abandoned facilities costs primarily for the consolidation of facilities in the U.S.

Analytical Instruments

In 2017, the Analytical Instruments segment recorded $59 million of net restructuring and other charges. The segment recorded charges to cost of revenues of $31 million for the sales of inventory revalued at the date of acquisition, as well as $30 million of restructuring and other costs, primarily for severance and other costs to achieve acquisition synergies, as well as charges for the settlement of retirement plans.

Specialty Diagnostics

In 2017, the Specialty Diagnostics segment recorded $38 million of net restructuring and other charges, principally charges for litigation-related matters, and, to a lesser extent, cash costs for employee severance and other costs associated with headcount reductions in the U.S. and Europe.

Laboratory Products and Services

In 2017, the Laboratory Products and Services segment recorded $192 million of net restructuring and other charges. The segment recorded charges to cost of revenues of $90 million, including $33 million to conform the accounting policies of Patheon to the company's accounting policies and $55 million for sales of inventory revalued at the date of acquisition. The segment also recorded $61 million of charges to selling, general, and administrative expenses, including $55 million for third-party acquisition transaction costs, as well as $6 million to conform the accounting policies of Patheon to the company's accounting policies. The segment also recorded $41 million of restructuring and other costs, primarily for employee severance and compensation due at Patheon on the date of acquisition, and, to a lesser extent, hurricane response/impairment charges.

Corporate

In 2017, the company recorded $5 million of net restructuring and other income, principally $8 million of income from favorable results of product liability litigation, partially offset by charges for the settlement of a retirement plan and severance at its corporate operations.

2016

During 2016, the company recorded net restructuring and other costs by segment as follows:

(In millions)	Cost of Revenues	Selling, General and Administrative Expenses	Restructuring and Other Costs, Net	Total
Life Sciences Solutions	$ 31	$ 36	$ 88	$ 155
Analytical Instruments	63	46	68	177
Specialty Diagnostics	—	—	15	15
Laboratory Products and Services	8	1	17	26
Corporate	—	21	1	22
	$ 102	$ 104	$ 189	$ 395

Life Sciences Solutions

In 2016, the Life Sciences Solutions segment recorded $155 million of net restructuring and other charges. The segment recorded charges to cost of revenues of $31 million, including $27 million for sales of inventories revalued at the date of acquisition and $4 million to conform the accounting policies of Affymetrix to the company's accounting policies. The segment recorded $36 million of charges to selling, general and administrative expenses, including $34 million of third-party transaction and integration costs primarily related to the acquisition of Affymetrix, $4 million for accelerated depreciation at facilities closing due to real estate consolidation, offset in part by credits of $2 million from changes in estimates of contingent acquisition consideration. In addition, the segment recorded $78 million of cash restructuring costs, including $60 million of severance and related costs primarily to achieve acquisition synergies, and $18 million of abandoned facilities costs principally for the consolidation of

facilities in the U.S. The segment also recorded $10 million of other costs, net, primarily for charges associated with litigation-related matters at acquired businesses.

Analytical Instruments

In 2016, the Analytical Instruments segment recorded $177 million of net restructuring and other charges. The segment recorded charges to cost of revenues of $63 million, including $21 million to conform the accounting policies of FEI to the

company's accounting policies and $42 million for the sales of inventory revalued at the date of acquisition. The segment recorded $46 million of charges to selling, general, and administrative expense, including $38 million of third-party transaction costs related to the acquisition of FEI, as well as $9 million of charges to conform the accounting policies of FEI to the company's accounting policies. The segment also recorded $68 million of cash restructuring costs primarily for severance obligations payable to former FEI executives and charges associated with abandoned facilities, including remediation and other closure costs of a manufacturing facility in the U.S.

Specialty Diagnostics

In 2016, the Specialty Diagnostics segment recorded $15 million of net restructuring and other charges. These costs were principally comprised of $10 million for charges associated with litigation-related matters and $6 million of cash restructuring costs for severance and other costs associated with headcount reductions and facility consolidations. The segment also recorded $1 million of other income, net, primarily gains on the sale of real estate, offset in part by charges for the settlement of retirement plans.

Laboratory Products and Services

In 2016, the Laboratory Products and Services segment recorded $26 million of net restructuring and other charges. The segment recorded charges to cost of revenues of $8 million, including $6 million for sales of inventories revalued at the date of acquisition, and $2 million for accelerated depreciation at facilities closing due to real estate consolidation. The segment recorded $11 million of cash restructuring costs, primarily for employee severance and other costs associated with headcount reductions and facility consolidations. In addition, the segment recorded $8 million of charges for an increase in environmental remediation cost estimates associated with a Superfund site in the U.S., offset in part by $1 million of gains on the settlement of litigation.

Corporate

In 2016, the company recorded $22 million of restructuring and other costs, principally within selling, general, and administrative expenses, including $17 million of charges for product liability litigation and $4 million of accelerated depreciation on information systems to be abandoned due to integration synergies. The segment also recorded $1 million of restructuring charges for severance and other costs associated with facility consolidation at its corporate operations.

The following table summarizes the cash components of the company's restructuring plans. The non-cash components and other amounts reported as restructuring and other costs, net, in the accompanying statement of income have been summarized in the notes to the tables. Accrued restructuring costs are included in other accrued expenses in the accompanying balance sheet.

(In millions)	Severance	Abandonment of Excess Facilities	Other (a)	Total
Balance at December 31, 2015	$ 15	$ 13	$ 3	$ 31
Costs incurred in 2016 (c)	109	46	12	167
Reserves reversed (b)	(2)	—	(1)	(3)
Payments	(83)	(27)	(12)	(122)
Currency translation	(1)	—	—	(1)
Balance at December 31, 2016	38	32	2	72
Costs incurred in 2017 (d)	62	27	17	106
Reserves reversed (b)	(9)	—	—	(9)
Payments	(62)	(19)	(12)	(93)
Currency translation	1	—	(1)	—
Balance at December 31, 2017	30	40	6	76
Costs incurred in 2018 (e)	51	33	18	102
Reserves reversed (b)	(7)	(4)	(3)	(14)
Payments	(39)	(27)	(17)	(83)
Currency translation	(1)	—	—	(1)
Balance at December 31, 2018	$ 34	$ 42	$ 4	$ 80

(a) Other includes relocation and moving expenses associated with facility consolidations, as well as employee retention costs which are accrued ratably over the period through which employees must work to qualify for a payment.

(b) Represents reductions in cost of plans.

(c) Excludes $24 million of provision for losses on litigation-related matters; $8 million of provision for environmental remediation; $5 million of net gains on the sale of real estate; and an aggregate of $3 million of non-cash income, net.

(d) Excludes $27 million of net credits associated with litigation-related matters, and $27 million of other restructuring charges, net, primarily for hurricane response/impairment, charges associated with the settlement/curtailment of retirement plans, and non-cash compensation due at an acquired business.

(e) Excludes $38 million of income, net, primarily associated with litigation-related matters, gains on sales of real estate, charges for environmental remediation, and hurricane response costs.

The company expects to pay accrued restructuring costs as follows: severance, employee-retention obligations and other costs, primarily through 2019; and abandoned-facility payments, over lease terms expiring through 2027.

Note 16. Unaudited Quarterly Information

	2018			
(In millions except per share amounts)	First (a)	Second (b)	Third (c)	Fourth (d)
Revenues	$ 5,853	$ 6,078	$ 5,920	$ 6,507
Gross Profit	2,580	2,738	2,615	2,924
Net Income	579	752	709	898
Earnings per Share:				
Basic	1.44	1.87	1.76	2.23
Diluted	1.43	1.85	1.75	2.22
Cash Dividend Declared per Common Share	0.17	0.17	0.17	0.17

Amounts reflect aggregate restructuring and other items, net, as follows:

(a) Costs of $56 million.

(b) Costs of $25 million.

(c) Income of $32 million.

(d) Costs of $42 million.

	2017			
(In millions except per share amounts)	First (a)	Second (b)	Third (c)	Fourth (d)
Revenues	$ 4,765	$ 4,990	$ 5,116	$ 6,047
Gross Profit	2,193	2,284	2,300	2,671
Net Income	551	612	534	528
Earnings per Share:				
Basic	1.41	1.57	1.35	1.32
Diluted	1.40	1.56	1.34	1.30
Cash Dividend Declared per Common Share	0.15	0.15	0.15	0.15

Amounts reflect aggregate restructuring and other items, net, as follows:

(a) Costs of $86 million.

(b) Costs of $30 million.

(c) Costs of $131 million.

(d) Costs of $51 million.

UNITED STATES SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

☒ Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 for the fiscal year ended December 31, 2017 or

☐ Transition Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934

Commission file number 1-8002

THERMO FISHER SCIENTIFIC INC.

(Exact name of Registrant as specified in its charter)

Delaware	04-2209186
(State of incorporation or organization)	*(I.R.S. Employer Identification No.)*
168 Third Avenue Waltham, Massachusetts	02451
(Address of principal executive offices)	*(Zip Code)*

Registrant's telephone number, including area code: (781) 622-1000

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Name of each exchange on which registered	Title of each class	Name of each exchange on which registered
Common Stock, $1.00 par value	New York Stock Exchange	2.000% Notes due 2025	New York Stock Exchange
Floating Rate Notes due 2018	New York Stock Exchange	1.400% Notes due 2026	New York Stock Exchange
Floating Rate Notes due 2019	New York Stock Exchange	1.450% Notes due 2027	New York Stock Exchange
1.500% Notes due 2020	New York Stock Exchange	1.375% Notes due 2028	New York Stock Exchange
2.150% Notes due 2022	New York Stock Exchange	1.950% Notes due 2029	New York Stock Exchange
0.750% Notes due 2024	New York Stock Exchange	2.875% Notes due 2037	New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. Yes ☐ No ☒

Indicate by check mark whether the Registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months, and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the Registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the Registrant was required to submit and post such files). Yes ☒ No ☐

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of the Registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ☒

Indicate by check mark whether the Registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and emerging growth company in Rule 12b-2 of the Exchange Act. (Check one) Large accelerated filer ☒ Accelerated filer ☐ Non-accelerated filer ☐ Smaller reporting company ☐ Emerging growth company ☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

As of June 30, 2017, the aggregate market value of the voting stock held by nonaffiliates of the Registrant was approximately $67,969,182,000 (based on the last reported sale of common stock on the New York Stock Exchange Composite Tape reporting system on June 30, 2017).

As of February 3, 2018, the Registrant had 401,784,066 shares of Common Stock outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Sections of Thermo Fisher's definitive Proxy Statement for the 2018 Annual Meeting of Shareholders are incorporated by reference into Parts II and III of this report.

THERMO FISHER SCIENTIFIC INC.

ANNUAL REPORT ON FORM 10-K
FOR THE FISCAL YEAR ENDED DECEMBER 31, 2017

TABLE OF CONTENTS

THERMO FISHER SCIENTIFIC INC.

PART I

Item 1. Business

General Development of Business

Thermo Fisher Scientific Inc. (also referred to in this document as "Thermo Fisher," "we," the "company," or the "registrant") is the world leader in serving science. Our mission is to enable our customers to make the world healthier, cleaner and safer. We help our customers accelerate life sciences research, solve complex analytical challenges, improve patient diagnostics and increase laboratory productivity.

Thermo Fisher has approximately 70,000 employees and serves more than 400,000 customers within pharmaceutical and biotech companies, hospitals and clinical diagnostic labs, universities, research institutions and government agencies, as well as environmental, industrial quality and process control settings.

We serve our customers through our premier brands, Thermo Scientific, Applied Biosystems, Invitrogen, Fisher Scientific and Unity Lab Services:

- The Thermo Scientific brand offers customers in research, diagnostics, industrial, and applied markets a complete range of high-end analytical instruments as well as laboratory equipment, software, services, consumables and reagents. Our portfolio of products includes innovative technologies for mass spectrometry, chromatography, elemental analysis, electron microscopy, molecular spectroscopy, sample preparation, informatics, chemical research and analysis, cell culture, bioprocess production, cellular, protein and molecular biology research, allergy testing, drugs-of-abuse testing, therapeutic drug monitoring testing, microbiology, anatomical pathology, as well as environmental monitoring and process control.

- The Applied Biosystems brand offers customers in research, clinical and applied markets integrated instrument systems, reagents, and software for genetic analysis. Our portfolio includes innovative technologies for genetic sequencing and real-time, digital and end point polymerase chain reaction (PCR), that are used to determine meaningful genetic information in applications such as cancer diagnostics, human identification testing, and animal health, as well as inherited and infectious disease.

- The Invitrogen brand offers life science customers a broad range of consumables and instruments that accelerate research and ensure consistency of results. Our portfolio of products includes innovative solutions for cellular analysis and biology, flow cytometry, cell culture, protein expression, synthetic biology, molecular biology and protein biology.

- Fisher Scientific is our channels brand, offering customers a complete portfolio of laboratory equipment and consumables, chemicals, supplies and services used in scientific research, healthcare, safety, and education markets. These products are offered through an extensive network of direct sales professionals, segment-relevant printed collateral and digital content, a state-of-the-art website, and supply-chain management services. We also offer a range of biopharma services for clinical trials management and biospecimen storage.

- Unity Lab Services is our instrument and equipment services brand, offering a complete portfolio of services from enterprise level engagements to individual instruments and laboratory equipment, regardless of the original manufacturer. Through our network of world-class service and support personnel, we provide services that are designed to help our customers improve productivity, reduce costs, and drive decisions with better data.

We continuously increase our depth of capabilities in technologies, software and services, and leverage our extensive global channels to address our customers' emerging needs. For example, our acquisition of Patheon N.V. in 2017 significantly expands our services offering for pharmaceutical and biotech customers by adding contract development and manufacturing capabilities. Our goal is to make our customers more productive in an increasingly competitive business environment, and to allow them to solve their challenges, from complex research to improved patient care, environmental and process monitoring, and consumer safety.

Thermo Fisher is a Delaware corporation and was incorporated in 1956. The company completed its initial public offering in 1967 and was listed on the New York Stock Exchange in 1980.

On February 14, 2017, the company acquired, within the Life Sciences Solutions segment, Finesse Solutions, Inc., expanding its bioproduction offerings.

On March 2, 2017, the company acquired, within the Analytical Instruments segment, Core Informatics, enhancing its existing informatics solutions.

Business (continued)

On August 29, 2017, the company acquired, within the Laboratory Products and Services segment, substantially all of the issued and outstanding shares of Patheon N.V., providing entry into the pharmaceutical contract development and manufacturing organization market and adding a complementary service to its existing pharmaceutical services portfolio.

Forward-looking Statements

Forward-looking statements, within the meaning of Section 21E of the Securities Exchange Act of 1934 (the Exchange Act), are made throughout this Annual Report on Form 10-K. Any statements contained herein that are not statements of historical fact may be deemed to be forward-looking statements, including without limitation statements regarding: projections of revenue, expenses, earnings, margins, tax rates, tax provisions, cash flows, pension and benefit obligations and funding requirements, our liquidity position; cost reductions, restructuring activities, new product and service developments, competitive strengths or market position, acquisitions or divestitures; growth, declines and other trends in markets we sell into; new or modified laws, regulations and accounting pronouncements; outstanding claims, legal proceedings, tax audits and assessments and other contingent liabilities; foreign currency exchange rates and fluctuations in those rates; general economic and capital markets conditions; the timing of any of the foregoing; assumptions underlying any of the foregoing; and any other statements that address events or developments that Thermo Fisher intends or believes will or may occur in the future. Without limiting the foregoing, the words "believes," "anticipates," "plans," "expects," "seeks," "estimates," and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements are accompanied by such words. While the company may elect to update forward-looking statements in the future, it specifically disclaims any obligation to do so, even if the company's estimates change, and readers should not rely on those forward-looking statements as representing the company's views as of any date subsequent to the date of the filing of this report.

A number of important factors could cause the results of the company to differ materially from those indicated by such forward-looking statements, including those detailed under the heading, "Risk Factors" in Part I, Item 1A.

Business Segments and Products

We report our business in four segments – Life Sciences Solutions, Analytical Instruments, Specialty Diagnostics, and Laboratory Products and Services. For financial information about these segments, including domestic and international operations, see Note 3 to our Consolidated Financial Statements, which begin on page F-1 of this report.

Life Sciences Solutions Segment

Through our Life Sciences Solutions segment, we provide an extensive portfolio of reagents, instruments and consumables used in biological and medical research, discovery and production of new drugs and vaccines as well as diagnosis of disease. These products and services are used by customers in pharmaceutical, biotechnology, agricultural, clinical, academic, and government markets. Life Sciences Solutions includes four primary businesses – Biosciences, Genetic Sciences, Clinical Next-Generation Sequencing, and BioProduction.

Biosciences

Our biosciences business includes reagents, instruments and consumables that help our customers conduct biological and medical research, discover new drugs and vaccines, and, in the case of some specific products, the diagnosis of disease.

Our biosciences offerings include:

- Reagents, instruments, and consumables used for protein biology, molecular biology, sample preparation and cell imaging and analysis. The portfolio includes antibodies and products for protein purification, detection, modification, and analysis; and sequencing, detection and purification products used for high content analysis of nucleic acids. Many of these products are also used in applied markets, including agriculture, forensics, diagnostics product development, and toxicology research.

- Tools used for genetic engineering, amplification, quantification and analysis as well as RNA isolation, including stem cell reprogramming kits, transfection reagents, RNA interference reagents, along with gene editing tools and gene synthesis products.

- Cell culture media, reagents, and plastics for preserving and growing mammalian cells which are used in many life science research applications.

- Fluorescence-based technologies, which facilitate the labeling of molecules for biological research and drug discovery. These technologies include a wide range of cell analysis instruments, including flow cytometers and imaging platforms that enable fluorescence microscopy.

Business (continued)

- Protein analysis products, including pre-cast electrophoresis gels for separating nucleic acids and proteins, and western blotting and staining tools.

Genetic Sciences

Our genetic sciences business combines a wide variety of instruments and related reagents used to provide high-value genomic solutions to assist customer decisions in the research, clinical and applied markets.

Our offerings include real-time PCR technology used to identify changes in gene expression, genotyping or proteins on an individual gene-by-gene basis; capillary electrophoresis (CE) sequencing, core technology used in DNA sequencing and fragment analysis applications; and microarray technology, used in gene expression, genotyping and reproductive health.

Our genetic analyzers served as the foundational platform used to sequence the first human genome. These systems are used in a variety of basic, commercial and clinical research applications.

Clinical Next-Generation Sequencing

Our clinical next-generation sequencing (NGS) business focuses on delivering simple, fast and cost-effective NGS technology for a range of applications. The business is focused on targeted sequencing solutions for research use; the application of NGS in oncology; and is an enabling technology for other businesses within Thermo Fisher.

BioProduction

Our bioproduction business supports developers and manufacturers of biological-based therapeutics and vaccines with a portfolio of premium solutions and services focused on upstream cell culture, downstream purification, analytics for detection and quantitation of process/product impurities, and a suite of single-use solutions spanning the biologics workflow.

Our bioproduction offerings include:

- Single-use bioproduction solutions that provide our customers with faster turnaround and set-up times, minimal validation requirements, reduced investment and running costs, and increased flexibility of manufacturing capacity.

- Production cell culture media solutions, which are used by leading biotechnology and pharmaceutical companies to grow cells in controlled conditions and enable large scale cGMP (Current Good Manufacturing Practices) manufacturing of drugs and vaccines. We also provide our customers with the associated services to optimize the productivity of these production platforms.

- Chromatography products, which deliver superior capacity and resolution for process-scale bioseparations, and offer a broad set of scalable options for the purification of antibodies, antibody fragments and proteins.

- Rapid molecular products that deliver accurate results in less than four hours for contaminant detection, identification and quantitation.

- Scalable solutions for the manufacture of cell therapy based drugs.

Our Doe & Ingalls offerings include chemical distribution and supply chain services that provide primarily life science manufacturers with reliable, secure supply chains for their chemical raw material.

Analytical Instruments Segment

Through our Analytical Instruments segment, we provide a broad offering of instruments, consumables, software and services that are used for a range of applications in the laboratory, on the production line and in the field. These products and services are used by customers in pharmaceutical, biotechnology, academic, government, environmental and other research and industrial markets, as well as the clinical laboratory. This segment includes three primary businesses – Chromatography and Mass Spectrometry, Chemical Analysis, and Materials and Structural Analysis.

Chromatography and Mass Spectrometry

Our chromatography and mass spectrometry (MS) business provides analytical instrumentation for organic and inorganic sample analysis across both applied technologies and life science research. These products are complemented by laboratory information management systems (LIMS); chromatography data systems (CDS); database analytical tools; automation systems; a range of consumables, such as a full line of chromatography columns; and a range of sample preparation and separation products including auto-samplers and multiplexing systems.

Chromatography is a technique for separating, identifying and quantifying individual chemical components of substances based on their specific physical and chemical characteristics. Our chromatography product line includes high performance

Business (continued)

liquid chromatography, ion chromatography and gas chromatography systems, all of which are supported by our Chromeleon chromatography data system software.

- *Liquid Chromatography (LC) Systems* analyze complex sample matrices in liquids. Our high-pressure liquid chromatography (HPLC) and ultrahigh pressure liquid chromatography (UHPLC) systems offer high throughput and sensitivity and are sold either as stand-alone systems or integrated with our mass spectrometers (LC/MS and LC/MS/MS). These systems are used for a range of applications, from complex proteomic analyses to routine industrial quality assurance and quality control (QA/QC).

- *Ion Chromatography (IC) Systems* separate ionic (charged) or highly polar molecules (e.g., sugars and carbohydrates), usually found in water-based solutions, and typically detect them based on their electrical conductivity. Our IC products are used in a wide range of applications, including scientific research, and environmental testing, as well as quality control in pharmaceutical, food and beverage, and other industrial processes.

- *Gas Chromatography (GC) Systems* analyze complex sample matrices in gases, comprising both separation and detection technology. Separation technology is common to all gas chromatography analyzers, and is paired with either a conventional detector (GC) or with different types of mass spectrometers (GC/MS). Our GC/MS offering includes a triple stage quadrupole, a single stage quadrupole, an Orbitrap, and an ion trap, for a range of applications, including food safety testing, quantitative screening of environmental samples, and complex molecular analyses.

- *Elemental Analysis Spectrometers* use atomic spectroscopy techniques to identify trace concentrations of elements in liquid and solid samples primarily in environmental, petrochemical, food safety, metallurgical, geochemical and clinical/toxicology research applications. These products are widely used in growth markets such as China, India and Latin America to support compliance with increasingly stringent international environmental and consumer safety regulations.

Mass spectrometry is a technique for analyzing chemical compounds, individually or in complex mixtures, by forming charged ions that are then analyzed according to their mass-to-charge ratios. In addition to molecular information, each discrete chemical compound generates a pattern that provides structurally identifiable information. Our comprehensive offering includes life sciences mass spectrometry systems; and inorganic mass spectrometry systems; as well as a range of sample preparation and separation products including auto-samplers and multiplexing systems.

- *Life Sciences Mass Spectrometers* include triple quadrupole and Orbitrap technologies. Our triple quadrupole systems provide high performance quantitative analysis of chemicals in biological fluids, environmental samples and food matrices. They are also used by the pharmaceutical industry for targeted quantitation during drug discovery. Our Orbitrap technologies provide high resolution and accurate mass capabilities for both research and applied markets and are well suited for drug metabolism, proteomics, environmental analysis, food safety, toxicology and clinical research applications. We also offer a comprehensive portfolio of instrument control and data analysis software to help customers simplify their workflows and obtain knowledge from often complex data.

- *Inorganic Mass Spectrometers* include four product lines: isotope ratio mass spectrometry (IRMS); multi-collector isotope ratio mass spectrometry (MC/IRMS); inductively coupled plasma mass spectrometry (ICP/MS); and high resolution trace mass spectrometry (HR Trace/MS). These products are primarily used for qualitative and quantitative analysis of inorganic matter in a range of applications, including environmental analysis, materials science and earth sciences.

Chemical Analysis

Our chemical analysis products fall into four main categories: materials and minerals; portable analytical instruments; radiation measurement and security instruments; and environmental and process instruments. Customers use these products to quickly and accurately analyze the composition of materials to optimize workflows primarily in industrial applications or to help them comply with governmental regulations and industry safety standards. Our

product lines range from those used on production lines to improve quality and efficiency, to portable systems for rapid and real-time chemical identification in the field or to analyze, measure or respond to hazardous situations.

- *Materials and Minerals Instruments* include production line process monitoring, and control systems for a range of industrial applications. For example, we offer on-line instruments that analyze bulk materials non-invasively and in real time to improve quality control and ensure safe operation in a mine or cement manufacturing plant, as well as systems that enable high-speed weighing during bulk materials handling. We also offer gauging systems that employ ionizing and non-ionizing technologies to measure the total thickness, basis weight and coating thickness of flat-sheet materials, such as steel, plastics, foil, rubber and glass. We also offer on line analyzers based on a variety of

Business (continued)

technologies such as X-ray imaging and ultra-trace chemical detection, to inspect packaged goods for physical contaminants, validate fill quantities, or check for missing or broken parts on line and at high speeds in the food and beverage, pharmaceutical production and packaging industries to maintain safety and quality standards.

- *Portable Analytical Instruments* are rugged handheld products that provide rapid, precise, real-time analysis at the point of need. Our two main product categories are elemental and optical analyzers. Our portable elemental analyzers use X-ray fluorescence (XRF) technology for identifying metal alloys in scrap metal recycling; QA/QC; precious metals analysis; environmental analysis; and lead screening in a range of consumer products. Our portable optical analyzers utilize Raman, Fourier transform infrared (FTIR) and near-infrared (NIR) technologies for use in the field by first responders, and law enforcement and military personnel who need to quickly and accurately identify chemicals and explosives in critical safety and security situations. Other applications include QA/QC in pharmaceutical production and identification of counterfeit drugs.

- *Radiation Measurement and Security Products* are used to monitor, detect and identify specific forms of radiation in nuclear power, environmental, industrial, medical, and security applications. Our primary customers include national, regional, and local government agencies responsible for monitoring cargo, vehicles and people traveling across borders. These products are also used by first-responders in safety and security situations, and for worker safety in the nuclear power and other industrial markets.

- *Environmental and Process Instruments* include fixed and portable instrumentation that help our customers protect people and the environment as well as comply with government regulations and industry safety standards. Our products are used by environmental regulatory agencies and power plant operators to measure ambient air, and stack gas emissions for compliance with regulated emissions standards for criteria pollutant gases. Our products are also used in ambient particulate monitoring applications by customers in mining environments to provide continuous measurements and logging of real-time concentrations and median particle sizes of airborne dust, smoke, mist and fumes to improve efficiency and increase worker safety.

In addition to our broad product offerings, we offer a variety of specialized services to our customers, including equipment servicing, instrument calibration services, asset management and training.

Materials and Structural Analysis

Our materials and structural analysis business includes electron microscopy, molecular spectroscopy and laboratory elemental analysis instruments that are used by customers in life sciences, materials sciences and industrial markets to accelerate breakthrough discoveries.

- *Electron Microscopy Instruments* include transmission electron microscopes which provide imaging and characterization at the atomic scale, with applications in semiconductor development, materials science research and the characterization of protein structure and function. We also offer scanning electron microscopes which resolve features from the optical regime down to the nanometer length scale and are used for a wide variety of applications from materials characterization in science and engineering to applications in natural resources, manufacturing, and biological systems. Our DualBeam focused ion beam-scanning electron microscope systems are used for sample preparation, 3D characterization, nanoprototyping, and industrial failure analysis. Our focused ion beam microscopes are used in a range of process control, failure analysis, and materials research applications. We also offer electrical failure analysis instruments which are used in root cause failure analysis and quality control, microCT instruments which are micro-computed tomography solutions for quantitative analysis of a broad range of materials, providing 3D visualization of large volumes non-destructively and 3D visualization software that turns the data and images generated by a broad range of instruments into 3D visualizations of the microscopic sample, allowing quantitative analysis of material properties.

- *Molecular Spectroscopy Instruments* are divided into four primary techniques: FTIR, Raman, NIR and ultraviolet/visible (UV/Vis) spectroscopy. These technologies are typically used in the laboratory to provide information on the structure of molecules to identify, verify and quantify organic materials in

pharmaceutical, biotechnology, polymer, chemical, and forensic sciences. Our material characterization instruments include rheometers and extruders that measure viscosity, elasticity, processability, and temperature-related mechanical changes of various materials. We also provide a range of surface analysis instruments commonly used in the semiconductor, metals, coatings, and polymer industries as a product development and failure analysis tool.

- *Laboratory Elemental Analysis Instruments* and analyzers use XRF, X-ray diffraction (XRD), and arc spark optical emission (OES) techniques for accurate and precise analysis of bulk materials in the metals, cement, minerals, and petrochemicals industries.

Business (continued)

Specialty Diagnostics Segment

Our Specialty Diagnostics segment offers a wide range of diagnostic test kits, reagents, culture media, instruments and associated products in order to serve customers in healthcare, clinical, pharmaceutical, industrial, and food safety laboratories. Our healthcare products are used to increase the speed and accuracy of diagnoses, which improves patient care in a more cost efficient manner. This segment has six primary businesses – Clinical Diagnostics, ImmunoDiagnostics, Microbiology, Anatomical Pathology, Transplant Diagnostics and our Healthcare Market Channel.

Clinical Diagnostics

Our clinical diagnostics products include a broad offering of liquid, ready-to-use and lyophilized immunodiagnostic reagent kits, calibrators, controls and calibration verification fluids. In particular, we provide products used for drugs-of-abuse testing; therapeutic drug monitoring, including immunosuppressant drug testing; thyroid hormone testing; serum toxicology; clinical chemistry; immunology; hematology; coagulation; glucose tolerance testing; first trimester screening; tumor markers testing; and biomarkers testing for sepsis, acute myocardial infarction and congestive heart failure. We also private label many of our reagents and controls for major *in vitro* diagnostics companies through OEM arrangements. In many instances, we will work with customers or partners to develop new products and applications for their instrument platforms.

We have developed one of the broadest menus for drugs-of-abuse immunoassays. We also provide a broad offering of immunosuppressant drug immunoassays that can be used on a variety of clinical chemistry analyzers.

Our clinical chemistry systems include analyzers and reagents to analyze and measure routine blood and urine chemistry, such as glucose and cholesterol; and advanced testing for specific proteins, therapeutic drug monitoring and drugs-of-abuse. Our diagnostic test range currently covers approximately 80 different validated methods. We also provide pre- and post-analytical automation for preparation of blood specimens before and after analysis, and specialty diagnostic tests based on patented biomarkers for sepsis, cardiovascular and pulmonary diseases, as well as intensive care treatments and prenatal screening.

ImmunoDiagnostics

Our immunodiagnostics offerings include developing, manufacturing and marketing complete blood-test systems to support the clinical diagnosis and monitoring of allergy, asthma and autoimmune diseases. In addition, we offer antibody tests for approximately 20 indications to help diagnose autoimmune diseases such as rheumatoid arthritis, celiac disease, lupus and scleroderma. Our products include ImmunoCAP for allergy and asthma tests and EliA for autoimmunity tests.

Microbiology

Our microbiology offerings include dehydrated and prepared culture media, collection and transport systems, instrumentation and consumables to detect pathogens in blood, diagnostic and rapid direct specimen tests, quality-control products and associated products for the microbiology laboratory. Our products help customers worldwide to diagnose infectious disease; determine appropriate antimicrobial therapy; implement effective infection control programs; and detect microbial contamination of their products or manufacturing facilities.

Within the food and pharmaceutical industries, our products are used to assure the safety and quality of consumer products by monitoring production environments; raw materials and end products for bacterial contamination; and animal health in the dairy industry.

Anatomical Pathology

Our anatomical pathology offerings include a broad portfolio of products primarily for cancer diagnosis and medical research in histology, cytology and hematology applications. These products include a wide range of instruments, consumables and reagents for specimen collection and transport, tissue preparation, staining and immunohistochemistry assays and controls. Reagent and consumable products include sample collection and preservation products used to ensure specimen integrity; tissue cassettes and reagents necessary for same-day, high-quality specimen processing; blades and paraffin used to section tissue; and a wide range of leading stains. Also included are a full line of immunohistochemistry antibodies, detection systems, ancillaries and controls.

We also provide a complete range of anatomical pathology instruments including cassette and slide labeling systems, which enable on-demand slide and cassette printing; tissue processors for same-day tissue-processing;

embedding stations, microtomes and cryostats used to section tissue; and automated staining and cover slip systems used for primary and immunohistochemistry staining. In cytology, we offer low-speed centrifugation technology coupled with patented EZ cytofunnels to deposit a thin layer of cells onto a microscope slide to ensure better cell capture and better preservation of cell morphology. We manufacture high-quality flat-sheet glass to produce medical disposable products such as microscope slides,

plates, cover glass, and microarray substrates serving the medical, diagnostics, and scientific communities. We also offer specialized hydrophobic, adhesive, and fluorescent slides through proprietary coating techniques.

Transplant Diagnostics

Our transplant diagnostics products include human leukocyte antigen (HLA) typing and testing for the organ transplant market. Our diagnostic tests are used by transplant centers for tissue typing, primarily to determine the compatibility of donors and recipients pre-transplant, and to detect the presence of antibodies post-transplant that can lead to transplant rejection. These transplant diagnostic tests are widely used across the transplant-testing workflow to improve patient outcomes. Our transplant diagnostic offerings include several lines of HLA typing and antibody detection assays utilizing serological, molecular, enzyme-linked immunosorbent assays (ELISA), flow, and multiplexing technologies.

Healthcare Market Channel

Our Healthcare Market channel offerings include a broad array of consumables, diagnostic kits and reagents, equipment, instruments, solutions and services for hospitals, clinical laboratories, reference laboratories, physicians' offices and other clinical testing facilities. These products are manufactured by Thermo Fisher and third parties and are primarily used in clinical diagnosis.

Laboratory Products and Services Segment

Our Laboratory Products and Services segment offers virtually everything needed for the laboratory. Our unique combination of self-manufactured and sourced products and extensive service offering, enables our customers to focus on their core activities and helps them to be more efficient, productive and cost effective. We serve the pharmaceutical, biotechnology, academic, government and other research and industrial markets, as well as the clinical laboratory through four key businesses: Laboratory Products, Laboratory Chemicals, Research and Safety Market Channel, and Pharma Services.

Laboratory Products

Our Laboratory Products are used primarily by pharmaceutical companies for drug discovery and development and by biotechnology companies and universities for life science research to advance the prevention and cure of diseases and enhance quality of life. This offering consists of equipment, accessories, and services for sample preparation, storage and protection, and analysis:

- *Laboratory Equipment Technologies* includes our leading laboratory refrigerators and freezers, ultralow-temperature freezers and cryopreservation storage tanks for maintaining samples in a cold environment to protect them from degradation. We also offer temperature control products such as heated bath circulators, immersion coolers, recirculating chillers, water baths, and dry baths in a range of sizes, temperatures and configurations for life science, analytical chemistry, manufacturing and quality-control applications. In addition, we offer sample preparation and preservation equipment, which protects our customers' chemical and biological samples and supports the growth of cells and organisms in optimal conditions such as temperature, carbon dioxide and humidity as well as incubators and related products. We also offer centrifugation products, which are used to separate biological matrices and inorganic materials, including microcentrifuges, general use bench-top centrifuges and floor models. Additionally, we offer biological safety cabinets, which enable technicians to handle samples without risk to themselves or their environment and without risk of cross-contamination of samples.

- *Water and Laboratory Products* include water analysis instruments such as meters, electrodes and solutions for the measurement of pH, ions, conductivity, dissolved oxygen, turbidity and other key parameters in the lab and production line. We also offer other laboratory equipment such as water purification systems, shakers, vacuum concentrators, microbiological incubators, ovens, furnaces, hotplates, stirrers, stirring hotplates, and other related products.

- *Laboratory Plastics Essentials* include a leading offering of laboratory pipette tips and a complementary range of handheld and automated pipetting systems, supporting low-through high-throughput activity. These products optimize productivity and ergonomics, and ensure accurate results. We also offer sample preparation and storage products such as centrifugation consumables as well as vials and organization

systems for ultralow temperature and cryogenic storage, with specific products designed for low protein binding and low DNA binding and containers for packaging life science and diagnostic reagents as well for the storage and transport of bulk intermediates and active pharmaceutical ingredients. Additionally, our offerings include a complete selection of clinical specimen collection products, drug-of-abuse collection kits and environmental and food-safety glass and plastic vials, bottles and containers, plastic transfer pipettes, general purpose clinical laboratory consumables and containers for breast milk collection, storage and feeding primarily used in neo-natal units and by lactation specialists. We also provide OEM and custom kit assembly services for clinical and drugs-of-abuse test kits.

Business (continued)

Laboratory Chemicals

Our Laboratory Chemicals comprises a broad range of chemicals, solvents and reagents supporting virtually every laboratory application – from research to drug discovery and development and manufacturing. This portfolio includes organic chemicals used to synthesize new materials; essential laboratory chemicals used by scientists to purify, extract, separate, identify and manufacture products; high-purity analytical reagents, bioreagents used in many different applications, from cell growth to detailed protein analysis; novel chemical building blocks, reactive intermediates and screening libraries used to accelerate drug discovery; and precious metals, salts and solutions used in a broad range of applications where highly specific reactions are desired. We provide bulk volumes of many products for scale-up from research to development and customized services for chemical procurement, processing, production, testing, and packaging.

Research and Safety Market Channel

Our Research and Safety Market channel serves academic, pharmaceutical, biotechnology, government and industrial customers. We go to market through our expert sales force, segment-relevant printed collateral and digital content in five languages, a state-of-the-art website, www.fishersci.com, containing full product content for more than 1.5 million products, and our global network of resellers and distributors.

We have an international network of warehouses in our primary markets through which we maintain inventory and coordinate product delivery. With specialized product vaults and warehouse management systems, we are able to handle the complete range of products we offer to our customers. Our transportation capabilities include our dedicated fleet of delivery vehicles as well as parcel shipping capabilities that are closely integrated with our third-party parcel carriers. Throughout the product delivery process, we provide our customers with convenient access to comprehensive electronic systems that offer automated catalog search, product order and invoicing, and payment capabilities.

Our channel offers a mix of products that are manufactured by Thermo Fisher, by third parties for us on a private-label basis, and by third parties under their brand but offered for sale exclusively through us. We also offer a broad range of third-party products representing leading industry brand names on a non-exclusive basis.

Our research products include a complete offering of laboratory products, ranging from capital equipment and instruments to chemicals to consumable products. Our safety products include clean-room and controlled-environment supplies, personal protective equipment, firefighting, military, and first responder equipment and supplies, and environmental monitoring and sampling equipment. Our education products include science-related and laboratory products for the K-12 and secondary education market.

In addition to our broad product offerings, we offer a variety of specialized services to our customers through our Unity Lab Services team, including training, equipment servicing and asset management, and dedicated supply management personnel. We also offer scientific support services including desktop delivery, coordination of instrument calibration and service, and on-site customer service.

Pharma Services

We provide the entire spectrum of development, manufacturing and clinical trials services for both small-molecule and large-molecule pharmaceuticals. This includes i) development of a suitable formulation and manufacturing process for the active pharmaceutical ingredient (API) or biologic; ii) technology transfer to scale up the manufacturing; iii) labeling, packaging, distribution and logistics for clinical trials; and iv) commercial scale manufacturing and packaging.

- *Drug Substance Services* - Our service offerings address small molecules, produced through chemical synthesis, and large molecules such as antibodies and proteins produced through mammalian cell culture. We provide development and manufacturing services for small molecule active pharmaceutical ingredients (APIs) and the biologically active component of pharmaceutical products under current good manufacturing practice (cGMP) conditions from early development through commercial production.

- *Drug Product Services* - We manufacture both small-molecule and large-molecule products for customers in conventional and specialized dosage forms. We differentiate ourselves by our breadth of dosage forms and specialized capabilities in both oral solid and sterile dosage forms. We provide a wide spectrum of

advanced formulation, production and technical services and scientific expertise and solutions, from the early stages of a product's development to regulatory approval and commercial scale production.

- *Clinical Trials Services* - we provide global services for pharmaceutical and biotechnology companies engaged in clinical trials, including comparator sourcing; specialized packaging; over-encapsulation; multi-lingual and specialized

Business (continued)

labeling and distribution for phase I through phase IV clinical trials; biological-specimen management and biobanking services; specialty pharmaceutical logistics; and clinical supply-chain planning and management.

Sales and Marketing

We market and sell our products and services through a direct sales force, customer-service professionals, electronic commerce, third-party distributors and various catalogs.

We have approximately 12,000 sales personnel including highly trained technical specialists who enable us to better meet the needs of our more technical end-users. We also provide customers with product standardization and other supply-chain-management services to reduce procurement costs.

New Products and Research and Development

Our business includes the development and introduction of new products and may include entry into new business segments. During 2017, 2016 and 2015, we incurred $888 million, $755 million and $692 million, respectively, of expense on research and development. We anticipate that we will continue to make significant expenditures for research and development as we seek to provide a continuing flow of innovative products to maintain and improve our competitive position.

Raw Materials

Our management team believes that we have a readily available supply of raw materials for all of our significant products from various sources. We do not anticipate any difficulties obtaining the raw materials essential to our business.

Raw material and fuel prices are subject to fluctuations due to market conditions. We employ many strategies, including the use of alternative materials, to mitigate the effect of these fluctuations on our results.

Patents, Licenses and Trademarks

Patents are important in many aspects of our business. No particular patent, or related group of patents, is so important, however, that its loss would significantly affect our operations as a whole. Where appropriate, we seek patent protection for inventions and developments made by our personnel that are incorporated into our products or otherwise fall within our fields of interest. Patent rights resulting from work sponsored by outside parties do not always accrue exclusively to the company and may be limited by agreements or contracts.

We protect some of our technology as trade secrets and, where appropriate, we use trademarks or register trademarks used in connection with products. We also enter into license agreements with others to grant and/or receive rights to patents and know-how.

Seasonal Influences

Revenues in the fourth quarter are historically stronger than in other quarters due to the capital spending patterns of industrial, pharmaceutical and government customers. Sales of flu tests and related diagnostic products vary quarter to quarter and year to year based on the severity and duration of each period’s flu season. Sales of allergy tests vary quarter to quarter and year to year based on the severity and duration of each period’s airborne pollen allergens.

Working Capital Requirements

There are no special inventory requirements or credit terms extended to customers that would have a material adverse effect on our working capital.

Dependency on a Single Customer

There is no single customer the loss of which would have a material adverse effect on our business. No customer accounted for more than 5% of our total revenues in any of the past three years.

Business (continued)

Backlog

Our backlog of firm orders at year-end 2017 and 2016 was as follows:

(In millions)	2017	2016
Life Sciences Solutions	$ 594	$ 528
Analytical Instruments	2,050	1,701
Specialty Diagnostics	158	171
Laboratory Products and Services	1,679	416
Eliminations	(20)	(23)
	$ 4,461	$ 2,793

We believe that virtually all of our backlog at the end of 2017 will be filled during 2018.

Government Contracts

Although the company transacts business with various government agencies, no government contract is of such magnitude that a renegotiation of profits or termination of the contract at the election of the government agency would have a material adverse effect on the company's financial results.

Competition

The company encounters aggressive and able competition in virtually all of the markets we serve. Because of the diversity of our products and services, we face many different types of competitors and competition. Our competitors include a broad range of manufacturers and third-party distributors. Competitive climates in many of the markets we serve are characterized by changing technology and customer demands that require continuing research and development. Our success primarily depends on the following factors:

- technical performance and advances in technology that result in new products and improved price/ performance ratios;
- product differentiation, availability and reliability;
- the depth of our capabilities;
- our reputation among customers as a quality provider of products and services;
- customer service and support;
- active research and application-development programs; and
- relative prices of our products and services.

Environmental Matters

We are subject to various laws and governmental regulations concerning environmental matters and employee safety and health in the United States and other countries. U.S. federal environmental legislation that affects us includes the Toxic Substances Control Act, the Resource Conservation and Recovery Act, the Clean Air Act, the Clean Water Act, the Safe Drinking Water Act, and the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). We are also subject to regulation by the Occupational Safety and Health Administration (OSHA) concerning employee safety and health matters. The United States Environmental Protection Agency (EPA), OSHA, and other federal agencies have the authority to promulgate regulations that have an effect on our operations.

In addition to these federal activities, various states have been delegated certain authority under the aforementioned federal statutes as well as having authority over these matters under state laws. Many state and local

governments have adopted environmental and employee safety and health laws and regulations, some of which are similar to federal requirements.

A number of our operations involve the handling, manufacturing, use or sale of substances that are or could be classified as toxic or hazardous materials within the meaning of applicable laws. Consequently, some risk of environmental harm is inherent in our operations and products, as it is with other companies engaged in similar businesses.

Our expenses for environmental requirements are incurred generally for ongoing compliance and historical remediation matters. Based on current information, we believe that these compliance costs are not material. For historical remediation obligations, our expenditures relate primarily to the cost of permitting, installing, and operating and maintaining groundwater-treatment systems and other remedial measures.

Business (continued)

Our Fair Lawn and Somerville, New Jersey facilities entered into administrative consent orders with the New Jersey Department of Environmental Protection in 1984 to maintain groundwater-remediation activities at these sites, and are currently under the State's Licensed Site Remediation Professional Program. As the owner of the Fair Lawn facility, we are listed as a potentially responsible party for remediation within an area called the Fair Lawn Wellfields Superfund Site, and, in 2008, the company and certain other parties entered into a consent order with the U.S. Environmental Protection Agency (USEPA) to complete a Remedial Investigation/Feasibility Study. In 2011, our Life Technologies subsidiary entered into a consent decree with the USEPA and other responsible parties to implement a groundwater remedy at the former Davis Landfill Superfund site in Smithfield, Rhode Island.

We record accruals for environmental liabilities based on current interpretations of environmental laws and regulations when it is probable that a liability has been incurred and the amount of such liability can be reasonably estimated. We calculate estimates based upon several factors, including reports prepared by environmental specialists and management's knowledge and experience with these environmental matters. We include in these estimates potential costs for investigation, remediation and operation and maintenance of cleanup sites. Accrued liabilities for environmental matters totaled $52 million at December 31, 2017.

These environmental liabilities do not include third-party recoveries to which we may be entitled. We believe that our accrual is adequate for the environmental liabilities we currently expect to incur. As a result we believe that our ultimate liability with respect to environmental matters will not have a material adverse effect on our financial position, results of operations or cash flows. However, we may be subject to remedial or compliance costs due to future events, such as changes in existing laws and regulations, changes in agency direction or enforcement policies, developments in remediation technologies, changes in the conduct of our operations, and the effect of changes in accounting rules, which could have a material adverse effect on our financial position, results of operations or cash flows.

Regulatory Affairs

Our operations, and some of the products we offer, are subject to a number of complex and stringent laws and regulations governing the production, handling, transportation and distribution of chemicals, drugs and other similar products, including the operating and security standards of the Food and Drug Administration, the Drug Enforcement Administration, the Bureau of Alcohol, Tobacco, Firearms and Explosives, and various state boards of pharmacy as well as comparable state and foreign agencies. As Thermo Fisher's businesses also include export and import activities, we are subject to pertinent laws enforced by the U.S. Departments of Commerce, State and Treasury. In addition, our logistics activities must comply with the rules and regulations of the Department of Transportation, the Federal Aviation Administration and similar foreign agencies. While we believe we are in compliance in all material respects with such laws and regulations, any noncompliance could result in substantial fines or otherwise restrict our ability to provide competitive distribution services and thereby have an adverse effect on our financial condition. To date, none has had a material impact on our operations.

We are subject to laws and regulations governing government contracts, and failure to address these laws and regulations or comply with government contracts could harm our business by leading to a reduction in revenue associated with these customers. We have agreements relating to the sale of our products to government entities and, as a result, we are subject to various statutes and regulations that apply to companies doing business with the government. We are also subject to investigation for compliance with the regulations governing government contracts. A failure to comply with these regulations could result in suspension of these contracts, criminal, civil and administrative penalties or debarment.

Number of Employees

We have approximately 70,000 employees.

Financial Information About Geographic Areas

Financial information about geographic areas is summarized in Note 3 to our Consolidated Financial Statements, which begin on page F-1 of this report.

Available Information

The company files annual, quarterly and current reports, proxy statements and other documents with the Securities and Exchange Commission (SEC) under the Exchange Act. The public may read and copy any materials that we file with the SEC at the SEC's Public Reference Room at 100 F Street NE, Washington, D.C. 20549. The

public may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. Also, the SEC maintains a website that contains reports, proxy and information statements and other information that issuers, including the company, file electronically with the SEC. The public can obtain any documents that we file with the SEC at www.sec.gov. We also make available free of charge on or through our own website at www.thermofisher.com our Annual Report on Form 10-K, Quarterly Reports on Form

Business (continued)

10-Q, Current Reports on Form 8-K and, if applicable, amendments to those reports filed or furnished pursuant to Section 13(a) of the Exchange Act as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC. In addition, paper copies of these documents may be obtained free of charge by writing to the company care of its Investor Relations Department at our principal executive office located at 168 Third Avenue, Waltham, Massachusetts 02451.

Executive Officers of the Registrant

Name	Age	Present Title (Fiscal Year First Became Executive Officer)
Marc N. Casper	49	President and Chief Executive Officer (2001)
Mark P. Stevenson	55	Executive Vice President and Chief Operating Officer (2014)
Michael A. Boxer	56	Senior Vice President and General Counsel (2018)
Patrick M. Durbin	51	Senior Vice President (2015)
Gregory J. Herrema	52	Senior Vice President (2017)
Seth H. Hoogasian	63	Senior Vice President and Retiring General Counsel (2001)
Michel Lagarde	44	Senior Vice President (2017)
Stephen Williamson	51	Senior Vice President and Chief Financial Officer (2015)
Peter E. Hornstra	58	Vice President and Chief Accounting Officer (2001)

Mr. Casper was appointed President and Chief Executive Officer in October 2009. He was Chief Operating Officer from May 2008 to October 2009 and Executive Vice President from November 2006 to October 2009. He was Senior Vice President from December 2003 to November 2006. From December 2001 to December 2003 he was Vice President.

Mr. Stevenson was appointed Executive Vice President and Chief Operating Officer in August 2017. He was Executive Vice President and President, Life Sciences Solutions from February 2014 to August 2017. Prior to the acquisition of Life Technologies Corporation ("Life Technologies"), Mr. Stevenson was President and Chief Operating Officer of Life Technologies from November 2008 to February 2014.

Mr. Boxer joined the company as Senior Vice President and General Counsel in January 2018. Prior to joining the company, Mr. Boxer was Executive Vice President and Group General Counsel at Luxottica, a leading global vision care company, from May 2011 to December 2017, and prior to that he held various positions of increasing responsibility at Luxottica.

Mr. Durbin was appointed Senior Vice President of Thermo Fisher Scientific and President, Specialty Diagnostics in October 2015. He was President of the BioPharma Services business from January 2010 to October 2015.

Mr. Herrema was appointed Senior Vice President and President, Customer Channels in January 2014. He was President, Biosciences from 2012 to 2014.

Mr. Hoogasian was appointed Senior Vice President in November 2006 and General Counsel in 1992. He was Secretary from 2001 to 2017. Mr. Hoogasian is retiring from the company on March 30, 2018.

Mr. Lagarde joined Thermo Fisher Scientific in August 2017 through the acquisition of Patheon and was appointed Senior Vice President and President, Pharma Services. From May 2016 to August 2017, Mr. Lagarde served as President and Chief Operating Officer at Patheon. From January 2008 to May 2016, Mr. Lagarde was Managing Director at JLL Partners, a private equity firm focused on healthcare.

Mr. Williamson was appointed Senior Vice President and Chief Financial Officer in August 2015. He was Vice President of Financial Operations from May 2008 to August 2015.

Mr. Hornstra was appointed Vice President in February 2007 and Chief Accounting Officer in January 2001. He was Corporate Controller from January 1996 to February 2007.

Item 1A. Risk Factors

Set forth below are the risks that we believe are material to our investors. This section contains forward-looking statements. You should refer to the explanation of the qualifications and limitations on forward-looking statements in Item 1. Business under the caption "Forward-looking Statements".

We must develop new products, adapt to rapid and significant technological change and respond to introductions of new products by competitors to remain competitive. Our growth strategy includes significant investment in and expenditures for product development. We sell our products in several industries that are characterized by rapid and significant technological changes, frequent new product and service introductions and enhancements and evolving industry standards. Competitive factors include technological innovation, price, service and delivery, breadth of product line, customer support, e-business capabilities and the ability to meet the special requirements of customers. Our competitors may adapt more quickly to new technologies and changes in customers' requirements than we can. Without the timely introduction of new products, services and enhancements, our products and services will likely become technologically obsolete over time, in which case our revenue and operating results would suffer.

Many of our existing products and those under development are technologically innovative and require significant planning, design, development and testing at the technological, product and manufacturing-process levels. Our customers use many of our products to develop, test and manufacture their own products. As a result, we must anticipate industry trends and develop products in advance of the commercialization of our customers' products. If we fail to adequately predict our customers' needs and future activities, we may invest heavily in research and development of products and services that do not lead to significant revenue.

It may be difficult for us to implement our strategies for improving internal growth. Some of the markets in which we compete have been flat or declining over the past several years. To address this issue, we are pursuing a number of strategies to improve our internal growth, including:

- strengthening our presence in selected geographic markets;
- allocating research and development funding to products with higher growth prospects;
- developing new applications for our technologies;
- expanding our service offerings;
- continuing key customer initiatives;
- combining sales and marketing operations in appropriate markets to compete more effectively;
- finding new markets for our products; and
- continuing the development of commercial tools and infrastructure to increase and support cross-selling opportunities of products and services to take advantage of our depth in product offerings.

We may not be able to successfully implement these strategies, and these strategies may not result in the expected growth of our business.

Our business is affected by general economic conditions and related uncertainties affecting markets in which we operate. Our business is affected by general economic conditions, both inside and outside the U.S. If the global economy and financial markets, or economic conditions in Europe, the U.S. or other key markets, are unstable, it could adversely affect the business, results of operations and financial condition of the company and its customers, distributors, and suppliers, having the effect of

- reducing demand for some of our products;
- increasing the rate of order cancellations or delays;

- increasing the risk of excess and obsolete inventories;
- increasing pressure on the prices for our products and services; and
- creating longer sales cycles and greater difficulty in collecting sales proceeds.

Demand for some of our products depends on capital spending policies of our customers and on government funding policies. Our customers include pharmaceutical and chemical companies, laboratories, universities, healthcare providers, government agencies and public and private research institutions. Many factors, including public policy spending

priorities, available resources and product and economic cycles, have a significant effect on the capital spending policies of these entities.

Spending by some of these customers fluctuates based on budget allocations and the timely passage of the annual federal budget. An impasse in federal government budget decisions could lead to substantial delays or reductions in federal spending.

As a multinational corporation, we are exposed to fluctuations in currency exchange rates, which could adversely affect our cash flows and results of operations. International markets contribute a substantial portion of our revenues, and we intend to continue expanding our presence in these regions. The exposure to fluctuations in currency exchange rates takes on different forms. International revenues and costs are subject to the risk that fluctuations in exchange rates could adversely affect our reported revenues and profitability when translated into U.S. dollars for financial reporting purposes. These fluctuations could also adversely affect the demand for products and services provided by us. As a multinational corporation, our businesses occasionally invoice third-party customers in currencies other than the one in which they primarily do business (the "functional currency"). Movements in the invoiced currency relative to the functional currency could adversely impact our cash flows and our results of operations. As our international sales grow, exposure to fluctuations in currency exchange rates could have a larger effect on our financial results. In 2017, currency translation had a favorable effect of $70 million on revenues due to the weakening of the U.S. dollar relative to other currencies in which the company sells products and services.

Significant developments stemming from the U.S. administration or the U.K.'s referendum on membership in the EU could have an adverse effect on us. The U.S. administration has called for substantial changes to trade agreements, such as the North American Free Trade Agreement (NAFTA), and has raised the possibility of imposing significant increases on tariffs on goods imported into the United States, particularly from China and Mexico. The administration has also indicated an intention to request Congress to make significant changes, replacement or elimination of the Patient Protection and Affordable Care Act, and government negotiation/ regulation of drug prices paid by government programs. Changes in U.S. social, political, regulatory and economic conditions or laws and policies governing the health care system and drug prices, foreign trade, manufacturing, and development and investment in the territories and countries where we or our customers operate could adversely affect our operating results and our business.

Additionally, on June 23, 2016, the United Kingdom held a referendum and voted in favor of leaving the European Union, or EU. This referendum has created political and economic uncertainty, particularly in the United Kingdom and the EU, and this uncertainty may last for years. Our business could be affected during this period of uncertainty, and perhaps longer, by the impact of the United Kingdom's referendum. In addition, our business could be negatively affected by new trade agreements between the United Kingdom and other countries, including the United States, and by the possible imposition of trade or other regulatory barriers in the United Kingdom. These possible negative impacts, and others resulting from the United Kingdom's actual or threatened withdrawal from the EU, may adversely affect our operating results and our customers' businesses.

Our inability to protect our intellectual property could have a material adverse effect on our business. In addition, third parties may claim that we infringe their intellectual property, and we could suffer significant litigation or licensing expense as a result. We place considerable emphasis on obtaining patent and trade secret protection for significant new technologies, products and processes because of the length of time and expense associated with bringing new products through the development process and into the marketplace. Our success depends in part on our ability to develop patentable products and obtain and enforce patent protection for our products both in the United States and in other countries. We own numerous U.S. and foreign patents, and we intend to file additional applications, as appropriate, for patents covering our products. Patents may not be issued for any pending or future patent applications owned by or licensed to us, and the claims allowed under any issued patents may not be sufficiently broad to protect our technology. Any issued patents owned by or licensed to us may be challenged, invalidated or circumvented, and the rights under these patents may not provide us with competitive advantages. In addition, competitors may design around our technology or develop competing technologies. Intellectual property rights may also be unavailable or limited in some foreign countries, which could make it easier for competitors to capture increased market position. We could incur substantial costs to defend ourselves in suits brought against us or in suits in which we may assert our patent rights against others. An unfavorable outcome of any such litigation could materially adversely affect our business and results of operations.

We also rely on trade secrets and proprietary know-how with which we seek to protect our products, in part, by confidentiality agreements with our collaborators, employees and consultants. These agreements may be breached and we may not have adequate remedies for any breach. In addition, our trade secrets may otherwise become known or be independently developed by our competitors.

Third parties may assert claims against us to the effect that we are infringing on their intellectual property rights. Our Life Technologies subsidiary is party to several lawsuits in which plaintiffs claim we infringe their intellectual property (Note 10). We could incur substantial costs and diversion of management resources in defending these claims, which could have a material

adverse effect on our business, financial condition and results of operations. In addition, parties making these claims could secure a judgment awarding substantial damages, as well as injunctive or other equitable relief, which could effectively block our ability to make, use, sell, distribute, or market our products and services in the United States or abroad. In the event that a claim relating to intellectual property is asserted against us, or third parties not affiliated with us hold pending or issued patents that relate to our products or technology, we may seek licenses to such intellectual property or challenge those patents. However, we may be unable to obtain these licenses on commercially reasonable terms, if at all, and our challenge of the patents may be unsuccessful. Our failure to obtain the necessary licenses or other rights could prevent the sale, manufacture, or distribution of our products and, therefore, could have a material adverse effect on our business, financial condition and results of operations.

Changes in governmental regulations may reduce demand for our products or increase our expenses. We compete in many markets in which we and our customers must comply with federal, state, local and international regulations, such as environmental, health and safety and food and drug regulations. We develop, configure and market our products to meet customer needs created by those regulations. Any significant change in regulations could reduce demand for our products or increase our expenses. For example, many of our instruments are marketed to the pharmaceutical industry for use in discovering and developing drugs. Changes in the U.S. Food and Drug Administration's regulation of the drug discovery and development process could have an adverse effect on the demand for these products.

Our pharma services offerings are highly complex, and if we are unable to provide quality and timely offerings to our customers, our business could suffer. Our pharma services offerings are highly exacting and complex, due in part to strict quality and regulatory requirements. Our operating results in this business depend on our ability to execute and, when necessary, improve our quality management strategy and systems, and our ability to effectively train and maintain our employee base with respect to quality management. A failure of our quality control systems could result in problems with facility operations or preparation or provision of products. In each case, such problems could arise for a variety of reasons, including equipment malfunction, failure to follow specific protocols and procedures, problems with raw materials or environmental factors and damage to, or loss of, manufacturing operations. Such problems could affect production of a particular batch or series of batches of products, requiring the destruction of such products or a halt of facility production altogether.

In addition, our failure to meet required quality standards may result in our failure to timely deliver products to our customers, which in turn could damage our reputation for quality and service. Any such failure could, among other things, lead to increased costs, lost revenue, reimbursement to customers for lost drug product, registered intermediates, registered starting materials, and active pharmaceutical ingredients, other customer claims, damage to and possibly termination of existing customer relationships, time and expense spent investigating the cause and, depending on the cause, similar losses with respect to other batches or products. Production problems in our drug and biologic manufacturing operations could be particularly significant because the cost of raw materials for such manufacturing is often high. If problems in preparation or manufacture of a product or failures to meet required quality standards for that product are not discovered before such product is released to the market, we may be subject to adverse regulatory actions, including product recalls, product seizures, injunctions to halt manufacture and distribution, restrictions on our operations, civil sanctions, including monetary sanctions, and criminal actions. In addition, such problems or failures could subject us to litigation claims, including claims from our customers for reimbursement for the cost of lost or damaged active pharmaceutical ingredients, the cost of which could be significant.

We are subject to product and other liability risks for which we may not have adequate insurance coverage. We may be named as a defendant in product liability lawsuits, which may allege that products or services we have provided from our pharma services offerings have resulted or could result in an unsafe condition or injury to consumers. Additionally, products currently or previously sold by our environmental and process instruments and radiation measurement and security instruments businesses include fixed and portable instruments used for chemical, radiation and trace explosives detection. These products are used in airports, embassies, cargo facilities, border crossings and other high-threat facilities for the detection and prevention of terrorist acts. If any of these products were to malfunction, it is possible that explosive or radioactive material could fail to be detected by our product, which could lead to product liability claims. There are also many other factors beyond our control that could lead to liability claims, such as the reliability and competence of the customers' operators and the training of such operators.

Any such product liability claims brought against us could be significant and any adverse determination may result in liabilities in excess of our insurance coverage. Although we carry product liability insurance, we cannot be certain that our current insurance will be sufficient to cover these claims or that it can be maintained on acceptable terms, if at all.

Our inability to complete any pending acquisitions or to successfully integrate any new or previous acquisitions could have a material adverse effect on our business. Our business strategy includes the acquisition of technologies and businesses that complement or augment our existing products and services. Certain acquisitions may be difficult to complete for

a number of reasons, including the need for antitrust and/or other regulatory approvals. Any acquisition we may complete may be made at a substantial premium over the fair value of the net identifiable assets of the acquired company. Further, we may not be able to integrate acquired businesses successfully into our existing businesses, make such businesses profitable, or realize anticipated cost savings or synergies, if any, from these acquisitions, which could adversely affect our business.

Moreover, we have acquired many companies and businesses. As a result of these acquisitions, we recorded significant goodwill and indefinite-lived intangible assets (primarily tradenames) on our balance sheet, which amount to approximately $25.29 billion and $1.27 billion, respectively, as of December 31, 2017. In addition, we have definite-lived intangible assets totaling $15.41 billion as of December 31, 2017. We assess the realizability of goodwill and indefinite-lived intangible assets annually as well as whenever events or changes in circumstances indicate that these assets may be impaired. We assess the realizability of definite-lived intangible assets whenever events or changes in circumstances indicate that these assets may be impaired. These events or circumstances would generally include operating losses or a significant decline in earnings associated with the acquired business or asset. Our ability to realize the value of the goodwill and intangible assets will depend on the future cash flows of these businesses. These cash flows in turn depend in part on how well we have integrated these businesses. If we are not able to realize the value of the goodwill and intangible assets, we may be required to incur material charges relating to the impairment of those assets.

We are subject to laws and regulations governing government contracts, and failure to address these laws and regulations or comply with government contracts could harm our business by leading to a reduction in revenue associated with these customers. We have agreements relating to the sale of our products to government entities and, as a result, we are subject to various statutes and regulations that apply to companies doing business with the government. The laws governing government contracts differ from the laws governing private contracts and government contracts may contain pricing terms and conditions that are not applicable to private contracts. We are also subject to investigation for compliance with the regulations governing government contracts. A failure to comply with these regulations could result in suspension of these contracts, criminal, civil and administrative penalties or debarment.

Because we compete directly with certain of our larger customers and product suppliers, our results of operations could be adversely affected in the short term if these customers or suppliers abruptly discontinue or significantly modify their relationship with us. Our largest customer in the laboratory products business is also a significant competitor. Our business may be harmed in the short term if our competitive relationship in the marketplace with certain of our large customers results in a discontinuation of their purchases from us. In addition, we manufacture products that compete directly with products that we source from third-party suppliers. We also source competitive products from multiple suppliers. Our business could be adversely affected in the short term if any of our large third-party suppliers abruptly discontinues selling products to us.

Because we rely heavily on third-party package-delivery services, a significant disruption in these services or significant increases in prices may disrupt our ability to ship products, increase our costs and lower our profitability. We ship a significant portion of our products to our customers through independent package delivery companies, such as Federal Express in the U.S. and DHL in Europe. We also maintain a small fleet of vehicles dedicated to the delivery of our products and ship our products through other carriers, including national and regional trucking firms, overnight carrier services and the U.S. Postal Service. If one or more of these third-party package-delivery providers were to experience a major work stoppage, preventing our products from being delivered in a timely fashion or causing us to incur additional shipping costs we could not pass on to our customers, our costs could increase and our relationships with certain of our customers could be adversely affected. In addition, if one or more of these third-party package-delivery providers were to increase prices, and we were not able to find comparable alternatives or make adjustments in our delivery network, our profitability could be adversely affected.

We are required to comply with a wide variety of laws and regulations, and are subject to regulation by various federal, state and foreign agencies. We are subject to various local, state, federal, foreign and transnational laws and regulations, which include the operating and security standards of the U.S. Federal Drug Administration (the FDA), the U.S. Drug Enforcement Agency (the DEA), various state boards of pharmacy, state health departments, the U.S. Department of Health and Human Services (the DHHS), the European Medicines Agency (the EMA), in Europe, the EU member states and other comparable agencies and, in the future, any changes to such laws and regulations could adversely affect us. In particular, we are subject to laws and regulations concerning current

good manufacturing practices and drug safety. Our subsidiaries may be required to register for permits and/or licenses with, and may be required to comply with the laws and regulations of the DEA, the FDA, the DHHS, foreign agencies including the EMA, and other various state boards of pharmacy, state health departments and/or comparable state agencies as well as certain accrediting bodies depending upon the type of operations and location of product distribution, manufacturing and sale.

Risk Factors (continued)

The manufacture, distribution and marketing of many of our products and services, including medical devices and pharma services, are subject to extensive ongoing regulation by the FDA, the DEA, the EMA, and other equivalent local, state, federal and non-U.S. regulatory authorities. In addition, we are subject to inspections by these regulatory authorities. Failure by us or by our customers to comply with the requirements of these regulatory authorities, including without limitation, remediating any inspectional observations to the satisfaction of these regulatory authorities, could result in warning letters, product recalls or seizures, monetary sanctions, injunctions to halt manufacture and distribution, restrictions on our operations, civil or criminal sanctions, or withdrawal of existing or denial of pending approvals, including those relating to products or facilities. In addition, such a failure could expose us to contractual or product liability claims, contractual claims from our customers, including claims for reimbursement for lost or damaged active pharmaceutical ingredients, as well as ongoing remediation and increased compliance costs, any or all of which could be significant. We are the sole manufacturer of a number of pharmaceuticals for many of our customers and a negative regulatory event could impact our customers' ability to provide products to their customers.

We are also subject to a variety of federal, state, local and international laws and regulations that govern, among other things, the importation and exportation of products, the handling, transportation and manufacture of substances that could be classified as hazardous, and our business practices in the U.S. and abroad such as anti-corruption and anti-competition laws. Any noncompliance by us with applicable laws and regulations or the failure to maintain, renew or obtain necessary permits and licenses could result in criminal, civil and administrative penalties and could have an adverse effect on our results of operations.

Our business could be adversely affected by disruptions at our sites. We rely upon our manufacturing operations to produce many of the products we sell and our warehouse facilities to store products, pending sale. Any significant disruption of those operations for any reason, such as strikes or other labor unrest, power interruptions, fire, hurricanes or other events beyond our control could adversely affect our sales and customer relationships and therefore adversely affect our business. We have significant operations in California, near major earthquake faults, which make us susceptible to earthquake risk. Although most of our raw materials are available from a number of potential suppliers, our operations also depend upon our ability to obtain raw materials at reasonable prices. If we are unable to obtain the materials we need at a reasonable price, we may not be able to produce certain of our products or we may not be able to produce certain of these products at a marketable price, which could have an adverse effect on our results of operations.

Fluctuations in our effective tax rate may adversely affect our results of operations and cash flows. As a global company, we are subject to taxation in numerous countries, states and other jurisdictions. In preparing our financial statements, we record the amount of tax that is payable in each of the countries, states and other jurisdictions in which we operate. Our future effective tax rate, however, may be lower or higher than experienced in the past due to numerous factors, including a change in the mix of our profitability from country to country, changes in accounting for income taxes and recently enacted and future changes in tax laws in jurisdictions in which we operate. Any of these factors could cause us to experience an effective tax rate significantly different from previous periods or our current expectations, which could have an adverse effect on our business, results of operations and cash flows.

We may incur unexpected costs from increases in fuel and raw material prices, which could reduce our earnings and cash flow. Our primary commodity exposures are for fuel, petroleum-based resins and steel. While we may seek to minimize the impact of price increases through higher prices to customers and various cost-saving measures, our earnings and cash flows could be adversely affected in the event these measures are insufficient to cover our costs.

A significant disruption in, or breach in security of, our information technology systems could adversely affect our business. As a part of our ongoing effort to upgrade our current information systems, we periodically implement new enterprise resource planning software and other software applications to manage certain of our business operations. As we implement and add functionality, problems could arise that we have not foreseen. Such problems could disrupt our ability to provide quotes, take customer orders and otherwise run our business in a timely manner. When we upgrade or change systems, we may suffer interruptions in service, loss of data or reduced functionality. In addition, if our new systems fail to provide accurate pricing and cost data our results of operations and cash flows could be adversely affected.

We also rely on our technology infrastructure, among other functions, to interact with suppliers, sell our products and services, fulfill orders and bill, collect and make payments, ship products, provide services and support to customers, track customers, fulfill contractual obligations and otherwise conduct business. Our systems may be vulnerable to damage or interruption from natural disasters, power loss, telecommunication failures, terrorist attacks, computer viruses, computer denial-of-service attacks, unauthorized access to customer or employee data or company trade secrets, and other attempts to harm our systems. Certain of our systems are not redundant, and our disaster recovery planning is not sufficient for every eventuality. Despite any precautions we may take, such problems could result in, among other consequences, interruptions in our services,

which could harm our reputation and financial results. Any of the cyber-attacks, breaches or other disruptions or damage described above, if significant, could materially interrupt our operations, delay production and shipments, result in theft of our and our customers' intellectual property and trade secrets, damage customer, business partner and employee relationships and our reputation or result in defective products or services, legal claims and proceedings, liability and penalties under privacy laws and increased cost for security and remediation, each of which could adversely affect our business and financial results.

Our debt may restrict our investment opportunities or limit our activities. As of December 31, 2017, we had approximately $21.01 billion in outstanding indebtedness. In addition, we have availability to borrow under a revolving credit facility that provides for up to $2.50 billion of unsecured multi-currency revolving credit. We may also obtain additional long-term debt and lines of credit to meet future financing needs, which would have the effect of increasing our total leverage.

Our leverage could have negative consequences, including increasing our vulnerability to adverse economic and industry conditions, limiting our ability to obtain additional financing and limiting our ability to acquire new products and technologies through strategic acquisitions.

Our ability to make scheduled payments, refinance our obligations or obtain additional financing will depend on our future operating performance and on economic, financial, competitive and other factors beyond our control. Our business may not generate sufficient cash flow to meet our obligations. If we are unable to service our debt, refinance our existing debt or obtain additional financing, we may be forced to delay strategic acquisitions, capital expenditures or research and development expenditures.

Additionally, the agreements governing our debt require that we maintain certain financial ratios, and contain affirmative and negative covenants that restrict our activities by, among other limitations, limiting our ability to incur additional indebtedness, merge or consolidate with other entities, make investments, create liens, sell assets and enter into transactions with affiliates. The covenants in our revolving credit facility (the Facility) include a Consolidated Leverage Ratio (total debt-to-Consolidated EBITDA) and a Consolidated Interest Coverage ratio (Consolidated EBITDA to Consolidated Interest Expense), as such terms are defined in the Facility. Specifically, the company has agreed that, so long as any lender has any commitment under the Facility, any letter of credit is outstanding under the Facility, or any loan or other obligation is outstanding under the Facility, it will maintain a maximum Consolidated Leverage Ratio of 4.0:1.0 for the first and second quarters of 2018 and then stepping down to 3.5:1.0 for the third quarter of 2018 and thereafter. The company has also agreed that so long as any lender has any commitment under the Facility or any letter of credit is outstanding under the Facility, or any loan or other obligation is outstanding under the Facility, it will maintain a minimum Consolidated Interest Coverage Ratio of 3.0:1.0 as of the last day of any fiscal quarter.

Our ability to comply with these financial restrictions and covenants is dependent on our future performance, which is subject to prevailing economic conditions and other factors, including factors that are beyond our control such as foreign exchange rates and interest rates. Our failure to comply with any of these restrictions or covenants may result in an event of default under the applicable debt instrument, which could permit acceleration of the debt under that instrument and require us to prepay that debt before its scheduled due date. Also, an acceleration of the debt under certain of our debt instruments would trigger an event of default under other of our debt instruments.

Item 1B. Unresolved Staff Comments

Not applicable.

Item 2. Properties

The location and general character of our principal properties by segment are as follows:

Life Sciences Solutions

We own approximately 2.3 million square feet of office, engineering, laboratory and production space, principally in California, New York, Maryland, Illinois, Oregon, Wisconsin and Pennsylvania, within the U.S., and in the U.K., Lithuania and New Zealand. We lease approximately 3.2 million square feet of office, engineering, laboratory and production space, principally in California, Maryland, Utah, Massachusetts and Texas, within the U.S., and in Singapore, Netherlands, China, Germany, India, Lithuania, South Korea and Norway, under various leases that expire between 2018 and 2032.

Analytical Instruments

We own approximately 2.3 million square feet of office, engineering, laboratory and production space, principally in California, Massachusetts, Wisconsin, Oregon and Minnesota, within the U.S., and in Germany, Netherlands, Italy and Switzerland. We lease approximately 2.3 million square feet of office, engineering, laboratory and production space, principally in California, Texas, Tennessee, Illinois, Pennsylvania, Colorado, Florida and Oregon, within the U.S., and in Czech Republic, China, Germany, the U.K., Japan, Australia, India and France, under various leases that expire between 2018 and 2034.

Specialty Diagnostics

We own approximately 2.1 million square feet of office, engineering, laboratory and production space, principally in Virginia, Kansas and California, within the U.S., and in Sweden, Germany, the U.K. and Switzerland. We lease approximately 1.4 million square feet of office, engineering, laboratory and production space, principally in California, Kansas and Michigan, within the U.S., and in Finland, the U.K., China, France, Canada and Japan under various leases that expire between 2018 and 2026.

Laboratory Products and Services

We own approximately 12.5 million square feet of office, engineering, laboratory, warehouse and production space, principally in North Carolina, Pennsylvania, Ohio, Puerto Rico, New York, New Jersey, South Carolina and Illinois, within the U.S., and in the U.K., Austria, Italy, Canada, France, Germany and China. We lease approximately 4.6 million square feet of office, engineering, laboratory, warehouse and production space, principally in California, Pennsylvania, New York, Maryland, Texas, Tennessee, Ohio, North Carolina and Massachusetts, within the U.S., and in Australia, Germany, the U.K., Mexico, China, Singapore, New Zealand, India and Sweden under various leases that expire between 2018 and 2038.

Corporate Headquarters

We own approximately 127,000 square feet of office space in Massachusetts.

We believe that all of the facilities that we are currently using are in good condition and are suitable and adequate to meet our current needs. If we are unable to renew any of the leases that are due to expire in 2018 or 2019, we believe that suitable replacement properties are available on commercially reasonable terms.

Item 3. Legal Proceedings

There are various lawsuits and claims against the company involving product liability, intellectual property, employment and commercial issues. See "Note 10 to our Consolidated Financial Statements – Commitments and Contingencies."

Item 4. Mine Safety Disclosures

Not applicable.

PART II

Item 5. Market for the Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities

Market Price of Common Stock

Our common stock is traded on the New York Stock Exchange under the symbol TMO. The following table sets forth the high and low sale prices of the company's common stock for 2017 and 2016, as reported in the consolidated transaction reporting system.

	2017		2016	
	High	Low	High	Low
First Quarter	$ 161.66	$ 140.00	$ 142.99	$ 119.75
Second Quarter	176.92	151.74	154.81	140.21
Third Quarter	194.30	170.07	160.68	143.01
Fourth Quarter	201.20	181.51	160.10	139.07

The closing price of the company's common stock on December 31, 2017 and 2016, was $189.88 and $141.10, respectively.

The following table sets forth the per share dividends declared on the company's common stock for 2017 and 2016.

	2017	2016
First Quarter	$ 0.15	$ 0.15
Second Quarter	0.15	0.15
Third Quarter	0.15	0.15
Fourth Quarter	0.15	0.15

Our payment of dividends in the future will be determined by our Board of Directors and will depend upon our earnings, financial condition and other factors.

Holders of Common Stock

As of February 3, 2018, the company had 3,595 holders of record of its common stock. This does not include holdings in street or nominee names.

Issuer Purchases of Equity Securities

There was no share repurchase activity for the company's fourth quarter of 2017. On July 7, 2016, the Board of Directors authorized the repurchase of up to $1.50 billion of the company's common stock. At December 31, 2017, $500 million was available for future repurchases of the company's common stock under this authorization.

Item 6. Selected Financial Data

(In millions except per share amounts)	2017 (a)	2016 (b)	2015 (c)	2014 (d)	2013 (e)
Statement of Income Data					
Revenues	$ 20,918	$ 18,274	$ 16,965	$ 16,890	$ 13,090
Income from Continuing Operations	2,228	2,025	1,980	1,895	1,279
Net Income	2,225	2,022	1,975	1,894	1,273
Earnings per Share from Continuing Operations:					
Basic	5.65	5.13	4.97	4.76	3.55
Diluted	5.60	5.10	4.93	4.71	3.50
Earnings per Share:					
Basic	5.64	5.12	4.96	4.76	3.53
Diluted	5.59	5.09	4.92	4.71	3.48
Cash Dividends Declared per Share	0.60	0.60	0.60	0.60	0.60
Balance Sheet Data					
Total Assets	56,669	45,908	40,834	42,852	31,863
Long-term Obligations	18,873	15,372	11,420	12,352	9,500

The caption "restructuring and other costs/income" in the notes below includes amounts charged to cost of revenues, primarily for the sale of inventories revalued at the date of acquisition, and charges/credits to selling, general and administrative expense primarily for significant acquisition transaction costs.

(a) Reflects $298 million of pre-tax charges for restructuring and other costs. Also reflects the acquisition of Patheon N.V. in August 2017.

(b) Reflects $395 million of pre-tax charges for restructuring and other costs. Also reflects the acquisitions of Affymetrix, Inc. in March 2016 and FEI Company in September 2016.

(c) Reflects $171 million of pre-tax charges for restructuring and other costs.

(d) Reflects $140 million of pre-tax income from gains on sale of businesses, net of restructuring and other costs. Also reflects the acquisition of Life Technologies Corporation in February 2014.

(e) Reflects $180 million of pre-tax charges for restructuring and other costs.

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

Reference is made throughout this Management's Discussion and Analysis of Financial Condition and Results of Operations to Notes to Consolidated Financial Statements, which begin on page F-1 of this report.

Overview

The company develops, manufactures and sells a broad range of products that are sold worldwide. The company expands the product lines and services it offers by developing and commercializing its own technologies and by making strategic acquisitions of complementary businesses. The company's continuing operations fall into four business segments (see Note 3): Life Sciences Solutions, Analytical Instruments, Specialty Diagnostics and Laboratory Products and Services.

Recent Acquisitions and Divestitures

The company's strategy is to augment internal growth at existing businesses with complementary acquisitions. The company's principal recent acquisitions are described below.

In February 2015, the company acquired, within the Life Sciences Solutions segment, Advanced Scientifics, Inc., a North America-based global provider of single-use systems and process equipment for bioprocess production, for approximately $289 million. The acquisition expanded the company's bioprocessing offerings. Revenues of Advanced Scientifics were approximately $80 million in 2014.

On September 30, 2015, the company acquired, within the Laboratory Products and Services segment, Alfa Aesar, a U.K.-based global manufacturer of research chemicals from Johnson Matthey Plc, for £257 million ($393 million) in cash. The acquisition expanded the company's existing portfolio of chemicals, solvents and reagents. Revenues of Alfa Aesar were approximately £78 million in 2014.

On March 31, 2016, the company acquired, primarily within the Life Sciences Solutions segment, Affymetrix, Inc., a North America-based provider of cellular and genetic analysis products, for a total purchase price of $1.34 billion, net of cash acquired, including the assumption of $254 million of debt. The acquisition expanded the company's existing portfolio of antibodies and assays for flow cytometry and single-cell biology applications. Additionally, the acquisition expanded the company's genetic analysis portfolio through the addition of microarrays. Revenues of Affymetrix were $360 million in 2015.

On September 19, 2016, the company acquired, within the Analytical Instruments segment, FEI Company, a North America-based provider of high-performance electron microscopy, for a total purchase price of $4.08 billion, net of cash acquired. The acquisition strengthened the company's analytical instrument portfolio with the addition of high-end electron microscopes. Revenues of FEI were $930 million in 2015.

On February 14, 2017, the company acquired, within the Life Sciences Solutions segment, Finesse Solutions, Inc., a North America-based developer of scalable control automation systems and software for bioproduction, for a total purchase price of $221 million, net of cash acquired. The acquisition expanded the company's bioproduction offerings. Revenues of Finesse Solutions were approximately $50 million in 2016.

On March 2, 2017, the company acquired, within the Analytical Instruments segment, Core Informatics, a North America-based provider of cloud-based platforms supporting scientific data management, for a total purchase price of $94 million, net of cash acquired. The acquisition enhanced the company's existing informatics solutions. Revenues of Core Informatics were approximately $10 million in 2016.

On August 29, 2017, the company acquired, within the Laboratory Products and Services segment, substantially all of the issued and outstanding shares of Patheon N.V., a leading global provider of high-quality drug development and delivery solutions to the pharmaceutical and biopharma sectors, for $35.00 per share in cash, or $7.36 billion, including the assumption of net debt. The company financed the purchase price, including the repayment of indebtedness of Patheon, with issuances of debt and equity.

Patheon provides comprehensive, integrated and highly customizable solutions as well as the expertise to help biopharmaceutical companies of all sizes satisfy complex development and manufacturing needs. The acquisition provided entry into the pharmaceutical contract development and manufacturing organization market and added a complementary service to the company's existing pharmaceutical services portfolio. Patheon's revenues totaled $1.87 billion for the year ended October 31, 2016.

Overview of Results of Operations and Liquidity

(Dollars in millions)	2017		2016	
Revenues				
Life Sciences Solutions	$ 5,728	27.4 %	$ 5,317	29.1 %
Analytical Instruments	4,821	23.0 %	3,668	20.1 %
Specialty Diagnostics	3,486	16.7 %	3,339	18.3 %
Laboratory Products and Services	7,825	37.4 %	6,724	36.8 %
Eliminations	(942)	(4.5%)	(774)	(4.3%)
	$ 20,918	100 %	$ 18,274	100 %

Sales in 2017 were $20.92 billion, an increase of $2.64 billion from 2016. Sales increased $1.63 billion due to acquisitions. The favorable effects of currency translation resulted in an increase in revenues of $70 million in 2017. Aside from the effects of acquisitions and currency translation, revenues increased $949 million (5%) primarily due to increased demand. Sales to customers in each of the company's primary end markets grew. Sales growth was moderate in North America and Europe and particularly strong in Asia.

In 2017, total company operating income and operating income margin were $2.97 billion and 14.2%, respectively, compared with $2.45 billion and 13.4%, respectively, in 2016. The increase in operating income was primarily due to profit on higher sales in local currencies, the effects of acquisitions and productivity improvements, net of inflationary cost increases, offset in part by an increase in amortization of acquisition-related intangible assets, due to recent acquisitions, and strategic growth investments. The company’s references to strategic growth investments generally refer to targeted spending for enhancing commercial capabilities, including expansion of geographic sales reach and e-commerce platforms, marketing initiatives, focused research projects and other expenditures to enhance the customer experience. The company’s references throughout this discussion to productivity improvements generally refer to improved cost efficiencies from its Practical Process Improvement (PPI) business system, reduced costs resulting from global sourcing initiatives, a lower cost structure following restructuring actions, including headcount reductions and consolidation of facilities, and low cost region manufacturing.

The increase in our effective tax rate in 2017 was principally due to a net provision of $204 million from the effects of the Tax Cuts and Jobs Act of 2017 (the Tax Act), consisting primarily of a one-time transition tax on deemed repatriated earnings and profits of foreign subsidiaries, net of a benefit from adjusting the deferred tax balances for the U.S. statutory tax rate reduction. Although the net $204 million charge represents what the company believes is a reasonable estimate of the impact of the Tax Act, the components of the net charge are provisional and may change as discussed in Note 7. In 2017, the company refinanced certain long term inter-company debt which resulted in an income tax benefit of $237 million related to a foreign exchange loss recognized for income tax purposes. In addition, in 2017 the company recorded a $65 million favorable adjustment to deferred tax balances due to extension of a tax holiday agreement in Singapore and $65 million of benefit associated with new required accounting for tax benefits from equity awards, as discussed in Note 1. The company continued to implement tax planning initiatives related to non-U.S. subsidiaries in 2017. These non-U.S. subsidiaries incurred foreign tax obligations, and made cash and deemed distributions to the company’s U.S. operations which resulted in no net tax cost. As a result of these distributions, the company benefitted from U.S. foreign tax credits of $86 million, offset in part by additional U.S. income taxes of $53 million on the related foreign income (which reduced the benefit from the foreign rate differential in 2017) for a net benefit of $33 million. The foreign tax credits are the result of foreign earnings and profits remitted or deemed remitted to the U.S. during the reporting year and the U.S. treatment of taxes paid in the foreign jurisdictions in the years those profits were originally earned. The company intends to make similar types of distributions from non-U.S. subsidiaries when they can be made at no net tax cost. The ability of the company to make distributions in future periods of similar type and magnitude will depend on the level of earnings and cash flow in various foreign jurisdictions and on the applicable tax laws in effect at that time. Accordingly, the impact of foreign tax credits on the company’s effective tax rate in future periods is likely to vary. The company also

implemented foreign tax credit planning in Sweden which resulted in $20 million of foreign tax credits, with no related incremental U.S. income tax expense.

The company recorded a benefit from income taxes in 2016. In 2016, the company continued to implement tax planning initiatives related to non-U.S. subsidiaries. These non-U.S. subsidiaries incurred foreign tax obligations, and made cash and deemed distributions to the company's U.S. operations which resulted in no net tax cost. As a result of these distributions, the company benefitted from U.S. foreign tax credits of $91 million, offset in part by additional U.S. taxes of $37 million on the related foreign income (which reduced the benefit from the foreign rate differential in 2016) for a net benefit of $54 million.

Overview of Results of Operations and Liquidity (continued)

The company also implemented foreign tax credit planning in Sweden which resulted in $100 million of foreign tax credits, with no related incremental U.S. income tax expense. In addition, the company recorded discrete benefits in 2016 totaling $39 million related to prior year tax filings and net charges of $12 million related to tax audits.

The effective tax rate in both 2017 and 2016 was also affected by relatively significant earnings in lower tax jurisdictions. Due primarily to the non-deductibility of intangible asset amortization for tax purposes, the company's cash payments for income taxes were higher than its income tax expense for financial reporting purposes and totaled $479 million and $663 million in 2017 and 2016, respectively.

The company expects its effective tax rate in 2018 will be between 6% and 9% based on currently forecasted rates of profitability in the countries in which the company conducts business and expected generation of foreign tax credits. The effective tax rate can vary significantly from period to period as a result of discrete income tax factors and events.

Income from continuing operations increased to $2.23 billion in 2017, from $2.03 billion in 2016. The increase in operating income in 2017 (discussed above) was offset in part by an increase in interest expense of $123 million primarily due to increases in outstanding debt to fund acquisitions and the increase in the tax provision in 2017 (discussed above).

During 2017, the company's cash flow from operations totaled $4.01 billion compared with $3.26 billion for 2016. The increase primarily resulted from higher income before amortization and depreciation in the 2017 period and lower investment in working capital in 2017.

As of December 31, 2017, the company's short-term debt totaled $2.14 billion, including $0.96 billion of commercial paper obligations and $1.17 billion of senior notes due within the next twelve months. The company has a revolving credit facility with a bank group that provides up to $2.50 billion of unsecured multi-currency revolving credit. If the company borrows under this facility, it intends to leave undrawn an amount equivalent to outstanding commercial paper to provide a source of funds in the event that commercial paper markets are not available. As of December 31, 2017, no borrowings were outstanding under the company's revolving credit facility, although available capacity was reduced by approximately $77 million as a result of outstanding letters of credit.

The company believes that its existing cash and cash equivalents of $1.34 billion as of December 31, 2017 and its future cash flow from operations together with available borrowing capacity under its revolving credit agreement will be sufficient to meet the cash requirements of its existing businesses for the foreseeable future, including at least the next 24 months.

Critical Accounting Policies and Estimates

The company's discussion and analysis of its financial condition and results of operations is based upon its financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States of America. The preparation of these financial statements requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenue and expenses and related disclosure of contingent liabilities. On an on-going basis, management evaluates its estimates, including those related to bad debts, inventories, business combinations, intangible assets and goodwill, sales returns, income taxes, contingencies and litigation, and pension costs. Management believes the most complex and sensitive judgments, because of their significance to the consolidated financial statements, result primarily from the need to make estimates about the effects of matters that are inherently uncertain. Management bases its estimates on historical experience, current market and economic conditions and other assumptions that management believes are reasonable. The results of these estimates form the basis for judgments about the carrying value of assets and liabilities where the values are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

The company believes the following represent its critical accounting policies and estimates used in the preparation of its financial statements:

(a) *Intangible Assets and Goodwill*

The company uses assumptions and estimates in determining the fair value of assets acquired and liabilities assumed in a business combination. The determination of the fair value of intangible assets, which represent a significant portion of the purchase price in many of the company's acquisitions, requires the use of significant judgment with regard to (i) the fair value; and (ii) whether such intangibles are amortizable or non-amortizable and, if the former, the period and the method by which the intangible asset will be amortized. The company estimates the fair value of acquisition-related intangible assets principally based on projections of cash flows that will arise from identifiable intangible assets of acquired businesses. The projected cash flows are discounted to determine the present value of the assets at

Critical Accounting Policies and Estimates (continued)

the dates of acquisition. Definite-lived intangible assets totaled $15.41 billion at December 31, 2017. The company reviews definite-lived intangible assets for impairment when indication of potential impairment exists, such as a significant reduction in cash flows associated with the assets. Actual cash flows arising from a particular intangible asset could vary from projected cash flows which could imply different carrying values from those established at the dates of acquisition and which could result in impairment of such asset.

The company evaluates goodwill and indefinite-lived intangible assets for impairment annually and when events occur or circumstances change that would more-likely-than-not reduce the fair value of the asset below its carrying amount. Events or circumstances that might require an interim evaluation include unexpected adverse business conditions, economic factors, unanticipated technological changes or competitive activities, loss of key personnel and acts by governments and courts. Goodwill and indefinite-lived intangible assets totaled $25.29 billion and $1.27 billion, respectively, at December 31, 2017. Estimates of future cash flows require assumptions related to revenue and operating income growth, asset-related expenditures, working capital levels and other factors. Different assumptions from those made in the company's analysis could materially affect projected cash flows and the company's evaluation of goodwill and indefinite-lived intangible assets for impairment.

For reporting units where the company performed the quantitative goodwill impairment test, indications of fair value based on projections of profitability for 2018 and thereafter and on peer revenues and earnings trading multiples were sufficient to conclude that no impairment of goodwill or indefinite-lived intangible assets existed at the end of the tenth fiscal month of 2017, the date of the company's impairment testing. There can be no assurance, however, that an economic downturn will not materially adversely affect peer trading multiples and the company's businesses such that they do not achieve their forecasted profitability and these assets become impaired. Should the fair value of the company's goodwill or indefinite-lived intangible assets decline because of reduced operating performance, market declines, or other indicators of impairment, or as a result of changes in the discount rate, charges for impairment may be necessary.

With the completion of the Patheon acquisition in August 2017, the company established a new reporting unit which solely consists of the legacy Patheon business, the book carrying value of which equaled its fair value as of the acquisition date. During its annual 2017 goodwill impairment assessment, the company performed a qualitative assessment of this reporting unit and determined that no events had occurred and no circumstances had changed that would more-likely-than-not reduce the fair value of the reporting unit below its carrying amount. As a result, the company did not perform the quantitative goodwill impairment test for this reporting unit. Given that the fair value of the reporting unit was not substantially in excess of its carrying value as of the annual 2017 assessment date, relatively small decreases in future cash flows from anticipated results could result in impairment of goodwill. The key variables that will drive the cash flows of the reporting unit will be levels of profitability and terminal value growth rate assumptions, as well as the weighted average cost of capital rate applied. The business unit consisting of the legacy Patheon business had $3.25 billion of goodwill, and an overall carrying value of $7.33 billion as of December 31, 2017.

(b) Income Taxes

In the ordinary course of business there is inherent uncertainty in quantifying the company's income tax positions. The company assesses income tax positions and records tax benefits for all years subject to examination based upon management's evaluation of the facts, circumstances and information available at the reporting date. For those tax positions where it is more likely than not that a tax benefit will be sustained, the company has recorded the largest amount of tax benefit with a greater than 50 percent likelihood of being realized upon ultimate settlement with a taxing authority that has full knowledge of all relevant information. For those income tax positions where it is not more likely than not that a tax benefit will be sustained, no tax benefit has been recognized in the financial statements. Should tax return positions that the company expects are sustainable not be sustained upon audit, the company could be required to record an incremental tax provision for such taxes. The company's reserve for these matters totaled $1.41 billion at December 31, 2017.

The company operates in numerous countries under many legal forms and, as a result, is subject to the jurisdiction of numerous domestic and non-U.S. tax authorities, as well as to tax agreements and treaties

among these governments. Determination of taxable income in any jurisdiction requires the interpretation of the related tax laws and regulations and the use of estimates and assumptions regarding significant future events, such as the amount, timing and character of deductions, permissible revenue recognition methods under the tax law and the sources and character of income and tax credits. Changes in tax laws, regulations, agreements and treaties, currency exchange restrictions or the company's

Critical Accounting Policies and Estimates (continued)

level of operations or profitability in each taxing jurisdiction could have an impact upon the amount of current and deferred tax balances and hence the company's net income.

The company estimates the degree to which tax assets and loss carryforwards will result in a benefit, after consideration of all positive and negative evidence, and provides a valuation allowance for tax assets and loss carryforwards that it believes will more likely than not go unused. In situations in which the company has been able to conclude that its deferred tax assets will be realized, it has generally relied on future reversals of taxable temporary differences, expected future taxable income where such estimates have historically been reliable, and other factors. If it becomes more likely than not that a tax asset or loss carryforward will be used, the company reverses the related valuation allowance. Any such reversals are recorded as a reduction of the company's tax provision. The company's tax valuation allowance totaled $256 million at December 31, 2017. Should the company's actual future taxable income by tax jurisdiction vary from estimates, additional allowances or reversals thereof may be necessary.

The company has not provided state income or foreign withholding taxes on certain of its non-U.S. subsidiaries' undistributed earnings, as such amounts are intended to be reinvested outside the United States indefinitely in the respective jurisdictions based on specific business plans and tax strategies. These business plans and tax strategies consider: short-term and long-term forecasts and budgets of the U.S. parent and non-U.S. subsidiaries; working capital and other needs in locations where earnings are generated; the company's past practices regarding non-U.S. subsidiary dividends; sources of financing by the U.S. parent, such as issuing debt or equity; and uses of cash by the U.S. parent that are more discretionary in nature, such as business combinations and share repurchase programs. However, should the company change its business plans and tax strategies in the future and decide to repatriate a portion of these earnings to one of its U.S. subsidiaries, including cash maintained by these non-U.S. subsidiaries, the company would recognize additional U.S. tax liabilities. It is not practicable to estimate the amount of additional state and foreign withholding tax liabilities that the company would incur.

(c) Contingencies and Litigation

The company records accruals for various contingencies, including legal proceedings, environmental, workers' compensation, product, general and auto liabilities, and other claims that arise in the normal course of business. The accruals are based on management's judgment, historical claims experience, the probability of losses and, where applicable, the consideration of opinions of internal and or external legal counsel and actuarial estimates. Accruals of acquired businesses, including product liability and environmental accruals, were initially recorded at fair value and discounted to their net present value. Additionally, the company records receivables from third-party insurers when recovery has been determined to be probable.

(d) Pension and Other Retiree Benefits

Several of the company's U.S. and non-U.S. subsidiaries sponsor defined benefit pension and other retiree benefit plans. The cost and obligations of these arrangements are calculated using many assumptions to estimate the benefits that the employee earns while working, the amount of which cannot be completely determined until the benefit payments cease. Major assumptions used in the accounting for these employee benefit plans include the discount rate, expected return on plan assets and rate of increase in employee compensation levels. Assumptions are determined based on company data and appropriate market indicators in consultation with third-party actuaries, and are evaluated each year as of the plans' measurement date. Net periodic pension costs for the company's pension and other postretirement benefit plans totaled $25 million in 2017. The company's unfunded benefit obligation totaled $486 million at year-end 2017 compared with $610 million at year-end 2016. Should any of these assumptions change, they would have an effect on net periodic pension costs and the unfunded benefit obligation. For example, a 10% decrease in the discount rate would result in an annual increase in pension and other postretirement benefit expense of approximately $2 million and an increase in the benefit obligation of approximately $95 million.

As of December 31, 2017, the company expects to contribute between $35 and $65 million to its existing defined benefit pension plans in 2018.

Results of Operations

2017 Compared With 2016

(In millions)	2017	2016	Total Change	Currency Translation	Acquisitions/ Divestitures	Operations
Revenues						
Life Sciences Solutions	$ 5,728	$ 5,317	$ 411	$ 12	$ 99	$ 300
Analytical Instruments	4,821	3,668	1,153	29	794	330
Specialty Diagnostics	3,486	3,339	147	12	9	126
Laboratory Products and Services	7,825	6,724	1,101	13	727	361
Eliminations	(942)	(774)	(168)	4	(4)	(168)
Consolidated Revenues	$ 20,918	$ 18,274	$ 2,644	$ 70	$ 1,625	$ 949

Sales in 2017 were $20.92 billion, an increase of $2.64 billion from 2016. Sales increased $1.63 billion due to acquisitions. The favorable effects of currency translation resulted in an increase in revenues of $70 million in 2017. Aside from the effects of acquisitions and currency translation, revenues increased $949 million (5%) primarily due to increased demand. Sales to customers in each of the company's primary end markets grew. Sales growth was moderate in North America and Europe and particularly strong in Asia.

In 2017, total company operating income and operating income margin were $2.97 billion and 14.2%, respectively, compared with $2.45 billion and 13.4%, respectively, in 2016. The increase in operating income was primarily due to profit on higher sales in local currencies, the effects of acquisitions and productivity improvements, net of inflationary cost increases, offset in part by an increase in amortization of acquisition-related intangible assets, due to recent acquisitions, and strategic growth investments.

In 2017, the company recorded restructuring and other costs, net, of $298 million, including $123 million of charges to cost of revenues primarily for the sale of inventories revalued at the date of acquisition, and, to a lesser extent, to conform the accounting policies of Patheon to the company's accounting policies. The company recorded $78 million of charges to selling, general and administrative expenses, primarily for third-party transaction and integration costs associated with recent acquisitions and changes in estimates of acquisition contingent consideration. In addition, the company recorded $97 million of cash restructuring costs, primarily to achieve acquisition synergies, including severance and abandoned facilities costs associated with the closure and consolidation of facilities in the U.S and Europe. The company’s other businesses incurred costs for continued headcount reductions and facility consolidations in an effort to streamline operations including severance at several businesses and abandoned facility expenses at businesses that have been or are being consolidated in the U.S., Europe and Asia. The company also recorded $27 million of net credits for litigation-related matters, which were mostly offset by compensation due at Patheon on the date of the acquisition, hurricane response/impairment costs, and net charges for the settlement/ curtailment of retirement plans (see Note 14).

In 2016, the company recorded restructuring and other costs, net, of $395 million, including $102 million of charges to cost of revenues for the sale of inventories revalued at the date of acquisition and to conform the accounting policies of FEI and Affymetrix to the company's accounting policies; $104 million of charges to selling, general and administrative expenses primarily for third-party transaction and integration costs related to the acquisitions of FEI and Affymetrix. In addition, the company recorded $164 million of cash restructuring costs, primarily to achieve acquisition synergies, including severance and abandoned facilities costs associated with the closure and consolidation of facilities in the U.S. The company’s other businesses incurred costs for continued headcount reductions and facility consolidations in an effort to streamline operations, including severance at several businesses and abandoned facility expenses at businesses that have been or are being consolidated in the U.S., Europe and Asia. The company also recorded charges for litigation and environmental remediation matters. These costs were partially offset by gains on the sales of real estate.

As of February 28, 2018, the company has identified restructuring actions that will result in additional charges of approximately $105 million, primarily in 2018, and expects to identify additional actions during 2018 which will be recorded when specified criteria are met, such as communication of benefit arrangements and abandonment of leased facilities. Approximately 35% of the additional charges will be incurred in the Life Sciences Solutions segment, 25% in the Analytical

Results of Operations (continued)

Instruments segment, 30% in the Laboratory Products and Services segment, and 10% in the Specialty Diagnostics segment. The restructuring projects for which charges were incurred in 2017 are expected to result in annual cost savings of approximately $90 million beginning in part in 2017 and, to a greater extent, in 2018, including $50 million in the Life Sciences Solutions segment, $20 million in the Analytical Instruments segment, $10 million in the Specialty Diagnostics segment and $10 million in the Laboratory Products and Services segment. The restructuring actions for which charges were incurred in 2016 resulted in annual cost savings of approximately $100 million beginning in part in 2016 and to a greater extent in 2017, including $60 million in the Life Sciences Solutions segment, $25 million in the Analytical Instruments segment, $5 million in the Specialty Diagnostics segment and $10 million in the Laboratory Products and Services segment.

Segment Results

The company's management evaluates segment operating performance using operating income before certain charges/credits to cost of revenues and selling, general and administrative expenses, principally associated with acquisition-related activities; restructuring and other costs/income including costs arising from facility consolidations such as severance and abandoned lease expense and gains and losses from the sale of real estate and product lines; and amortization of acquisition-related intangible assets. The company uses this measure because it helps management understand and evaluate the segments' core operating results and facilitate comparison of performance for determining compensation (Note 3). Accordingly, the following segment data is reported on this basis.

(Dollars in millions)	2017	2016	Change
Revenues			
Life Sciences Solutions	$ 5,728	$ 5,317	8 %
Analytical Instruments	4,821	3,668	31 %
Specialty Diagnostics	3,486	3,339	4 %
Laboratory Products and Services	7,825	6,724	16 %
Eliminations	(942)	(774)	22 %
Consolidated Revenues	$ 20,918	$ 18,274	14 %
Segment Income			
Life Sciences Solutions	$ 1,896	$ 1,596	19 %
Analytical Instruments	1,027	745	38 %
Specialty Diagnostics	930	910	2 %
Laboratory Products and Services	1,007	971	4 %
Subtotal Reportable Segments	4,860	4,222	15 %
Cost of Revenues Charges	(123)	(102)	
Selling, General and Administrative Charges, Net	(78)	(104)	
Restructuring and Other (Costs) Income, Net	(97)	(189)	
Amortization of Acquisition-related Intangible Assets	(1,594)	(1,378)	
Consolidated Operating Income	$ 2,968	$ 2,449	21 %
Reportable Segments Operating Income Margin	23.2 %	23.1 %	

Consolidated Operating Income Margin	14.2 %	13.4 %

Income from the company's reportable segments increased 15% to $4.86 billion in 2017 due primarily to profit on higher sales in local currencies, the effects of acquisitions and productivity improvements, net of inflationary cost increases, offset in part by strategic growth investments.

Results of Operations (continued)

Life Sciences Solutions

(Dollars in millions)	2017	2016	Change
Revenues	$ 5,728	$ 5,317	8 %
Operating Income Margin	33.1 %	30.0 %	3.1 pt

Sales in the Life Sciences Solutions segment increased $411 million to $5.73 billion in 2017. Sales increased $300 million (6%) due to higher revenues at existing businesses, $99 million due to acquisitions and $12 million due to the favorable effects of currency translation. The increase in revenue at existing businesses was primarily due to increased demand for biosciences products and, to a lesser extent, bioprocess production products as well as genetic sciences products.

Operating income margin was 33.1% in 2017 compared to 30.0% in 2016. The increase in operating margin resulted primarily from productivity improvements, net of inflationary cost increases, and, to a lesser extent, profit on higher sales in local currencies and price increases. These increases were offset in part by strategic growth investments and acquisition dilution.

Analytical Instruments

(Dollars in millions)	2017	2016	Change
Revenues	$ 4,821	$ 3,668	31 %
Operating Income Margin	21.3 %	20.3 %	1.0 pt

Sales in the Analytical Instruments segment increased $1.15 billion to $4.82 billion in 2017. Sales increased $794 million due to acquisitions, $330 million (9%) due to higher revenues at existing businesses and $29 million due to the favorable effects of currency translation. The increase in revenue at existing businesses was primarily due to increased demand in each of the segment's primary businesses particularly products sold by the segment's chromatography and mass spectrometry business and materials and structural analysis business.

Operating income margin was 21.3% in 2017 compared to 20.3% in 2016. The increase resulted primarily from profit on higher sales in local currencies, productivity improvements, net of inflationary cost increases and, to a lesser extent, the effect of acquisitions, offset in part by strategic growth investments and, to a lesser extent, unfavorable foreign currency exchange and unfavorable sales mix.

Specialty Diagnostics

(Dollars in millions)	2017	2016	Change
Revenues	$ 3,486	$ 3,339	4 %
Operating Income Margin	26.7 %	27.2 %	-0.5 pt

Sales in the Specialty Diagnostics segment increased $147 million to $3.49 billion in 2017. Sales increased $126 million (4%) due to higher revenues at existing businesses, $12 million due to the favorable effects of currency translation and $9 million due to acquisitions. The increase in revenue at existing businesses was primarily due to higher demand for products sold through the segment's healthcare market channel as well as clinical diagnostics products and immunodiagnostics products.

Operating income margin was 26.7% in 2017 and 27.2% in 2016. The decrease resulted primarily from strategic growth investments and, to a lesser extent, unfavorable sales mix, offset in part by profit on higher sales in local currencies and productivity improvements, net of inflationary cost increases.

Results of Operations (continued)

Laboratory Products and Services

(Dollars in millions)	2017	2016	Change
Revenues	$ 7,825	$ 6,724	16 %
Operating Income Margin	12.9 %	14.4 %	-1.5 pt

Sales in the Laboratory Products and Services segment increased $1.10 billion to $7.83 billion in 2017. Sales increased $727 million due to acquisitions, $361 million (5%) due to higher revenues at existing businesses and $13 million due to the favorable effects of currency translation. The increase in revenue at existing businesses was primarily due to increased demand for products sold through the segment's channel business and, to a lesser extent, laboratory equipment and consumables.

Operating income margin was 12.9% in 2017 compared to 14.4% in 2016. The decrease was primarily due to unfavorable sales mix and strategic growth investments offset in part by profit on higher sales in local currencies and, to a lesser extent, the effect of acquisitions.

Other Expense, Net

The company reported other expense, net, of $539 million and $425 million in 2017 and 2016, respectively (Note 4). Interest expense increased $123 million primarily due to an increase in outstanding debt.

Provision for Income Taxes

The increase in our effective tax rate in 2017 was principally due to a net provision of $204 million from the effects of the Tax Cuts and Jobs Act of 2017, consisting primarily of a one-time transition tax on deemed repatriated earnings and profits of foreign subsidiaries, net of a benefit from adjusting the deferred tax balances for the U.S. statutory tax rate reduction. Although the net $204 million charge represents what the company believes is a reasonable estimate of the impact of the Tax Act, the components of the net charge are provisional and may change as discussed in Note 7. In 2017, the company refinanced certain long term inter-company debt which resulted in an income tax benefit of $237 million related to a foreign exchange loss recognized for income tax purposes. In addition, in 2017 the company recorded a $65 million favorable adjustment to deferred tax balances due to extension of a tax holiday agreement in Singapore and $65 million of benefit associated with new required accounting for tax benefits from equity awards, as discussed in Note 1. The company continued to implement tax planning initiatives related to non-U.S. subsidiaries in 2017. These non-U.S. subsidiaries incurred foreign tax obligations, and made cash and deemed distributions to the company’s U.S. operations which resulted in no net tax cost. As a result of these distributions, the company benefitted from U.S. foreign tax credits of $86 million, offset in part by additional U.S. income taxes of $53 million on the related foreign income (which reduced the benefit from the foreign rate differential in 2017) for a net benefit of $33 million. The foreign tax credits are the result of foreign earnings and profits remitted or deemed remitted to the U.S. during the reporting year and the U.S. treatment of taxes paid in the foreign jurisdictions in the years those profits were originally earned. The company intends to make similar types of distributions from non-U.S. subsidiaries when they can be made at no net tax cost. The ability of the company to make distributions in future periods of similar type and magnitude will depend on the level of earnings and cash flow in various foreign jurisdictions and on the applicable tax laws in effect at that time. Accordingly, the impact of foreign tax credits on the company’s effective tax rate in future periods is likely to vary. The company also implemented foreign tax credit planning in Sweden which resulted in $20 million of foreign tax credits, with no related incremental U.S. income tax expense.

The company recorded a benefit from income taxes in 2016. In 2016, the company continued to implement tax planning initiatives related to non-U.S. subsidiaries. These non-U.S. subsidiaries incurred foreign tax obligations, and made cash and deemed distributions to the company’s U.S. operations which resulted in no net tax cost. As a result of these distributions, the company benefitted from U.S. foreign tax credits of $91 million, offset in part by additional U.S. taxes of $37 million on the related foreign income (which reduced the benefit from the foreign rate differential in 2016) for a net benefit of $54 million. The company also implemented foreign tax credit planning in Sweden

which resulted in $100 million of foreign tax credits, with no related incremental U.S. income tax expense. In addition, the company recorded discrete benefits in 2016 totaling $39 million related to prior year tax filings and net charges of $12 million related to tax audits.

The effective tax rate in both 2017 and 2016 was also affected by relatively significant earnings in lower tax jurisdictions. Due primarily to the non-deductibility of intangible asset amortization for tax purposes, the company's cash payments for

Results of Operations (continued)

income taxes were higher than its income tax expense for financial reporting purposes and totaled $479 million and $663 million in 2017 and 2016, respectively.

The company expects its effective tax rate in 2018 will be between 6% and 9% based on currently forecasted rates of profitability in the countries in which the company conducts business and expected generation of foreign tax credits. The effective tax rate can vary significantly from period to period as a result of discrete income tax factors and events.

The company has operations and a taxable presence in approximately 50 countries outside the U.S. Some of these countries have lower tax rates than the U.S. The company's ability to obtain a benefit from lower tax rates outside the U.S. is dependent on its relative levels of income in countries outside the U.S. and on the statutory tax rates in those countries. Based on the dispersion of the company's non-U.S. income tax provision among many countries, the company believes that a change in the statutory tax rate in any individual country is not likely to materially affect the company's income tax provision or net income, aside from any resulting one-time adjustment to the company's deferred tax balances to reflect a new rate.

Recent Accounting Pronouncements

A description of recently issued accounting standards is included under the heading *"Recent Accounting Pronouncements"* in Note 1.

Contingent Liabilities

The company is contingently liable with respect to certain legal proceedings and related matters. An unfavorable outcome that differs materially from current accrual estimates, if any, for one or more of the matters described under the headings *"Product Liability, Workers Compensation and Other Personal Injury Matters," "Intellectual Property Matters"* and *"Commercial Matters"* in Note 10 could have a material adverse effect on the company's financial position as well as its results of operations and cash flows.

2016 Compared With 2015

(In millions)	2016	2015	Total Change	Currency Translation	Acquisitions/ Divestitures	Operations
Revenues						
Life Sciences Solutions	$ 5,317	$ 4,774	$ 543	$ (38)	$ 255	$ 326
Analytical Instruments	3,668	3,208	460	(27)	387	100
Specialty Diagnostics	3,339	3,244	95	(20)	—	115
Laboratory Products and Services	6,724	6,372	352	(75)	96	331
Eliminations	(774)	(633)	(141)	15	(5)	(151)
Consolidated Revenues	$ 18,274	$ 16,965	$ 1,309	$ (145)	$ 733	$ 721

Sales in 2016 were $18.27 billion, an increase of $1.31 billion from 2015. The unfavorable effects of currency translation resulted in a decrease in revenues of $145 million in 2016. Sales increased $733 million due to acquisitions. Aside from the effects of currency translation and acquisitions, revenues increased $721 million (4%) primarily due to increased demand. Sales to customers in the company's primary end markets grew. Demand from customers in pharmaceutical and biotech industries was particularly strong. Sales growth was strong in Asia, moderate in Europe and modest in North America.

In 2016, total company operating income and operating income margin were $2.45 billion and 13.4%, respectively, compared with $2.34 billion and 13.8%, respectively, in 2015. The increase in operating income was primarily due to profit on higher sales in local currencies, productivity improvements, net of inflationary cost

increases, and, to a lesser extent, acquisitions. These increases were offset in part by higher restructuring and acquisition-related charges in the 2016 period, strategic growth investments and unfavorable sales mix.

In 2016, the company recorded restructuring and other costs, net, of $395 million, including $102 million of charges to cost of revenues for the sale of inventories revalued at the date of acquisition and to conform the accounting policies of FEI and Affymetrix to the company's accounting policies; $104 million of charges to selling, general and administrative expenses primarily for third-party transaction and integration costs related to the acquisitions of FEI and Affymetrix. In addition, the company recorded $164 million of cash restructuring costs, primarily to achieve acquisition synergies, including severance and

Results of Operations (continued)

abandoned facilities costs associated with the closure and consolidation of facilities in the U.S. The company's other businesses incurred costs for continued headcount reductions and facility consolidations in an effort to streamline operations, including severance at several businesses and abandoned facility expenses at businesses that have been or are being consolidated in the U.S., Europe and Asia (see Note 14). The company also recorded charges for litigation and environmental remediation matters. These costs were partially offset by gains on the sales of real estate.

In 2015, the company recorded restructuring and other costs, net, of $171 million, including $9 million of charges to cost of revenues for the sale of inventories revalued at the date of acquisition and, to a lesser extent, accelerated depreciation at facilities closing due to real estate consolidation; $46 million of charges to selling, general and administrative expenses primarily for charges associated with product liability litigation, third-party transaction and integration costs primarily related to the acquisitions of Life Technologies and Alfa Aesar, and accelerated depreciation at facilities closing due to real estate consolidation. In addition, the company recorded $82 million of cash restructuring costs primarily for actions to achieve synergies from the Life Technologies acquisition and for abandoned facilities costs associated with a manufacturing facility in the U.S. The company's other businesses incurred costs for continued headcount reductions and facility consolidations in an effort to streamline operations, including severance at several businesses and abandoned facility expenses at businesses that have been or are being consolidated, including the consolidation of operations within several facilities in the U.S., Europe and Asia. The company also recorded charges for litigation-related matters associated with acquired businesses and impairment of acquired technology in development. These costs were partially offset by gains on the sale of a small product line and real estate.

The restructuring actions for which charges were incurred in 2015 resulted in annual cost savings of approximately $100 million beginning in part in 2015 and to a greater extent in 2016, including $50 million in the Life Sciences Solutions segment, $25 million in the Analytical Instruments segment, $10 million in the Specialty Diagnostics segment and $15 million in the Laboratory Products and Services segment.

Segment Results

(Dollars in millions)	2016	2015	Change
Revenues			
Life Sciences Solutions	$ 5,317	$ 4,774	11 %
Analytical Instruments	3,668	3,208	14 %
Specialty Diagnostics	3,339	3,244	3 %
Laboratory Products and Services	6,724	6,372	6 %
Eliminations	(774)	(633)	22 %
Consolidated Revenues	$ 18,274	$ 16,965	8 %
Segment Income			
Life Sciences Solutions	$ 1,596	$ 1,414	13 %
Analytical Instruments	745	613	22 %
Specialty Diagnostics	910	873	4 %
Laboratory Products and Services	971	922	5 %
Subtotal Reportable Segments	4,222	3,822	10 %
Cost of Revenues Charges	(102)	(9)	
Selling, General and Administrative Costs, Net	(104)	(46)	
Restructuring and Other Income (Costs), Net	(189)	(116)	

Amortization of Acquisition-related Intangible Assets	(1,378)	(1,315)	
Consolidated Operating Income	$ 2,449	$ 2,336	5%
Reportable Segments Operating Income Margin	23.1%	22.5%	
Consolidated Operating Income Margin	13.4%	13.8%	

Results of Operations (continued)

Income from the company's reportable segments increased 10% to $4.22 billion in 2016 due primarily to profit on higher sales in local currencies and productivity improvements, net of inflationary cost increases. These increases were offset in part by strategic growth investments and unfavorable sales mix.

Life Sciences Solutions

(Dollars in millions)	2016	2015	Change
Revenues	$ 5,317	$ 4,774	11 %
Operating Income Margin	30.0 %	29.6 %	0.4 pt

Sales in the Life Sciences Solutions segment increased $543 million to $5.32 billion in 2016. Sales increased $326 million (7%) due to higher revenues at existing businesses and $255 million due to acquisitions, offset in part by a decrease of $38 million due to the unfavorable effects of currency translation. The increase in revenue at existing businesses was primarily due to increased demand for biosciences products and bioprocess production products and, to a lesser extent, next generation sequencing products.

Operating income margin was 30.0% in 2016 compared to 29.6% in 2015. The increase in operating margin resulted from productivity improvements, net of inflationary cost increases, profit on higher sales in local currencies and, to a lesser extent, price increases. These increases were offset in part by unfavorable sales mix, acquisition dilution and strategic growth investments.

Analytical Instruments

(Dollars in millions)	2016	2015	Change
Revenues	$ 3,668	$ 3,208	14 %
Operating Income Margin	20.3 %	19.1 %	1.2 pt

Sales in the Analytical Instruments segment increased $460 million to $3.67 billion in 2016. Sales increased $387 million due to acquisitions and $100 million (3%) due to higher revenues at existing businesses, offset in part by a decrease of $27 million due to the unfavorable effects of currency translation. The increase in revenue at existing businesses was primarily due to increased demand for products sold by the segment's chromatography and mass spectrometry business and, to a lesser extent, sales of environmental instruments. These increases were offset in part by lower sales of chemical analysis products due primarily to softness in certain industrial end markets.

Operating income margin was 20.3% in 2016 compared to 19.1% in 2015. The increase resulted primarily from productivity improvements, net of inflationary cost increases, profit on higher sales in local currencies and, to a lesser extent, favorable foreign currency exchange. These increases were offset in part by unfavorable sales mix and strategic growth investments.

Specialty Diagnostics

(Dollars in millions)	2016	2015	Change
Revenues	$ 3,339	$ 3,244	3 %
Operating Income Margin	27.2 %	26.9 %	0.3 pt

Sales in the Specialty Diagnostics segment increased $95 million to $3.34 billion in 2016. Sales increased $115 million (4%) due to higher revenues at existing businesses, offset in part by a decrease of $20 million due to the unfavorable effects of currency translation. The increase in revenue at existing businesses was primarily due to increased demand for products in each of the segment's principal businesses with particular strength in the segment’s healthcare market channel and sales of immunodiagnostics products and clinical diagnostics products.

Results of Operations (continued)

Operating income margin was 27.2% in 2016 and 26.9% in 2015. The increase resulted primarily from productivity improvements, net of inflationary cost increases, and profit on higher sales in local currencies, offset in part by strategic growth investments.

Laboratory Products and Services

(Dollars in millions)	2016	2015	Change
Revenues	$ 6,724	$ 6,372	6%
Operating Income Margin	14.4%	14.5%	-0.1 pt

Sales in the Laboratory Products and Services segment increased $352 million to $6.72 billion in 2016. Sales increased $331 million (5%) due to higher revenues at existing businesses and $96 million due to an acquisition. These increases were offset in part by $75 million due to the unfavorable effects of currency translation. The increase in revenue at existing businesses was primarily due to increased demand for products in each of the segment's principal businesses.

Operating income margin was 14.4% in 2016 compared to 14.5% in 2015. Decreases due to strategic growth investments and unfavorable sales mix were offset in part by productivity improvements, net of inflationary cost increases, and profit on higher sales in local currencies.

Other Expense, Net

The company reported other expense, net, of $425 million and $400 million in 2016 and 2015, respectively (Note 4). Interest expense increased $55 million primarily due to an increase in outstanding debt. In 2016, other items, net includes $22 million of charges related to the amortization of fees paid to obtain bridge financing commitments for the acquisition of FEI and $9 million of losses on the early extinguishment of debt, offset in part by $12.5 million of gains on investments. In 2015, other items, net includes losses of $12 million on the early extinguishment of debt and costs of $7.5 million associated with entering into interest rate swap arrangements.

Provision for Income Taxes

The company recorded a benefit from income taxes in 2016. In 2016, the company continued to implement tax planning initiatives related to non-U.S. subsidiaries. These non-U.S. subsidiaries incurred foreign tax obligations, and made cash and deemed distributions to the company's U.S. operations which resulted in no net tax cost. As a result of these distributions, the company benefitted from U.S. foreign tax credits of $91 million, offset in part by additional U.S. taxes of $37 million on the related foreign income (which reduced the benefit from the foreign rate differential in 2016) for a net benefit of $54 million. The company also implemented foreign tax credit planning in Sweden which resulted in $100 million of foreign tax credits, with no related incremental U.S. income tax expense. In addition, the company recorded discrete benefits in 2016 totaling $39 million related to prior year tax filings and net charges of $12 million related to tax audits.

The company recorded a benefit from income taxes in 2015. In 2015, the company implemented tax planning initiatives related to non-U.S. subsidiaries. These non-U.S. subsidiaries incurred foreign tax obligations, and made cash and deemed distributions to the company's U.S. operations which resulted in no net tax cost. As a result of these distributions, the company benefitted from U.S. foreign tax credits of $111 million, offset in part by additional U.S. taxes of $46 million on the related foreign income (which reduced the benefit from the foreign rate differential in 2015) for a net benefit of $66 million. The foreign tax credits are the result of foreign earnings and profits remitted or deemed remitted to the U.S. during the reporting year and the U.S. treatment of taxes paid in the foreign jurisdictions in the years those profits were originally earned. The company also implemented foreign tax credit planning in Sweden which resulted in $80 million of foreign tax credits, with no related incremental U.S. income tax expense. In addition, the company recorded discrete benefits totaling $54 million related to additional prior year foreign tax and other credits as well as restructuring and other costs associated with the 2014 acquisition of Life Technologies. The tax provision in the 2015 period was favorably affected by $37 million as a result of adjustments to deferred tax

balances due to changes in tax rates. The effective tax rate in both 2016 and 2015 was also affected by relatively significant earnings in lower tax jurisdictions. Due primarily to the non-deductibility of intangible asset amortization for tax purposes, the company's cash payments for income taxes were higher than its income tax expense for financial reporting purposes and totaled $663 million and $477 million in 2016 and 2015, respectively.

Liquidity and Capital Resources

Consolidated working capital was $2.37 billion at December 31, 2017, compared with $2.16 billion at December 31, 2016. Included in working capital were cash and cash equivalents of $1.34 billion at December 31, 2017 and $786 million at December 31, 2016.

2017

Cash provided by operating activities was $4.01 billion during 2017. An increase in other liabilities provided cash of $1.02 billion primarily due to the Tax Act's one-time transition tax on deemed repatriated earnings and profits of foreign subsidiaries. Given the availability of foreign tax credits, the company does not expect the transition tax to result in significant cash requirements. An increase in accounts payable provided cash of $274 million due to the timing of payments. Increases in accounts receivable and inventories used cash of $362 million and $81 million, respectively, primarily to support growth in sales in local currencies. An increase in other assets used cash of $153 million primarily due to the timing of income tax refunds. Cash payments for income taxes decreased to $479 million during 2017, compared with $663 million in 2016. The company made cash contributions to its pension and postretirement benefit plans totaling $200 million during 2017. Payments for restructuring actions, principally severance costs and lease and other expenses of real estate consolidation, used cash of $93 million during 2017.

During 2017, the company’s investing activities used $7.73 billion of cash. Acquisitions used cash of $7.23 billion. The company’s investing activities also included the purchase of $508 million of property, plant and equipment.

The company’s financing activities provided $3.85 billion of cash during 2017. Issuance of senior notes and borrowings under a term loan provided cash of $6.46 billion. The company also issued 10 million shares of its common stock for net proceeds of $1.69 billion. Repayment of senior notes and term loans used cash of $3.30 billion and a net decrease in commercial paper obligations used cash of $134 million. The company’s financing activities also included the repurchase of $750 million of the company’s common stock and the payment of $237 million in cash dividends, offset in part by $128 million of net proceeds from employee stock option exercises. On July 7, 2016, the Board of Directors authorized the repurchase of up to $1.50 billion of the company’s common stock. At February 28, 2018, $500 million was available for future repurchases of the company’s common stock under this authorization. In January 2018, the company issued additional commercial paper obligations and used the proceeds and cash on hand to repay the $450 million principal balance of the 2.15% Senior Notes due 2018.

As of December 31, 2017, the company’s short-term debt totaled $2.14 billion, including $960 million of commercial paper obligations and $1.17 billion of senior notes due within the next twelve months. The company has a revolving credit facility with a bank group that provides up to $2.50 billion of unsecured multi-currency revolving credit. If the company borrows under this facility, it intends to leave undrawn an amount equivalent to outstanding commercial paper to provide a source of funds in the event that commercial paper markets are not available. As of December 31, 2017, no borrowings were outstanding under the company’s revolving credit facility, although available capacity was reduced by approximately $77 million as a result of outstanding letters of credit.

Approximately half of the company’s cash balances and cash flows from operations are from outside the U.S. A portion of these foreign cash balances are associated with earnings that are permanently reinvested and which the company plans to use to support continued growth plans outside of the U.S. through funding operations and other investment and growth opportunities. The majority of these funds are only available for use by the company's U.S. operations if they are repatriated into the U.S. The funds repatriated would be subject to additional state and foreign withholding taxes upon repatriation; however, it is not practicable to estimate the amount of additional tax liabilities that would be incurred. The company currently has no plans to repatriate these funds held by its non-U.S. subsidiaries.

The company believes that its existing cash and cash equivalents of $1.34 billion as of December 31, 2017 and its future cash flow from operations together with available borrowing capacity under its revolving credit agreement will be sufficient to meet the cash requirements of its existing businesses for the foreseeable future, including at least the next 24 months.

2016

Cash provided by operating activities was $3.26 billion during 2016. An increase in accounts receivable used cash of $352 million primarily to support growth in sales in local currencies and due to the mid-month timing of the

acquisition of FEI when receivables are commonly lower than at quarter-end. Inventories provided cash of $98 million due to a reduction associated with fourth quarter 2016 sales. An increase in other assets used cash of $153 million primarily due to the timing of payments. An increase in other liabilities provided cash of $216 million primarily due to the timing of payments for income taxes and

Liquidity and Capital Resources (continued)

incentive compensation. Cash payments for income taxes increased to $663 million during 2016, compared with $477 million in 2015. The company made cash contributions to its pension and postretirement benefit plans totaling $43 million during 2016. Payments for restructuring actions, principally severance costs and lease and other expenses of real estate consolidation, used cash of $122 million during 2016.

During 2016, the company's investing activities used $5.52 billion of cash. Acquisitions used cash of $5.18 billion. The company's investing activities also included the purchase of $444 million of property, plant and equipment.

The company's financing activities provided $2.76 billion of cash during 2016. Issuance of senior notes and borrowings under term loans provided cash of $7.60 billion and an increase in commercial paper obligations provided cash of $904 million. Repayment of senior notes, the 364-day term loan and acquired debt used cash of $4.33 billion. The company's financing activities also included the repurchase of $1.25 billion of the company's common stock and the payment of $238 million in cash dividends, offset in part by $87 million of proceeds from employee stock option exercises.

2015

Cash provided by operating activities was $2.94 billion during 2015. Increases in accounts receivable and inventories used cash of $149 million and $141 million, respectively, primarily to support growth in sales in local currencies. An increase in other assets used cash of $254 million primarily related to the timing of tax payments/ refunds. An increase in other liabilities provided cash of $200 million primarily due to the timing of payments for income taxes and incentive compensation. Cash payments for income taxes decreased to $477 million during 2015, compared with $586 million in 2014 that included taxes associated with gains on divestitures. The company made cash contributions to its pension and postretirement benefit plans totaling $38 million during 2015. Payments for restructuring actions, principally severance costs and lease and other expenses of real estate consolidation, used cash of $97 million during 2015.

During 2015, the company's investing activities used $1.09 billion of cash. Acquisitions used cash of $695 million. The company's investing activities also included the purchase of $423 million of property, plant and equipment.

The company's financing activities used $2.62 billion of cash during 2015. Repayments of long-term debt totaled $3.79 billion. Issuance of senior notes provided cash of $1.80 billion and an increase in commercial paper obligations provided cash of $50 million. The company's financing activities also included the repurchase of $500 million of the company's common stock and the payment of $241 million in cash dividends, offset in part by $72 million of proceeds from employee stock option exercises.

Off-Balance Sheet Arrangements

The company did not use special purpose entities or other off-balance-sheet financing arrangements in 2015, 2016 or 2017, except for letters of credit, bank guarantees, residual value guarantees under three lease agreements, surety bonds and other guarantees disclosed in the table or discussed below. The amounts disclosed in the table below for letters of credit, bank guarantees, surety bonds and other guarantees relate to guarantees of the company's performance, primarily in the ordinary course of business.

Liquidity and Capital Resources (continued)

Contractual Obligations and Other Commercial Commitments

The table below summarizes, by period due or expiration of commitment, the company's contractual obligations and other commercial commitments as of December 31, 2017.

	Payments due by Period or Expiration of Commitment				
(In millions)	2018	2019 and 2020	2021 and 2022	2023 and Thereafter	Total
Contractual Obligations and Other Commercial Commitments					
Debt principal, including short-term debt (a)	$ 2,132	$ 3,064	$ 3,901	$ 12,065	$ 21,162
Interest	1	2	1	2	6
Capital lease obligations	3	5	5	—	13
Operating lease obligations	188	277	172	169	806
Unconditional purchase obligations (b)	672	48	11	2	733
Letters of credit and bank guarantees	154	16	9	4	183
Surety bonds and other guarantees	27	8	—	—	35
Pension obligations on balance sheet	56	92	102	342	592
Asset retirement obligations accrued on balance sheet	7	11	10	18	46
Acquisition-related contingent consideration accrued on balance sheet	9	5	5	16	35
Other (c)	1	—	—	—	1
	$ 3,250	$ 3,528	$ 4,216	$ 12,618	$ 23,612

(a) Amounts represent the expected cash payments for debt and do not include any deferred issuance costs.

(b) Unconditional purchase obligations include agreements to purchase goods, services or fixed assets that are enforceable and legally binding and that specify all significant terms, including: fixed or minimum quantities to be purchased; fixed, minimum or variable price provisions; and the approximate timing of the transaction. Purchase obligations exclude agreements that are cancelable at any time without penalty.

(c) Obligation represents funding commitments pursuant to investments held by the company.

Reserves for unrecognized tax benefits of $1.41 billion have not been included in the above table due to the inability to predict the timing of tax audit resolutions.

The company has no material commitments for purchases of property, plant and equipment, other than those included in the above table, but expects that for 2018, such expenditures will be between $700 and $730 million.

Guarantees of residual value under lease arrangements for three facilities have not been included in the above table due to the inability to predict if and when the guarantees may require payment (see Note 10). The residual value guarantees become operative at the end of the leases for up to a maximum of $155 million. The initial terms of these leases end in 2019, 2020 and 2022, although renewal options exist for each.

A guarantee of pension plan obligations of a divested business has not been included in the preceding table due to the inability to predict if and when the guarantee may require payment. The purchaser of the divested business has agreed to pay for the pension benefits, however the company was required to guarantee payment of these pension benefits should the purchaser fail to do so. The amount of the guarantee at December 31, 2017 was $43 million.

In disposing of assets or businesses, the company often provides representations, warranties and/or indemnities to cover various risks including, for example, unknown damage to the assets, environmental risks involved in the sale of real estate, liability to investigate and remediate environmental contamination at waste facilities, and unidentified tax liabilities and related legal fees. The company does not have the ability to estimate the potential liability from such indemnities because they relate to unknown conditions. However, the company has no reason to believe that these uncertainties would have a material adverse effect on its financial position, annual results of operations or cash flows.

Liquidity and Capital Resources (continued)

The company has recorded liabilities for known indemnifications included as part of environmental liabilities. See Item 1. Business – Environmental Matters for a discussion of these liabilities.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

The company is exposed to market risk from changes in interest rates and currency exchange rates, which could affect its future results of operations and financial condition. The company manages its exposure to these risks through its regular operating and financing activities. The company has periodically hedged interest rate risks of fixed-rate instruments with offsetting interest rate swaps. Additionally, the company uses short-term forward and option contracts primarily to hedge certain balance sheet and operational exposures resulting from changes in currency exchange rates. Such exposures result from purchases, sales, cash and intercompany loans that are denominated in currencies other than the functional currencies of the respective operations. The currency-exchange contracts principally hedge transactions denominated in euro, British pounds sterling, Swedish kronor, Norwegian kroner, Swiss franc and Canadian dollars. Income and losses arising from these derivative contracts are recognized as offsets to losses and income resulting from the underlying exposure being hedged. The company does not enter into speculative derivative agreements.

Interest Rates

The company is exposed to changes in interest rates while conducting normal business operations as a result of ongoing investing and financing activities, which affect the company's debt as well as cash and cash equivalents. As of December 31, 2017, the company's debt portfolio was comprised primarily of fixed rate borrowings. The fair market value of the company's fixed interest rate debt is subject to interest rate risk. Generally, the fair market value of fixed interest rate debt will increase as interest rates fall and decrease as interest rates rise. The total estimated fair value of the company's debt at December 31, 2017 was $21.62 billion (see Note 12). Fair values were determined from available market prices using current interest rates and terms to maturity. If interest rates were to decrease by 100 basis points, the fair value of the company's debt at December 31, 2017 would increase by approximately $1.30 billion. If interest rates were to increase by 100 basis points, the fair value of the company's debt at December 31, 2017 would decrease by approximately $1.20 billion.

In addition, interest rate changes would result in a change in the company's interest expense due to variable-rate debt instruments including swap arrangements. In 2017, a 100 basis point increase in interest rates on the swap arrangements and variable-rate debt would have increased the company's annual pre-tax interest expense by approximately $44 million.

Currency Exchange Rates

The company views its investment in international subsidiaries with a functional currency other than the U.S. dollar as permanent. The company's investment in international subsidiaries is sensitive to fluctuations in currency exchange rates. The functional currencies of the company's international subsidiaries are principally denominated in British pounds sterling, Swedish kronor, euro, Canadian dollars, Danish kroner and Swiss franc. The effect of a change in the period ending currency exchange rates on the company's net investment in international subsidiaries is reflected in the "accumulated other comprehensive items" component of shareholders' equity. The company also uses foreign currency-denominated debt to partially hedge its net investments in foreign operations against adverse movements in exchange rates. A 10% depreciation in year-end 2017 functional currencies, relative to the U.S. dollar, would result in a reduction of shareholders' equity of $1.55 billion.

The fair value of forward currency-exchange contracts is sensitive to changes in currency exchange rates. The fair value of forward currency-exchange contracts is the estimated amount that the company would pay or receive upon termination of the contract, taking into account the change in currency exchange rates. A 10% depreciation in year-end 2017 non-functional currency exchange rates related to the company's contracts would result in an unrealized gain on forward currency-exchange contracts of $130 million. A 10% appreciation in year-end 2017 non-functional currency exchange rates related to the company's contracts would result in an increase in the unrealized loss on forward currency-exchange contracts of $130 million. The unrealized gains or losses on forward currency-

exchange contracts resulting from changes in currency exchange rates are expected to approximately offset losses or gains on the exposures being hedged.

Certain of the company's cash and cash equivalents are denominated in currencies other than the functional currency of the depositor and are sensitive to changes in currency exchange rates. A 10% depreciation in the related year-end 2017 non-functional currency exchange rates applied to such cash balances would result in a negative impact of $34 million on the company's net income.

Item 8. Financial Statements and Supplementary Data

This data is submitted as a separate section to this report. See Item 15 "Exhibits and Financial Statement Schedules."

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

Not applicable.

Item 9A. Controls and Procedures

Management's Evaluation of Disclosure Controls and Procedures

The company's management, with the participation of the company's chief executive officer and chief financial officer, evaluated the effectiveness of the company's disclosure controls and procedures as of December 31, 2017. The term "disclosure controls and procedures," as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act, means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC's rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the company's management, including its principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on the evaluation of the company's disclosure controls and procedures as of December 31, 2017, the company's chief executive officer and chief financial officer concluded that, as of such date, the company's disclosure controls and procedures were effective at the reasonable assurance level.

Changes in Internal Control over Financial Reporting

There have been no changes in the company's internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) during the fiscal quarter ended December 31, 2017, that have materially affected or are reasonably likely to materially affect the company's internal control over financial reporting.

Management's Annual Report on Internal Control Over Financial Reporting

The company's management, including the company's chief executive officer and chief financial officer, is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the company. Internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. The company's management conducted an assessment of the effectiveness of the company's internal control over financial reporting as of December 31, 2017 based on criteria established in "Internal Control - Integrated Framework" (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on this assessment, the company's management concluded that, as of December 31, 2017, the company's internal control over financial reporting was effective. Management's assessment of the effectiveness of the company's internal control over financial reporting as of December 31, 2017, excluded Patheon N.V., which was acquired by the company in August 2017 in a purchase business combination. Patheon N.V. is a subsidiary of the company whose total assets and total net sales represented approximately 13% of consolidated total assets and approximately 3% of consolidated total revenues, respectively, of the company as of and for the year ended December 31, 2017. As permitted by guidelines established by the Securities and Exchange Commission, companies are allowed to exclude certain acquisitions from their assessments of internal control over financial reporting during the first year of an acquisition while integrating the acquired companies.

The company's independent registered public accounting firm, PricewaterhouseCoopers LLP, has audited the effectiveness of the company's internal control over financial reporting as of December 31, 2017, as stated in their report that appears on page F-2 of this Annual Report on Form 10-K.

Item 9B. Other Information

Not applicable.

THERMO FISHER SCIENTIFIC INC.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

The information with respect to directors required by this Item will be contained in our definitive proxy statement to be filed with the SEC not later than 120 days after the close of business of the fiscal year (2018 Definitive Proxy Statement) and is incorporated in this report by reference.

The information with respect to executive officers required by this Item is included in Item 1 of Part I of this report.

The other information required by this Item will be contained in our 2018 Definitive Proxy Statement and is incorporated in this report by reference.

Item 11. Executive Compensation

The information required by this Item will be contained in our 2018 Definitive Proxy Statement and is incorporated in this report by reference.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

The information required by this Item will be contained in our 2018 Definitive Proxy Statement and is incorporated in this report by reference.

Item 13. Certain Relationships and Related Transactions, and Director Independence

The information required by this Item will be contained in our 2018 Definitive Proxy Statement and is incorporated in this report by reference.

Item 14. Principal Accountant Fees and Services

The information required by this Item will be contained in our 2018 Definitive Proxy Statement and is incorporated in this report by reference.

THERMO FISHER SCIENTIFIC INC.

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a) The following documents are filed as part of this report:

(1) Consolidated Financial Statements (see Index on page F-1 of this report)

(2) All schedules are omitted because they are not applicable or not required, or because the required information is included either in the consolidated financial statements or in the notes thereto.

(b) Exhibits

See the Exhibit Index on page 45.

Item 16. Form 10-K Summary

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this Report to be signed on its behalf by the undersigned, thereunto duly authorized.

Date: February 28, 2018

THERMO FISHER SCIENTIFIC INC.

By: /s/ Marc N. Casper
Marc N. Casper
President and Chief Executive Officer

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the Registrant and in the capacities indicated, as of February 28, 2018.

By: /s/ Marc N. Casper
Marc N. Casper
President, Chief Executive Officer and Director
(Principal Executive Officer)

By: /s/ Judy C. Lewent
Judy C. Lewent
Director

By: /s/ Jim P. Manzi
Jim P. Manzi
Chairman of the Board and Director

By: /s/ Thomas J. Lynch
Thomas J. Lynch
Director

By: /s/ Stephen Williamson
Stephen Williamson
Senior Vice President and Chief Financial Officer
(Principal Financial Officer)

By: /s/ William G. Parrett
William G. Parrett
Director

By: /s/ Peter E. Hornstra
Peter E. Hornstra
Vice President and Chief Accounting Officer
(Principal Accounting Officer)

By: /s/ Lars R. Sørensen
Lars R. Sørensen
Director

By: /s/ Nelson J. Chai
Nelson J. Chai
Director

By: /s/ Scott M. Sperling
Scott M. Sperling
Director

By: /s/ C. Martin Harris
C. Martin Harris
Director

By: /s/ Elaine S. Ullian
Elaine S. Ullian
Director

By: /s/ Tyler E. Jacks
Tyler E. Jacks
Director

By: /s/ Dion J Weisler
Dion J Weisler
Director

THERMO FISHER SCIENTIFIC INC.

EXHIBIT INDEX

Exhibit Number	Description of Exhibit
2.1	Purchase Agreement, dated as of May 15, 2017, by and between Thermo Fisher Scientific Inc., Thermo Fisher (CN) Luxembourg S.à r.l. and Patheon N.V. (filed as Exhibit 99.(D)(1) to the Registrant's Tender Offer Statement on Schedule TO-T filed May 31, 2017 and incorporated in this document by reference).
3.1	Amended and Restated Certificate of Incorporation of the Registrant (filed as Exhibit 3.1 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2005 [File No. 1-8002] and incorporated in this document by reference).
3.2	Amendment to Thermo Fisher Scientific Inc.'s Third Amended and Restated Certificate of Incorporation (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed November 14, 2006 [File No. 1-8002] and incorporated in this document by reference).
3.3	Certificate of Elimination of the Series B Junior Participating Preferred Stock of the Company, dated November 13, 2015 (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed November 16, 2015 [File No. 1-8002] and incorporated in this document by reference).
3.4	By-Laws of the Registrant, as amended and effective as of March 1, 2017 (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed March 2, 2017 [File No. 1-8002] and incorporated in this document by reference).
	The Registrant agrees, pursuant to Item 601(b)(4)(iii)(A) of Regulation S-K, to furnish to the Commission, upon request, a copy of each instrument with respect to long-term debt of the Registrant or its consolidated subsidiaries.
4.1	Indenture dated as of November 20, 2009 between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 99.1 to the Registrant's Current Report on Form 8-K filed November 20, 2009 [File No. 1-8002] and incorporated in this document by reference).
4.2	Second Supplemental Indenture dated as of April 27, 2010 between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 99.2 to the Registrant's Current Report on Form 8-K filed April 27, 2010 [File No. 1-8002] and incorporated in this document by reference).
4.3	Third Supplemental Indenture dated as of February 22, 2011 between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 99.2 to the Registrant's Current Report on Form 8-K filed February 22, 2011 [File No. 1-8002] and incorporated in this document by reference).
4.4	Fourth Supplemental Indenture dated as of August 16, 2011 between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 99.2 to the Registrant's Current Report on Form 8-K filed August 16, 2011 [File No. 1-8002] and incorporated in this document by reference).
4.5	Fifth Supplemental Indenture dated as of August 22, 2012 between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 99.2 to the Registrant's Current Report on Form 8-K filed August 22, 2012 [File No. 1-8002] and incorporated in this document by reference).
4.6	Sixth Supplemental Indenture, dated as of December 11, 2013, between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 99.2 to the Registrant's Current Report on Form 8-K filed December 11, 2013 [File No. 1-8002] and incorporated in this document by reference).
4.7	Seventh Supplemental Indenture, dated as of November 14, 2014, between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 99.2 to the Registrant's Current Report on Form 8-K filed November 14, 2014 [File No. 1-8002] and incorporated in this document by reference).
4.8	Eighth Supplemental Indenture, dated as of November 24, 2014, among the Company, The Bank of New York Mellon Trust Company, N.A., as trustee, and The Bank of New York Mellon, London Branch, as paying agent (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed November 24, 2014 [File No. 1-8002] and incorporated in this document by reference).
4.9	Ninth Supplemental Indenture, dated as of July 21, 2015, among the Company, The Bank of New York Mellon Trust Company, N.A., as trustee, and The Bank of New York Mellon, London Branch, as paying agent (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed July 21, 2015 [File No. 1-8002] and incorporated in this document by reference).
4.10	Tenth Supplemental Indenture, dated as of November 24, 2015, among the Company, The Bank of New York Mellon Trust Company, N.A., as trustee, and The Bank of New York Mellon, London Branch, as paying agent (filed

as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed November 24, 2015 [File No. 1-8002] and incorporated in this document by reference).

4.11	Eleventh Supplemental Indenture, dated as of December 9, 2015, between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed December 9, 2015 [File No. 1-8002] and incorporated in this document by reference).
4.12	Twelfth Supplemental Indenture, dated as of April 13, 2016, between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed April 13, 2016 [File No. 1-8002] and incorporated in this document by reference).
4.13	Thirteenth Supplemental Indenture, dated as of September 12, 2016, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed September 12, 2016 [File No. 1-8002] and incorporated in this document by reference).
4.14	Fourteenth Supplemental Indenture, dated as of September 19, 2016, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed September 19, 2016 [File No. 1-8002] and incorporated in this document by reference).

THERMO FISHER SCIENTIFIC INC.

EXHIBIT INDEX

Exhibit Number	Description of Exhibit
4.15	Fifteenth Supplemental Indenture, dated as of March 16, 2017, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed March 16, 2017 [File No. 1-8002] and incorporated in this document by reference).
4.16	Sixteenth Supplemental Indenture, dated as of July 24, 2017, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed July 24, 2017 [File No. 1-8002] and incorporated in this document by reference).
4.17	Seventeenth Supplemental Indenture, dated as of August 14, 2017, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed August 14, 2017 [File No. 1-8002] and incorporated in this document by reference).
4.18	Indenture, dated as of August 9, 2016, among Thermo Fisher Scientific (Finance I) B.V., as issuer, the Company, as guarantor, and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.1 to the Registrant's Current Report on Form 8-K filed August 9, 2016 [File No. 1-8002] and incorporated in this document by reference).
4.19	First Supplemental Indenture, dated as of August 9, 2016, among Thermo Fisher Scientific (Finance I) B.V., as issuer, the Company, as guarantor, and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed August 9, 2016 [File No. 1-8002] and incorporated in this document by reference).
4.20	Indenture between Life Technologies and U.S. Bank National Association., as trustee, dated as of February 19, 2010 (filed as Exhibit 4.1 to Life Technologies Corporation's Current Report on Form 8-K, filed on February 19, 2010 [File No. 000-25317] and incorporated in this document by reference).
4.21	First Supplemental Indenture between Life Technologies and U.S. Bank National Association., as trustee, dated as of February 19, 2010, including the forms of the Life Technologies 3.375% Senior Notes due 2013, 4.400% Senior Notes due 2015 and 6.000% Senior Notes due 2020 (filed as Exhibit 4.2 to Life Technologies Corporation's Current Report on Form 8-K filed February 19, 2010 [File No. 000-25317] and incorporated in this document by reference).
4.22	Second Supplemental Indenture between Life Technologies and U.S. Bank National Association., as trustee, dated as of December 14, 2010, including the forms of the Life Technologies 3.50% Senior Notes due 2016 and 5.00% Senior Notes due 2021 (filed as Exhibit 4.2 to Life Technologies Corporation's Current Report on Form 8-K filed December 14, 2010 [File No. 000-25317] and incorporated in this document by reference).
10.1	Thermo Fisher Scientific Inc. Deferred Compensation Plan for Directors of the Registrant, as amended and restated on September 12, 2007 (filed as Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 29, 2007 [File No. 1-8002] and incorporated in this document by reference).*
10.2	Thermo Electron Corporation Deferred Compensation Plan, effective November 1, 2001 (filed as Exhibit 10.13 to the Registrant's Annual Report on Form 10-K for the fiscal year ended December 29, 2001 [File No. 1-8002] and incorporated in this document by reference).*
10.3	Form of Amended and Restated Indemnification Agreement between the Registrant and its directors and officers (filed as Exhibit 10.2 to the Registrant's Registration Statement on Form S-4 [Reg. No. 333-90661] and incorporated in this document by reference).*
10.4	Executive Registry Program at the Massachusetts General Hospital (filed as Exhibit 10.74 to the Registrant's Annual Report on Form 10-K for the fiscal year ended December 28, 2002 [File No. 1-8002] and incorporated in this document by reference).*
10.5	Thermo Fisher Scientific Inc. Executive Severance Policy (filed as Exhibit 10.2 to the Registrant's Current Report on Form 8-K filed May 19, 2008 [File No. 1-8002] and incorporated in this document by reference).*
10.6	Summary of Thermo Fisher Scientific Inc. Annual Director Compensation (filed as Exhibit 10.7 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2016 [File No. 1-8002] and incorporated in this document by reference).*
10.7	Summary of Annual Incentive Program of Thermo Electron Corporation (filed as Exhibit 10.66 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2004 [File No. 1-8002] and incorporated in this document by reference).*

10.8	Summary of 2017 Annual Cash Incentive Plan Matters (set forth in Item 5.02 to the Registrant's Current Report on Form 8-K filed March 2, 2017 [File No. 1-8002] under the heading "Annual Cash Incentive Plans - Establishment of Criteria for 2017 Bonus" and incorporated in this document by reference).*
10.9	Form of Noncompetition Agreement between the Registrant and certain key employees and executive officers (filed as Exhibit 10.25 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.10	Retirement Plan for Non-Employee Directors of Fisher Scientific International Inc. (filed as Exhibit 10.12 to Fisher Scientific International Inc.'s Annual Report on Form 10-K for the year ended December 31, 1992 [File No. 1-10920] and incorporated in this document by reference).*
10.11	First Amendment to the Fisher Scientific International Inc. Retirement Plan for Non-Employee Directors (filed as Exhibit 10.04 to Fisher Scientific International Inc.'s Quarterly Report on Form 10-Q for the quarter ended March 31, 2005 [File No. 1-10920] and incorporated in this document by reference).*

THERMO FISHER SCIENTIFIC INC.

EXHIBIT INDEX

Exhibit Number	Description of Exhibit
10.12	Amendment to Retirement Plan for Non-Employee Directors of Fisher Scientific International Inc. (filed as Exhibit 10.02 to Fisher Scientific International Inc.'s Current Report on Form 8-K filed March 7, 2006 [File No. 1-10920] and incorporated in this document by reference).*
10.13	Thermo Fisher Scientific Inc. Amended and Restated 2005 Deferred Compensation Plan, effective January 1, 2009 (filed as Exhibit 10.43 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2008 [File No. 1-8002] and incorporated in this document by reference).*
10.14	Thermo Fisher Scientific Inc. 2008 Stock Incentive Plan (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed May 22, 2008 [File No. 1-8002] and incorporated in this document by reference).*
10.15	Amendment No. 1 to Thermo Fisher Scientific Inc. Amended and Restated 2005 Deferred Compensation Plan (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 27, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.16	Stock Option Agreement, between Marc Casper and the Registrant, dated November 21, 2009 (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed November 25, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.17	Stock Option Agreement, between Marc Casper and the Registrant, dated November 21, 2009 (filed as Exhibit 10.2 to the Registrant's Current Report on Form 8-K filed November 25, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.18	2009 Restatement of Executive Severance Agreement, between Marc Casper and the Registrant, dated November 21, 2009 (filed as Exhibit 10.5 to the Registrant's Current Report on Form 8-K filed November 25, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.19	Executive Change In Control Retention Agreement, between Marc Casper and the Registrant, dated November 21, 2009 (filed as Exhibit 10.6 to the Registrant's Current Report on Form 8-K filed November 25, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.20	Noncompetition Agreement, between Marc Casper and the Registrant, dated November 21, 2009 (filed as Exhibit 10.7 to the Registrant's Current Report on Form 8-K filed November 25, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.21	Amendment No. 1 to Executive Severance Policy, dated February 25, 2010 (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed February 25, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.22	Amendment No. 1 to 2009 Restatement of Executive Severance Agreement, dated February 25, 2010, between the Registrant and Marc N. Casper (filed as Exhibit 10.2 to the Registrant's Current Report on Form 8-K filed February 25, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.23	Amendment No. 2 to Executive Severance Policy, dated November 10, 2010 (filed as Exhibit 10.54 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.24	Amendment No. 2 to 2009 Restatement of Executive Severance Agreement, dated November 10, 2010, between the Registrant and Marc N. Casper (filed as Exhibit 10.55 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.25	Amendment No. 1 to Executive Change In Control Retention Agreement, dated November 10, 2010, between Marc N. Casper and the Registrant (filed as Exhibit 10.56 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.26	Amendment to 2008 Stock Incentive Plan dated November 10, 2010 (filed as Exhibit 10.57 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.27	Form of Thermo Fisher Scientific Inc.'s Restricted Stock Unit Agreement for Directors (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended April 2, 2011 [File No. 1-8002] and incorporated in this document by reference).*

10.28	Form of Thermo Fisher Scientific Inc.'s Performance Restricted Stock Unit Agreement (filed as Exhibit 10.4 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.29	Form of Thermo Fisher Scientific Inc.'s Restricted Stock Unit Agreement (filed as Exhibit 10.2 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.30	Form of Thermo Fisher Scientific Inc.'s Stock Option Agreement (filed as Exhibit 10.6 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.31	Form of Performance Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc Casper (filed as Exhibit 10.3 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.32	Form of Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc Casper (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*

THERMO FISHER SCIENTIFIC INC.

EXHIBIT INDEX

Exhibit Number	Description of Exhibit
10.33	Form of Stock Option Agreement between Thermo Fisher Scientific Inc. and Marc Casper (filed as Exhibit 10.5 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.34	Thermo Fisher Scientific Inc. 2013 Stock Incentive Plan (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed May 23, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.35	Thermo Fisher Scientific Inc. 2013 Annual Incentive Award Plan (filed as Exhibit 10.2 to the Registrant's Current Report on Form 8-K filed May 23, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.36	Restricted Stock Unit Award Agreement between Life Technologies Corporation and Mark Stevenson dated April 1, 2013 (filed as Exhibit 10.58 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2014 [File No. 1-8002] and incorporated in this document by reference).*
10.37	Supplemental Executive Retirement Plan effective as of December 31, 2005, as amended and restated as of August 28, 2006 (filed as Exhibit 10.3 to Applera Corporation's Quarterly Report on Form 10-Q for the quarter ended September 30, 2006 [File No. 1-04389] and incorporated in this document by reference).*
10.38	Amendment to Supplemental Executive Retirement Plan, effective as of January 1, 2010 (filed as Exhibit 10.1 to Life Technologies Corporation's Current Report on Form 8-K filed December 18, 2009 [File No. 000-25317] and incorporated in this document by reference).*
10.39	Noncompetition Agreement between the Registrant and Mark Stevenson, dated September 10, 2015 (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 26, 2015 [File No. 1-8002] and incorporated in this document by reference).*
10.40	Form of Thermo Fisher Scientific Inc.'s Stock Option Agreement for Officers (filed as Exhibit 10.44 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2016 [File No. 1-8002] and incorporated in this document by reference).*
10.41	Patheon N.V. 2016 Omnibus Incentive Plan (filed as Exhibit 10.2 to the Current Report on Form 8-K filed by Patheon N.V. on July 26, 2016 [File No. 001-37837] and incorporated in this document by reference).
10.42	Amendment to Patheon N.V. 2016 Omnibus Incentive Plan, dated March 7, 2017 (filed as exhibit 4.5 to the Registrant's Registration Statement on Form S-8 filed August 29, 2017 [File No. 1-8002] and incorporated in this document by reference).*
10.43	Amendment to Patheon N.V. 2016 Omnibus Incentive Plan, dated August 23, 2017 (filed as exhibit 4.6 to the Registrant's Registration Statement on Form S-8 filed August 29, 2017 [File No. 1-8002] and incorporated in this document by reference).*
10.44	Credit Agreement, dated July 1, 2016, among the Company, certain Subsidiaries of the Company from time to time party thereto, each lender from time to time party thereto, and Bank of America, N.A. (filed as Exhibit 10.3 to the Registrant's Current Report on Form 8-K filed July 1, 2016 [File No. 1-8002] and incorporated in this document by reference).
21	Subsidiaries of the Registrant.
23.1	Consent of PricewaterhouseCoopers LLP, an Independent Registered Public Accounting Firm.
31.1	Certification of Chief Executive Officer required by Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification of Chief Financial Officer required by Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1	Certification of Chief Executive Officer required by Exchange Act Rules 13a-14(b) and 15d-14(b), as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.**
32.2	Certification of Chief Financial Officer required by Exchange Act Rules 13a-14(b) and 15d-14(b), as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.**
101.INS	XBRL Instance Document.

101.SCH	XBRL Taxonomy Extension Schema Document.
101.CAL	XBRL Taxonomy Calculation Linkbase Document.
101.DEF	XBRL Taxonomy Definition Linkbase Document.
101.LAB	XBRL Taxonomy Label Linkbase Document.
101.PRE	XBRL Taxonomy Presentation Linkbase Document.

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*Indicates management contract or compensatory plan, contract or arrangement.

** Certification is not deemed "filed" for purposes of Section 18 of the Exchange Act or otherwise subject to the liability of that section. Such certification is not deemed to be incorporated by reference into any filing under the Securities Act or the Exchange Act except to the extent that the registrant specifically incorporates it by reference.

THERMO FISHER SCIENTIFIC INC.

EXHIBIT INDEX

Attached as Exhibit 101 to this report are the following formatted in XBRL (Extensible Business Reporting Language): (i) Consolidated Balance Sheet at December 31, 2017, and 2016, (ii) Consolidated Statement of Income for the years ended December 31, 2017, 2016 and 2015, (iii) Consolidated Statement of Comprehensive Income for the years ended December 31, 2017, 2016 and 2015 (iv) Consolidated Statement of Cash Flows for the years ended December 31, 2017, 2016 and 2015, (v) Consolidated Statement of Shareholders' Equity for the years ended December 31, 2017, 2016 and 2015 and (vi) Notes to Consolidated Financial Statements.

THERMO FISHER SCIENTIFIC INC.

INDEX OF CONSOLIDATED FINANCIAL STATEMENTS AND SCHEDULE

The following Consolidated Financial Statements of the Registrant and its subsidiaries are required to be included in Item 15:

THERMO FISHER SCIENTIFIC INC.

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Shareholders of Thermo Fisher Scientific Inc.:

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Thermo Fisher Scientific Inc. and its subsidiaries as of December 31, 2017 and December 31, 2016, and the related consolidated statements of income and comprehensive income, of shareholders' equity and of cash flows for each of the three years in the period ended December 31, 2017, including the related notes (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 2017, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2017 and December 31, 2016, and the results of their operations and their cash flows for each of the three years in the period ended December 31, 2017 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2017, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the COSO.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in Management's Annual Report on Internal Control over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) ("PCAOB") and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

As described in Management's Annual Report on Internal Control over Financial Reporting, management has excluded Patheon N.V. from its assessment of internal control over financial reporting as of December 31, 2017 because it was acquired by the Company in a purchase business combination during 2017. We have also excluded Patheon N.V. from our audit of internal control over financial reporting. Patheon N.V. is a subsidiary whose total assets and total revenues excluded from management's assessment and our audit of internal control over financial reporting represent approximately 13% and approximately 3%, respectively, of the related consolidated financial statement amounts as of and for the year ended December 31, 2017.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those

policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit

preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ PricewaterhouseCoopers LLP

Boston, Massachusetts
February 28, 2018

We have served as the Company's auditor since 2002.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED BALANCE SHEET

(In millions except share and per share amounts)	December 31, 2017	December 31, 2016
Assets		
Current Assets:		
Cash and cash equivalents	$ 1,335	$ 786
Accounts receivable, less allowances of $109 and $77	3,879	3,049
Inventories	2,971	2,213
Refundable income taxes	432	378
Other current assets	804	595
Total current assets	9,421	7,021
Property, Plant and Equipment, Net	4,047	2,578
Acquisition-related Intangible Assets, Net	16,684	13,969
Other Assets	1,227	1,012
Goodwill	25,290	21,328
Total Assets	$ 56,669	$ 45,908
Liabilities and Shareholders' Equity		
Current Liabilities:		
Short-term obligations and current maturities of long-term obligations	$ 2,135	$ 1,255
Accounts payable	1,428	926
Accrued payroll and employee benefits	918	709
Deferred revenue	719	486
Other accrued expenses	1,848	1,490
Total current liabilities	7,048	4,866
Deferred Income Taxes	2,766	2,557
Other Long-term Liabilities	2,569	1,573
Long-term Obligations	18,873	15,372
Commitments and Contingencies (Note 10)		
Shareholders' Equity:		
Preferred stock, $100 par value, 50,000 shares authorized; none issued		
Common stock, $1 par value, 1,200,000,000 shares authorized; 428,327,873 and 415,138,564 shares issued	428	415
Capital in excess of par value	14,177	12,140
Retained earnings	15,914	13,927
Treasury stock at cost, 27,013,311 and 21,690,679 shares	(3,103)	(2,306)
Accumulated other comprehensive items	(2,003)	(2,636)
Total shareholders' equity	25,413	21,540

Total Liabilities and Shareholders' Equity	$ 56,669	$ 45,908

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF INCOME

(In millions except per share amounts)	Year Ended December 31, 2017	December 31, 2016	December 31, 2015
Revenues			
Product revenues	$ 17,374	$ 15,712	$ 14,668
Service revenues	3,544	2,562	2,297
Total revenues	20,918	18,274	16,965
Costs and Operating Expenses:			
Cost of product revenues	8,976	8,214	7,584
Cost of service revenues	2,497	1,691	1,625
Selling, general and administrative expenses	5,492	4,976	4,612
Research and development expenses	888	755	692
Restructuring and other costs, net	97	189	116
Total costs and operating expenses	17,950	15,825	14,629
Operating Income	2,968	2,449	2,336
Other Expense, Net	(539)	(425)	(400)
Income from Continuing Operations Before Income Taxes	2,429	2,024	1,936
(Provision for) Benefit from Income Taxes	(201)	1	44
Income from Continuing Operations	2,228	2,025	1,980
Loss from Discontinued Operations (net of income tax benefit of $2, $2 and $3)	(3)	(3)	(5)
Net Income	$ 2,225	$ 2,022	$ 1,975
Earnings per Share from Continuing Operations			
Basic	$ 5.65	$ 5.13	$ 4.97
Diluted	$ 5.60	$ 5.10	$ 4.93
Earnings per Share			
Basic	$ 5.64	$ 5.12	$ 4.96
Diluted	$ 5.59	$ 5.09	$ 4.92
Weighted Average Shares			
Basic	395	395	399
Diluted	398	397	402
Cash Dividends Declared per Common Share	$ 0.60	$ 0.60	$ 0.60

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF COMPREHENSIVE INCOME

(In millions)	Year Ended December 31, 2017	Year Ended December 31, 2016	Year Ended December 31, 2015
Comprehensive Income			
Net Income	$ 2,225	$ 2,022	$ 1,975
Other Comprehensive Items:			
Currency translation adjustment (net of tax benefit of $145, $0 and $0)	588	(566)	(706)
Unrealized gains and losses on available-for-sale investments:			
Unrealized holding (losses) gains arising during the period (net of tax (benefit) provision of $0, $0 and $0)	(1)	(2)	1
Reclassification adjustment for (gains) losses included in net income (net of tax (provision) benefit of ($1), $0 and $0)	(1)	1	—
Unrealized gains and losses on hedging instruments:			
Unrealized losses on hedging instruments (net of tax benefit of $0, $22 and $6)	—	(37)	(9)
Reclassification adjustment for losses included in net income (net of tax benefit of $5, $4 and $2)	7	6	3
Pension and other postretirement benefit liability adjustments:			
Pension and other postretirement benefit liability adjustments arising during the period (net of tax provision (benefit) of $7, ($17) and ($5))	23	(47)	(9)
Amortization of net loss and prior service benefit included in net periodic pension cost (net of tax benefit of $5, $2 and $3)	17	6	8
Total other comprehensive items	633	(639)	(712)
Comprehensive Income	$ 2,858	$ 1,383	$ 1,263

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF CASH FLOWS

(In millions)	Year Ended December 31, 2017	December 31, 2016	December 31, 2015
Operating Activities			
Net income	$ 2,225	$ 2,022	$ 1,975
Loss from discontinued operations	3	3	5
Income from continuing operations	2,228	2,025	1,980
Adjustments to reconcile income from continuing operations to net cash provided by operating activities:			
Depreciation and amortization	2,033	1,758	1,688
Change in deferred income taxes	(1,098)	(620)	(525)
Non-cash stock-based compensation	159	133	125
Non-cash charges for sale of inventories revalued at the date of acquisition	87	75	7
Other non-cash expenses, net	103	67	61
Changes in assets and liabilities, excluding the effects of acquisitions and dispositions:			
Accounts receivable	(362)	(352)	(149)
Inventories	(81)	98	(141)
Other assets	(153)	(153)	(254)
Accounts payable	274	56	(3)
Other liabilities	1,016	216	200
Contributions to retirement plans	(200)	(43)	(38)
Net cash provided by continuing operations	4,006	3,260	2,951
Net cash used in discontinued operations	(1)	(2)	(9)
Net cash provided by operating activities	4,005	3,258	2,942
Investing Activities			
Acquisitions, net of cash acquired	(7,226)	(5,178)	(695)
Purchase of property, plant and equipment	(508)	(444)	(423)
Proceeds from sale of property, plant and equipment	7	26	18
Proceeds from sale of investments	22	81	12
Other investing activities, net	(24)	(5)	(5)
Net cash used in investing activities	$ (7,729)	$ (5,520)	$ (1,093)

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF CASH FLOWS (Continued)

(In millions)	Year Ended December 31, 2017	December 31, 2016	December 31, 2015
Financing Activities			
Net proceeds from issuance of debt	$ 6,459	$ 7,604	$ 1,798
Repayment of debt	(3,299)	(4,334)	(3,789)
Proceeds from issuance of commercial paper	8,380	9,182	7,934
Repayments of commercial paper	(8,514)	(8,278)	(7,885)
Purchases of company common stock	(750)	(1,250)	(500)
Dividends paid	(237)	(238)	(241)
Net proceeds from issuance of company common stock	1,690	—	—
Net proceeds from issuance of company common stock under employee stock plans	128	87	72
Other financing activities, net	(3)	(14)	(6)
Net cash provided by (used in) financing activities	3,854	2,759	(2,617)
Exchange Rate Effect on Cash	420	(152)	(130)
Increase (Decrease) in Cash, Cash Equivalents and Restricted Cash	550	345	(898)
Cash, Cash Equivalents and Restricted Cash at Beginning of Period	811	466	1,364
Cash, Cash Equivalents and Restricted Cash at End of Period	$ 1,361	$ 811	$ 466

See Note 13 for supplemental cash flow information.

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF SHAREHOLDERS' EQUITY

(In millions)	Common Stock Shares	Common Stock Amount	Capital in Excess of Par Value	Retained Earnings	Treasury Stock Shares	Treasury Stock Amount	Accumulated Other Comprehensive Items	Total Shareholders' Equity
Balance at December 31, 2014	408	$ 408	$ 11,474	$ 10,407	8	$ (456)	$ (1,285)	$ 20,548
Issuance of shares under employees' and directors' stock plans	4	4	139	—	—	(52)	—	91
Stock-based compensation	—	—	125	—	—	—	—	125
Tax benefit related to employees' and directors' stock plans	—	—	63	—	—	—	—	63
Purchases of company common stock	—	—	—	—	4	(500)	—	(500)
Dividends declared	—	—	—	(240)	—	—	—	(240)
Net income	—	—	—	1,975	—	—	—	1,975
Other comprehensive items	—	—	—	—	—	—	(712)	(712)
Balance at December 31, 2015	412	412	11,801	12,142	12	(1,008)	(1,997)	21,350
Issuance of shares under employees' and directors' stock plans	3	3	153	—	1	(48)	—	108
Stock-based compensation	—	—	133	—	—	—	—	133
Tax benefit related to employees' and directors' stock plans	—	—	53	—	—	—	—	53
Purchases of company common stock	—	—	—	—	9	(1,250)	—	(1,250)
Dividends declared	—	—	—	(237)	—	—	—	(237)
Net income	—	—	—	2,022	—	—	—	2,022
Other comprehensive items	—	—	—	—	—	—	(639)	(639)
Balance at December 31, 2016	415	415	12,140	13,927	22	(2,306)	(2,636)	21,540
Issuance of shares under employees' and directors' stock plans	3	3	196	—	—	(47)	—	152
Issuance of shares	10	10	1,680	—	—	—	—	1,690
Stock-based compensation	—	—	159	—	—	—	—	159
Purchases of company common stock	—	—	—	—	5	(750)	—	(750)
Dividends declared	—	—	—	(238)	—	—	—	(238)
Net income	—	—	—	2,225	—	—	—	2,225
Other comprehensive items	—	—	—	—	—	—	633	633
Other	—	—	2	—	—	—	—	2
Balance at December 31, 2017	428	$ 428	$ 14,177	$ 15,914	27	$ (3,103)	$ (2,003)	$ 25,413

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Note 1. Nature of Operations and Summary of Significant Accounting Policies

Nature of Operations

Thermo Fisher Scientific Inc. (the company or Thermo Fisher) enables customers to make the world healthier, cleaner and safer by providing analytical instruments, equipment, reagents and consumables, software and services for research, manufacturing, analysis, discovery and diagnostics. Markets served include pharmaceutical and biotech, academic and government, industrial and applied, as well as healthcare and diagnostics.

Principles of Consolidation

The accompanying financial statements include the accounts of the company and its wholly and majority-owned subsidiaries. All material intercompany accounts and transactions have been eliminated. The company accounts for investments in businesses using the equity method when it has significant influence but not control (generally between 20% and 50% ownership) and is not the primary beneficiary.

Revenue Recognition and Accounts Receivable

Revenue is recognized after all significant obligations have been met, collectability is probable and title has passed, which typically occurs upon shipment or delivery or completion of services. If customer-specific acceptance criteria exist, the company recognizes revenue after demonstrating adherence to the acceptance criteria. The company recognizes revenue and related costs for arrangements with multiple deliverables, such as equipment and installation, as each element is delivered or completed based upon its relative fair value. When a portion of the customer's payment is not due until installation or other deliverable occurs, the company defers that portion of the revenue until completion of installation or transfer of the deliverable. Provisions for discounts, warranties, rebates to customers, returns and other adjustments are provided for in the period the related sales are recorded. Sales taxes, value-added taxes and certain excise taxes collected from customers and remitted to governmental authorities are accounted for on a net basis and therefore are excluded from revenue.

Service revenues represent the company's service offerings including clinical trial logistics, drug development and manufacturing, asset management, diagnostic testing, training, service contracts, and field service including related time and materials. Service revenues are recognized as the service is performed. Revenues for service contracts are recognized ratably over the contract period.

The company records shipping and handling charges billed to customers in net sales and records shipping and handling costs in cost of product revenues for all periods presented.

Accounts receivable are recorded at the invoiced amount and do not bear interest. The company maintains allowances for doubtful accounts for estimated losses resulting from the inability of its customers to pay amounts due. The allowance for doubtful accounts is the company's best estimate of the amount of probable credit losses in existing accounts receivable. The company determines the allowance based on the age of the receivable, the creditworthiness of the customer and any other information that is relevant to the judgment. Account balances are charged off against the allowance when the company believes it is probable the receivable will not be recovered. The company does not have any off-balance-sheet credit exposure related to customers.

The changes in the allowance for doubtful accounts are as follows:

	Year Ended December 31,		
(In millions)	2017	2016	2015
Beginning Balance	$ 77	$ 70	$ 74
Provision charged to expense (a)	32	16	5
Accounts written off	(10)	(9)	(4)
Acquisitions, currency translation and other	10	—	(5)

Ending Balance	$ 109	$ 77	$ 70

(a) In 2017, includes $6 million of charges to conform the accounting policies of Patheon to the company's accounting policies. In 2016, includes $9 million of charges to conform the accounting policies of FEI to the company's accounting policies.

Deferred revenue in the accompanying balance sheet consists primarily of unearned revenue on service contracts, which is recognized ratably over the terms of the contracts. The majority of the deferred revenue in the accompanying 2017 balance sheet will be recognized within one year.

Warranty Obligations

The company provides for the estimated cost of standard product warranties, primarily from historical information, in cost of product revenues at the time product revenue is recognized. While the company engages in extensive product quality programs and processes, including actively monitoring and evaluating the quality of its component supplies, the company's warranty obligation is affected by product failure rates, utilization levels, material usage, service delivery costs incurred in correcting a product failure and supplier warranties on parts delivered to the company. Should actual product failure rates, utilization levels, material usage, service delivery costs or supplier warranties on parts differ from the company's estimates, revisions to the estimated warranty liability would be required. The liability for warranties is included in other accrued expenses in the accompanying balance sheet. Extended warranty agreements are considered service contracts, which are discussed above. Costs of service contracts are recognized as incurred. The changes in the carrying amount of standard product warranty obligations are as follows:

	Year Ended	
(In millions)	December 31, 2017	December 31, 2016
Beginning Balance	$ 78	$ 56
Provision charged to income	110	96
Usage	(101)	(87)
Acquisitions	—	17
Adjustments to previously provided warranties, net	(4)	(2)
Currency translation	4	(2)
Ending Balance	$ 87	$ 78

Research and Development

The company conducts research and development activities to increase its depth of capabilities in technologies, software and services. Research and development costs include employee compensation and benefits, consultants, facilities related costs, material costs, depreciation and travel. Research and development costs are expensed as incurred.

Restructuring Costs

Accounting for the timing and amount of termination benefits provided by the company to employees is determined based on whether: (a) the company has a substantive plan to provide such benefits, (b) the company has a written employment contract with the affected employees that includes a provision for such benefits, (c) the termination benefits are due to the occurrence of an event specified in an existing plan or agreement, or (d) the termination benefits are a one-time benefit. In certain circumstances, employee termination benefits may meet more than one of the characteristics listed above and therefore, may have individual elements that are subject to different accounting models.

From time to time when executing a restructuring or exit plan, the company also incurs costs other than termination benefits, such as lease termination costs, that are not associated with or will not be incurred to generate revenues. These include costs that represent amounts under contractual obligations that exist prior to the restructuring plan communication date and will either continue after the restructuring plan is completed with no economic benefit or result in a penalty to cancel a contractual obligation. Such costs are recognized when incurred, which generally occurs at the contract termination or cease-use date but may continue over the remainder of the original contractual period.

Income Taxes

The company recognizes deferred income taxes based on the expected future tax consequences of differences between the financial statement basis and the tax basis of assets and liabilities, calculated using enacted tax rates in effect for the year in which the differences are expected to be reflected in the tax return.

The financial statements reflect expected future tax consequences of uncertain tax positions that the company has taken or expects to take on a tax return presuming the taxing authorities' full knowledge of the positions and all relevant facts, but without discounting for the time value of money (Note 7).

Earnings per Share

Basic earnings per share has been computed by dividing net income by the weighted average number of shares outstanding during the year. Except where the result would be antidilutive to income from continuing operations, diluted earnings per share has been computed using the treasury stock method for outstanding stock options and restricted units, as well as their related income tax effects (Note 8).

Cash and Cash Equivalents

Cash equivalents consists principally of money market funds, commercial paper and other marketable securities purchased with an original maturity of three months or less. These investments are carried at cost, which approximates market value.

Inventories

Inventories are valued at the lower of cost or net realizable value, cost being determined principally by the first-in, first-out (FIFO) method with certain of the company's businesses utilizing the last-in, first-out (LIFO) method. The company periodically reviews quantities of inventories on hand and compares these amounts to the expected use of each product or product line. In addition, the company has certain inventory that is subject to fluctuating market pricing. The company assesses the carrying value of this inventory based on a lower of cost or net realizable value analysis. The company records a charge to cost of sales for the amount required to reduce the carrying value of inventory to net realizable value. Costs associated with the procurement of inventories, such as inbound freight charges, purchasing and receiving costs, and internal transfer costs, are included in cost of revenues in the accompanying statement of income. The components of inventories are as follows:

(In millions)	December 31, 2017	December 31, 2016
Raw Materials	$ 708	$ 466
Work in Process	505	328
Finished Goods	1,758	1,419
Inventories	$ 2,971	$ 2,213

The value of inventories maintained using the LIFO method was $219 million and $207 million at December 31, 2017 and 2016, respectively, which was below estimated replacement cost by $31 million and $28 million, respectively. Reductions to cost of revenues as a result of the liquidation of LIFO inventories were nominal during the three years ended December 31, 2017.

Property, Plant and Equipment

Property, plant and equipment are recorded at cost. The costs of additions and improvements are capitalized, while maintenance and repairs are charged to expense as incurred. The company provides for depreciation and amortization using the straight-line method over the estimated useful lives of the property as follows: buildings and improvements, 25 to 40 years; machinery and equipment (including software), 3 to 10 years; and leasehold improvements, the shorter of the term of the lease or the life of the asset. When assets are retired or otherwise disposed of, the assets and related accumulated depreciation are eliminated from the accounts and the resulting gain or loss is reflected in the accompanying statement of income. Property, plant and equipment consists of the following:

(In millions)	December 31, 2017	December 31, 2016
Land	$ 401	$ 306
Buildings and Improvements	1,662	1,154

Machinery, Equipment and Leasehold Improvements	4,276	2,956
Property, Plant and Equipment, at Cost	6,339	4,416
Less: Accumulated Depreciation and Amortization	2,292	1,838
Property, Plant and Equipment, Net	$ 4,047	$ 2,578

Depreciation and amortization expense of property, plant and equipment was $439 million, $380 million and $373 million in 2017, 2016 and 2015, respectively.

Acquisition-related Intangible Assets

Acquisition-related intangible assets include the costs of acquired customer relationships, product technology, tradenames and other specifically identifiable intangible assets, and are being amortized using the straight-line method over their estimated useful lives, which range from 3 to 20 years. In addition, the company has tradenames and in-process research and development that have indefinite lives and which are not amortized. The company reviews intangible assets for impairment when indication of potential impairment exists, such as a significant reduction in cash flows associated with the assets. Intangible assets with indefinite lives are reviewed for impairment annually or whenever events or changes in circumstances indicate they may be impaired. Acquisition-related intangible assets are as follows:

	Balance at December 31, 2017			Balance at December 31, 2016		
(In millions)	Gross	Accumulated Amortization	Net	Gross	Accumulated Amortization	Net
Definite Lived:						
Customer relationships	$ 17,356	$ (5,902)	$ 11,454	$ 13,167	$ (4,821)	$ 8,346
Product technology	6,046	(2,811)	3,235	5,680	(2,204)	3,476
Tradenames	1,538	(817)	721	1,452	(646)	806
Other	34	(34)	—	33	(33)	—
	24,974	(9,564)	15,410	20,332	(7,704)	12,628
Indefinite Lived:						
Tradenames	1,235	—	1,235	1,235	—	1,235
In-process research and development	39	—	39	106	—	106
	1,274	—	1,274	1,341	—	1,341
Acquisition-related Intangible Assets	$ 26,248	$ (9,564)	$ 16,684	$ 21,673	$ (7,704)	$ 13,969

The estimated future amortization expense of acquisition-related intangible assets with definite lives is as follows:

(In millions)	
2018	$ 1,705
2019	1,698
2020	1,609
2021	1,510
2022	1,383
2023 and Thereafter	7,505

Estimated Future Amortization Expense of Definite-lived Intangible Assets	$ 15,410

Amortization of acquisition-related intangible assets was $1.59 billion, $1.38 billion and $1.31 billion in 2017, 2016 and 2015, respectively.

Other Assets

Other assets in the accompanying balance sheet include deferred tax assets, cash surrender value of life insurance, insurance recovery receivables related to product liability matters, pension assets, cost-method and available-for-sale investments, notes receivable, restricted cash and other assets.

Investments for which there are not readily determinable market values are accounted for under the cost method of accounting. The company periodically evaluates the carrying value of its investments accounted for under the cost method of

accounting, which provides that they are recorded at the lower of cost or estimated net realizable value. At December 31, 2017 and 2016, the company had cost method investments with carrying amounts of $32 million and $37 million, respectively, which are included in other assets.

Goodwill

The company assesses goodwill for impairment annually and whenever events occur or circumstances change that would more-likely-than-not reduce the fair value of a reporting unit below its carrying amount. Such events or circumstances generally include the occurrence of operating losses or a significant decline in earnings associated with one or more of the company's reporting units. The company is permitted to first assess qualitative factors to determine whether the goodwill impairment test is necessary. If the qualitative assessment results in a determination that the fair value of a reporting unit is more-likely-than-not less than its carrying amount, the company performs the goodwill impairment test. The company may bypass the qualitative assessment for the reporting unit in any period and proceed directly to the goodwill impairment test. The company estimates the fair value of its reporting units by using forecasts of discounted future cash flows and peer market multiples. The company would record an impairment charge based on the excess of a reporting unit's carrying amount over its fair value. Prior to the annual impairment test in the fourth quarter of 2017 and adoption of new guidance discussed elsewhere in Note 1, if an impairment had been indicated, any excess of the carrying value over the implied fair value of goodwill would have been recorded as an operating loss. The company determined that no impairments existed in 2017, 2016 or 2015.

The changes in the carrying amount of goodwill by segment are as follows:

(In millions)	Life Sciences Solutions	Analytical Instruments	Specialty Diagnostics	Laboratory Products and Services	Total
Balance at December 31, 2015	$ 7,617	$ 2,703	$ 3,771	$ 4,737	$ 18,828
Acquisitions	619	2,059	1	14	2,693
Finalization of purchase price allocations for 2015 acquisitions	—	—	—	7	7
Currency translation	(3)	(80)	(108)	(31)	(222)
Other	13	4	(5)	10	22
Balance at December 31, 2016	8,246	4,686	3,659	4,737	21,328
Acquisitions	136	99	27	3,256	3,518
Finalization of purchase price allocations for 2016 acquisitions	(4)	68	—	(1)	63
Currency translation	14	174	171	25	384
Other	(1)	—	(1)	(1)	(3)
Balance at December 31, 2017	$ 8,391	$ 5,027	$ 3,856	$ 8,016	$ 25,290

Loss Contingencies

Accruals are recorded for various contingencies, including legal proceedings, environmental, workers' compensation, product, general and auto liabilities, self-insurance and other claims that arise in the normal course of business. The accruals are based on management's judgment, historical claims experience, the probability of losses and, where applicable, the consideration of opinions of internal and/or external legal counsel and actuarial estimates. Additionally, the company records receivables from third-party insurers up to the amount of the loss when recovery has been determined to be probable. Liabilities acquired in acquisitions have been recorded at fair value and, as such, were discounted to present value at the dates of acquisition.

Currency Translation

All assets and liabilities of the company’s non-U.S. subsidiaries are translated at year-end exchange rates. Resulting translation adjustments are reflected in the "accumulated other comprehensive items" component of shareholders’ equity. Revenues and expenses are translated at average exchange rates for the year. Currency transaction (losses) gains are included in the accompanying statement of income and in aggregate were $(31) million, $19 million and $(11) million in 2017, 2016 and 2015, respectively.

Derivative Contracts

The company is exposed to certain risks relating to its ongoing business operations including changes to interest rates and currency exchange rates. The company uses derivative instruments primarily to manage currency exchange and interest rate risks. The company recognizes derivative instruments as either assets or liabilities and measures those instruments at fair value. If a derivative is a hedge, depending on the nature of the hedge, changes in the fair value of the derivative are either offset against the change in fair value of the hedged item through earnings or recognized in other comprehensive income until the hedged item is recognized in earnings. Derivatives that are not designated as hedges are recorded at fair value through earnings.

The company uses short-term forward and option currency exchange contracts primarily to hedge certain balance sheet and operational exposures resulting from changes in currency exchange rates, predominantly intercompany loans and cash balances that are denominated in currencies other than the functional currencies of the respective operations. The currency-exchange contracts principally hedge transactions denominated in euro, British pounds sterling, Swedish kronor, Norwegian kroner, Swiss franc and Canadian dollars. The company does not hold or engage in transactions involving derivative instruments for purposes other than risk management.

Cash flow hedges. For derivative instruments that are designated and qualify as a cash flow hedge, the effective portion of the gain or loss on the derivative is reported as a component of other comprehensive income and reclassified into earnings in the same period or periods during which the hedged transaction affects earnings.

Fair value hedges. For derivative instruments that are designated and qualify as a fair value hedge, the gain or loss on the derivative, as well as the offsetting loss or gain on the hedged item attributable to the hedged risk, are recognized in earnings. During 2016, in connection with new debt issuances, the company entered into interest rate swap arrangements. The company includes the gain or loss on the hedged items (fixed-rate debt) in the same line item (interest expense) as the offsetting effective portion of the loss or gain on the related interest rate swaps.

Net investment hedges. The company also uses foreign currency-denominated debt to partially hedge its net investments in foreign operations against adverse movements in exchange rates. The company's euro-denominated senior notes have been designated as, and are effective as, economic hedges of part of the net investment in a foreign operation. Accordingly, foreign currency transaction gains or losses due to spot rate fluctuations on the euro-denominated debt instruments are included in currency translation adjustment within other comprehensive income and shareholders' equity.

Use of Estimates

The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. In addition, significant estimates were made in estimating future cash flows to assess potential impairment of assets and in determining the fair value of acquired intangible assets (Note 2) and the ultimate loss from abandoning leases at facilities being exited (Note 14). Actual results could differ from those estimates.

Recent Accounting Pronouncements

In February 2018, the FASB issued new guidance to allow reclassifications from accumulated other comprehensive income (AOCI) to retained earnings for certain tax effects on items within AOCI resulting from the Tax Cuts and Jobs Act of 2017 (the Tax Act). The guidance will be effective in 2019 and early adoption is permitted. The company may choose to record the reclassifications in the period of adoption or retrospectively. The company is currently evaluating the timing and method of adoption.

In December 2017, the SEC staff issued guidance to address the application of accounting guidance in situations when a registrant does not have the necessary information available, prepared, or analyzed (including computations) in reasonable detail to complete the accounting for certain income tax effects of the Tax Act enacted on December 22, 2017. As discussed further in Note 7, the company is reporting provisional amounts for certain income tax effects of the Tax Act for which a reasonable estimate can be determined but for which the accounting impact may change based on further analysis regarding the amount and composition of the company's historical foreign earnings and

future issuance of interpretive regulations. Adjustments to provisional amounts identified during the measurement period, which may be up to December 22, 2018, will be included as adjustments to Benefit from (Provision for) Income Taxes in the period the amounts are determined.

In August 2017, the FASB issued new guidance to simplify the application of hedge accounting guidance. Among other things, the new guidance will permit more hedging strategies to qualify for hedge accounting, allow for additional time to perform an initial assessment of a hedge's effectiveness, and permit a qualitative effectiveness test for certain hedges after

initial qualification. The company adopted this guidance in January 2018. The adoption of this guidance is not expected to have a material impact on the company's consolidated financial statements.

In March 2017, the FASB issued new guidance intended to improve the presentation of net periodic pension cost and net periodic postretirement benefit cost. The new guidance requires the service cost component of net periodic cost be reported in the same line item(s) as other employee compensation costs and all other components of the net periodic cost be reported in the income statement below operating income. The guidance is effective for the company in 2018. The adoption of this guidance is not expected to have a material impact on the company's consolidated financial statements.

In January 2017, the FASB issued new guidance that eliminates the requirement to calculate the implied fair value of goodwill to measure a goodwill impairment charge. Instead, the new guidance requires entities to record an impairment charge based on the excess of a reporting unit's carrying amount over its fair value. The company adopted this guidance when it performed its annual goodwill impairment test in the fourth quarter of 2017. The adoption of this guidance did not have a material impact on the company's consolidated financial statements.

In January 2017, the FASB issued new guidance clarifying the definition of a business and providing criteria to determine when an integrated set of assets and activities is not defined as a business. The new guidance requires such integrated sets to be defined as an asset (and not a business) if substantially all of the fair value of the gross assets acquired or disposed is concentrated in a single identifiable asset or a group of similar identifiable assets. The guidance is effective for the company in 2018. The adoption of this guidance is not expected to have a material impact on the company's consolidated financial statements.

In October 2016, the FASB issued new guidance eliminating the deferral of the tax effects of intra-entity asset transfers. The guidance is effective for the company in 2018. The impact of this guidance will be dependent on the extent of future asset transfers which usually occur in connection with planning around acquisitions and other business structuring activities. The adoption of this guidance is not expected to have a material impact on the company's consolidated financial statements.

In March 2016, the FASB issued new guidance which affects the accounting for stock-based compensation. The new guidance simplifies the accounting for share-based payment transactions, including the income tax consequences, classification of awards as either equity or liabilities, and classification on the statement of cash flows. The company adopted this guidance on January 1, 2017 and applied the changes to the statement of cash flows retrospectively. Adoption of this guidance decreased the company's tax provision in 2017 by $65 million and increased diluted earnings per share for the same period by $0.16. The impact in future periods will be dependent upon changes in the company's stock price, the volume of employee stock option exercises and the timing of service- and performance-based restricted unit vesting.

In February 2016, the FASB issued new guidance which requires lessees to record most leases on their balance sheets as lease liabilities, initially measured at the present value of the future lease payments, with corresponding right-of-use assets. The new guidance also sets forth new disclosure requirements related to leases. The company plans to adopt the guidance in 2019 using a modified retrospective method. The company is currently evaluating the impact this guidance will have on its consolidated financial statements, however, assets and liabilities will increase upon adoption for right-of-use assets and lease liabilities. The company's future commitments under lease obligations are summarized in Note 10.

In January 2016, the FASB issued new guidance which affects the accounting for equity investments, financial liabilities under the fair value option, and the presentation and disclosure requirements for financial instruments. This guidance retains the current accounting for classifying and measuring investments in debt securities and loans, but requires equity investments to be measured at fair value with subsequent changes recognized in net income, except for those accounted for under the equity method or requiring consolidation. The guidance also changes the accounting for investments without a readily determinable fair value and that do not qualify for the practical expedient permitted by the guidance to estimate fair value. A policy election can be made for these investments whereby estimated fair value may be measured at cost and adjusted in subsequent periods for any impairment or changes in observable prices of identical or similar investments. The guidance is effective for the company in 2018. The adoption of this guidance is not expected to have a material impact on the company's consolidated financial statements.

In July 2015, the FASB issued new guidance which requires an entity to measure inventory at the lower of cost and net realizable value. Net realizable value is defined as the estimated selling prices in the ordinary course of business, less reasonably predictable costs of completion, disposal, and transportation. This guidance does not apply to inventory that is measured using last-in, first-out (LIFO). The guidance was effective for the company in 2017. Adoption of this guidance did not have a material impact on the company's consolidated financial statements.

In May 2014, the FASB issued new revenue recognition guidance which provides a single comprehensive model for entities to use in accounting for revenue arising from contracts with customers and will supersede most current revenue

recognition guidance. The new standard also requires significantly expanded disclosures regarding the qualitative and quantitative information of an entity's nature, amount, timing, and uncertainty of revenue and cash flows arising from contracts with customers. During 2016 and 2017, the FASB issued additional guidance and clarification, including the elimination of certain SEC Staff Guidance. The guidance is effective for the company in 2018. The company has elected to adopt this guidance through application of the modified retrospective method.

The company substantially completed its analysis of the impact of the new guidance in 2017. Applying the new guidance to the majority of the company's revenue arrangements based on its most commonly used customer terms and conditions and routine sales transactions, which generally consist of a single performance obligation to transfer promised goods or services, does not have a material impact to the company's consolidated financial statements. While the timing of revenue recognition for some of the company's other sales transactions has been affected by the new guidance, the impact is not expected to be material. The impact of recording the cumulative effect of the change in the accounting guidance in the company's balance sheet in the first quarter of 2018 is expected to be less than 1% of total assets, total liabilities, and total shareholders' equity.

Note 2. Acquisitions

The company's acquisitions have historically been made at prices above the determined fair value of the acquired identifiable net assets, resulting in goodwill, due to expectations of the synergies that will be realized by combining the businesses. These synergies include the elimination of redundant facilities, functions and staffing; use of the company's existing commercial infrastructure to expand sales of the acquired businesses' products; and use of the commercial infrastructure of the acquired businesses to cost-effectively expand sales of company products.

Acquisitions have been accounted for using the purchase method of accounting, and the acquired companies' results have been included in the accompanying financial statements from their respective dates of acquisition. Acquisition transaction costs are recorded in selling, general and administrative expenses as incurred.

2017

On August 29, 2017, the company acquired, within the Laboratory Products and Services segment, substantially all of the issued and outstanding shares of Patheon N.V., a leading global provider of high-quality drug development and delivery solutions to the pharmaceutical and biopharma sectors, for $35.00 per share in cash, or $7.36 billion, including the assumption of net debt. The company financed the purchase price, including the repayment of indebtedness of Patheon, with issuances of debt and equity.

Patheon provides comprehensive, integrated and highly customizable solutions as well as the expertise to help biopharmaceutical companies of all sizes satisfy complex development and manufacturing needs. The acquisition provided entry into the pharmaceutical contract development and manufacturing organization market and added a complementary service to the company's existing pharmaceutical services portfolio. Patheon's revenues totaled $1.87 billion for the year ended October 31, 2016. The purchase price exceeded the fair market value of the identifiable net assets and, accordingly, $3.26 billion was allocated to goodwill, $125 million of which is tax deductible.

On March 2, 2017, the company acquired, within the Analytical Instruments segment, Core Informatics, a North America-based provider of cloud-based platforms supporting scientific data management, for a total purchase price of $94 million, net of cash acquired. The acquisition enhanced the company's existing informatics solutions. Revenues of Core Informatics were approximately $10 million in 2016. The purchase price exceeded the fair market value of the identifiable net assets and, accordingly, $63 million was allocated to goodwill, $50 million of which is tax deductible.

On February 14, 2017, the company acquired, within the Life Sciences Solutions segment, Finesse Solutions, Inc., a North America-based developer of scalable control automation systems and software for bioproduction, for a total purchase price of $221 million, net of cash acquired. The acquisition expanded the company's bioproduction offerings. Revenues of Finesse Solutions were approximately $50 million in 2016. The purchase price exceeded the fair market value of the identifiable net assets and, accordingly, $136 million was allocated to goodwill, none of which is tax deductible.

In addition, in 2017 the company acquired, within the Specialty Diagnostics segment, a North America-based molecular diagnostics company offering qPCR tests to the transplant community and, within the Analytical Instruments segment, a provider of desktop scanning electron microscopy solutions and a manufacturer of volatile organic compound monitoring instruments and integrated systems, for an aggregate purchase price of $110 million.

The components of the purchase price and net assets acquired for 2017 acquisitions are as follows:

(In millions)	Patheon	Core Informatics	Finesse Solutions	Other	Total
Purchase Price					
Cash paid	$ 6,861	$ 95	$ 223	$ 97	$ 7,276
Debt assumed	488	—	—	—	488
Fair value of contingent consideration	—	9	—	8	17
Fair value of equity awards exchanged	6	—	—	—	6
Fair value of previously held interest	—	—	—	11	11
Purchase price payable	50	—	—	7	57
Cash acquired	(47)	(10)	(2)	(13)	(72)
	$ 7,358	$ 94	$ 221	$ 110	$ 7,783
Net Assets Acquired					
Current assets	$ 1,046	$ 2	$ 17	$ 20	$ 1,085
Property, plant and equipment	1,288	—	1	3	1,292
Definite-lived intangible assets:					
Customer relationships	3,618	6	68	16	3,708
Product technology	—	29	32	35	96
Tradenames and other	112	3	2	—	117
Indefinite-lived intangible assets:					
In-process research and development	—	—	2	—	2
Goodwill	3,255	63	136	64	3,518
Other assets	54	—	—	—	54
Deferred tax liabilities	(1,091)	(4)	(22)	(14)	(1,131)
Other liabilities assumed	(924)	(5)	(15)	(14)	(958)
	$ 7,358	$ 94	$ 221	$ 110	$ 7,783

The weighted-average amortization periods for definite-lived intangible assets acquired in 2017 are 17 years for customer relationships, 9 years for product technology and 4 years for tradenames and other. The weighted average amortization period for all definite-lived intangible assets acquired in 2017 is 16 years.

2016

On September 19, 2016, the company acquired, within the Analytical Instruments segment, FEI Company, a North America-based provider of high-performance electron microscopy, for a total purchase price of $4.08 billion, net of cash acquired. The acquisition strengthened the company's analytical instrument portfolio with the addition of high-end electron microscopes. Revenues of FEI were $930 million in 2015. The purchase price exceeded the fair value of the identifiable net assets and, accordingly, $2.13 billion was allocated to goodwill, approximately $65 million of which is tax deductible.

On March 31, 2016, the company acquired, primarily within the Life Sciences Solutions segment, Affymetrix, Inc., a North America-based provider of cellular and genetic analysis products, for a total purchase price of $1.34 billion, net of cash acquired, including the assumption of $254 million of debt. The acquisition expanded the company's existing portfolio of antibodies and assays for flow cytometry and single-cell biology applications. Additionally, the acquisition expanded the company's genetic analysis portfolio through the addition of microarrays.

Revenues of Affymetrix were $360 million in 2015. The purchase price exceeded the fair value of the identifiable net assets and, accordingly, $615 million was allocated to goodwill, none of which is tax deductible.

In addition, in 2016, the company acquired, within the Life Sciences Solutions segment, a manufacturer of transfection reagents and cell-related products and selected assets of an existing channel partner, within the Analytical Instruments segment, a provider of X-ray diffraction solutions for material science and industrial applications and, within the Specialty Diagnostics segment, an existing channel partner for its microbiology media products, for an aggregate purchase price of $33 million.

The components of the purchase price and net assets acquired for 2016 acquisitions are as follows:

(In millions)	FEI	Affymetrix	Other	Total
Purchase Price				
Cash paid	$ 4,440	$ 1,165	$ 29	$ 5,634
Debt assumed	—	254	1	255
Purchase price payable	11	1	3	15
Cash acquired	(369)	(78)	—	(447)
	$ 4,082	$ 1,342	$ 33	$ 5,457
Net Assets Acquired				
Current assets	$ 619	$ 161	$ 3	$ 783
Property, plant and equipment	153	19	—	172
Definite-lived intangible assets:				
Customer relationships	1,051	501	9	1,561
Product technology	740	253	7	1,000
Tradenames and other	42	46	—	88
Indefinite-lived intangible assets:				
In-process research and development	105	14	—	119
Goodwill	2,125	615	16	2,756
Other assets	72	8	—	80
Liabilities assumed	(825)	(275)	(2)	(1,102)
	$ 4,082	$ 1,342	$ 33	$ 5,457

The weighted-average amortization periods for definite-lived intangible assets acquired in 2016 are 16 years for customer relationships, 8 years for product technology and 8 years for tradenames and other. The weighted average amortization period for all definite-lived intangible assets acquired in 2016 is 13 years.

The company recorded a deferred tax liability of $156 million in the acquisition accounting related to the outside basis difference of the Affymetrix Singapore operations as the company does not intend to permanently reinvest the pre-acquisition Singapore earnings. This deferred tax liability was reversed in 2017 as a result of the enactment of the Tax Act.

2015

On September 30, 2015, the company acquired, within the Laboratory Products and Services segment, Alfa Aesar, a U.K.-based global manufacturer of research chemicals from Johnson Matthey Plc, for £257 million ($393 million) in cash. The acquisition expanded the company's existing portfolio of chemicals, solvents and reagents. Revenues of Alfa Aesar were approximately £78 million in 2014. The purchase price exceeded the fair value of the identifiable net assets and, accordingly, $125 million was allocated to goodwill, $41 million of which is tax deductible.

In February 2015, the company acquired, within the Life Sciences Solutions segment, Advanced Scientifics, Inc., a North America-based global provider of single-use systems and process equipment for bioprocess production, for approximately $289 million. The acquisition expanded the company's bioprocessing offerings. Revenues of Advanced Scientifics were approximately $80 million in 2014. The purchase price exceeded the fair value of the identifiable net assets and, accordingly, $124 million was allocated to goodwill, all of which is tax deductible.

In addition, in 2015, the company acquired, within the Analytical Instruments segment, selected assets of certain existing channel partners for its chromatography and mass spectrometry products and, within the Specialty Diagnostics segment, an existing channel partner for its transplant diagnostics products, for an aggregate purchase price of $19 million.

During 2015, the company made contingent purchase price payments totaling $11 million for acquisitions completed prior to 2015. The contingent purchase price payments were contractually due to the sellers upon achievement of certain performance criteria at the acquired businesses.

The components of the purchase price and net assets acquired for 2015 acquisitions are as follows:

(In millions)	Alfa Aesar	Advanced Scientifics	Other	Total
Purchase Price				
Cash paid	$ 393	$ 289	$ 19	$ 701
Purchase price payable	—	—	1	1
Cash acquired	(4)	—	(1)	(5)
	$ 389	$ 289	$ 19	$ 697
Net Assets Acquired				
Current assets	$ 96	$ 29	$ 5	$ 130
Property, plant and equipment	39	11	—	50
Definite-lived intangible assets:				
Customer relationships	137	90	8	235
Product technology	—	37	—	37
Tradenames and other	16	2	—	18
Goodwill	125	124	9	258
Other assets	5	—	—	5
Liabilities assumed	(29)	(4)	(3)	(36)
	$ 389	$ 289	$ 19	$ 697

The weighted-average amortization periods for definite-lived intangible assets acquired in 2015 are 15 years for customer relationships, 10 years for product technology and 10 years for tradenames and other. The weighted average amortization period for all definite-lived intangible assets acquired in 2015 is 14 years.

Unaudited Pro Forma Information

The following unaudited pro forma information provides the effect of the company's 2017 acquisition of Patheon as if the acquisition had occurred on January 1, 2016, and the effects of the company's 2016 acquisitions of FEI and Affymetrix as if the acquisitions had occurred on January 1, 2015:

(In millions)	2017	2016	2015
Revenues	$ 22,144	$ 20,807	$ 18,230
Net Income	$ 2,258	$ 1,791	$ 1,684

The historical consolidated financial information of the company, Patheon, FEI, and Affymetrix has been adjusted in the pro forma information to give effect to pro forma events that are directly attributable to the acquisitions and related financing arrangements, are expected to have a continuing impact on the company, and are factually supportable.

To reflect the acquisition of Patheon as if it had occurred on January 1, 2016, and the acquisitions of FEI and Affymetrix as if they had occurred on January 1, 2015, the unaudited pro forma results include adjustments to reflect, among other things, the incremental intangible asset amortization to be incurred based on the preliminary values of each identifiable intangible asset and the interest expense from debt financings obtained to partially fund the cash consideration transferred. Pro forma adjustments were tax effected at the company's historical statutory rates in effect

for the respective periods. The unaudited pro forma amounts are not necessarily indicative of the combined results of operations that would have been realized had the acquisitions and related financings occurred on the aforementioned dates, nor are they meant to be indicative of any anticipated combined results of operations that the company will experience after the transaction. In addition, the amounts do not include any adjustments for actions that may be taken following the completion of the transaction, such as expected cost savings, operating synergies, or revenue enhancements that may be realized subsequent to the transaction.

Pro forma net income for the year ended December 31, 2017, excludes certain items associated with the Patheon acquisition that were included in the determination of net income for that period. These items have been included in the determination of pro forma net income for the year ended December 31, 2016, and are as follows: $54 million of direct

transaction costs, $39 million of accounting policy conformity adjustments, $21 million of initial restructuring costs, $40 million reduction of revenues for revaluing the deferred revenue obligations to fair value, and $55 million of expense related to the fair value adjustment to acquisition-date inventories.

Pro forma net income for the year ended December 31, 2016, excludes certain items associated with the FEI and Affymetrix acquisitions that were included in the determination of net income for that period. These items have been included in the determination of pro forma net income for the year ended December 31, 2015, and are as follows: $102 million of direct transaction costs, $33 million of accounting policy conformity adjustments, $46 million of initial restructuring costs, $6 million reduction of revenues for revaluing the deferred revenue obligations to fair value, and $99 million of expense related to the fair value adjustment to acquisition-date inventories.

The company's results would not have been materially different from its pro forma results had the company's other 2016 or 2017 acquisitions occurred at the beginning of 2015 or 2016, respectively.

Revenues of Patheon in 2017, subsequent to the date of acquisition, were $722 million. Operating losses for the same period totaled $108 million, primarily due to acquisition-related charges and restructuring charges related to synergy actions.

Note 3. Business Segment and Geographical Information

The company's financial performance is reported in four segments. A description of each segment follows.

Life Sciences Solutions: provides an extensive portfolio of reagents, instruments and consumables used in biological and medical research, discovery and production of new drugs and vaccines as well as diagnosis of disease. These products and services are used by customers in pharmaceutical, biotechnology, agricultural, clinical, academic, and government markets.

Analytical Instruments: provides a broad offering of instruments, consumables, software and services that are used for a range of applications in the laboratory, on the production line and in the field. These products and services are used by customers in pharmaceutical, biotechnology, academic, government, environmental and other research and industrial markets, as well as the clinical laboratory.

Specialty Diagnostics: provides a wide range of diagnostic test kits, reagents, culture media, instruments and associated products used to increase the speed and accuracy of diagnoses. These products are used by customers in healthcare, clinical, pharmaceutical, industrial and food safety laboratories.

Laboratory Products and Services: provides virtually everything needed for the laboratory, including a combination of self-manufactured and sourced products for customers in research, academic, government, industrial and healthcare settings. The segment also includes a comprehensive offering of outsourced services used by the pharmaceutical and biotech industries for drug development, clinical trials logistics and commercial drug manufacturing.

The company's management evaluates segment operating performance based on operating income before certain charges/credits to cost of revenues and selling, general and administrative expenses, principally associated with acquisition accounting; restructuring and other costs/income including costs arising from facility consolidations such as severance and abandoned lease expense and gains and losses from the sale of real estate and product lines as well as from significant litigation-related matters; and amortization of acquisition-related intangible assets. The company uses this measure because it helps management understand and evaluate the segments' core operating results and facilitates comparison of performance for determining compensation.

Business Segment Information

(In millions)	2017	2016	2015
Revenues			
Life Sciences Solutions	$ 5,728	$ 5,317	$ 4,774
Analytical Instruments	4,821	3,668	3,208
Specialty Diagnostics	3,486	3,339	3,244
Laboratory Products and Services	7,825	6,724	6,372
Eliminations	(942)	(774)	(633)
Consolidated revenues	20,918	18,274	16,965
Segment Income (a)			
Life Sciences Solutions	1,896	1,596	1,414
Analytical Instruments	1,027	745	613
Specialty Diagnostics	930	910	873
Laboratory Products and Services	1,007	971	922
Subtotal reportable segments (a)	4,860	4,222	3,822
Cost of revenues charges	(123)	(102)	(9)
Selling, general and administrative charges, net	(78)	(104)	(46)
Restructuring and other costs, net	(97)	(189)	(116)
Amortization of acquisition-related intangible assets	(1,594)	(1,378)	(1,315)
Consolidated operating income	2,968	2,449	2,336
Other expense, net (b)	(539)	(425)	(400)
Income from continuing operations before income taxes	$ 2,429	$ 2,024	$ 1,936
Depreciation			
Life Sciences Solutions	$ 129	$ 142	$ 147
Analytical Instruments	71	50	39
Specialty Diagnostics	72	70	74
Laboratory Products and Services	167	118	113
Consolidated depreciation	$ 439	$ 380	$ 373

(a) Represents operating income before certain charges to cost of revenues and selling, general and administrative expenses; restructuring and other costs, net; and amortization of acquisition-related intangibles.

(b) The company does not allocate other expense, net to its segments.

(In millions)	2017	2016	2015
Total Assets			
Life Sciences Solutions	$ 19,063	$ 19,065	$ 18,537
Analytical Instruments	9,960	9,520	4,763
Specialty Diagnostics	7,095	6,802	7,183
Laboratory Products and Services	19,181	9,405	9,614
Corporate/Other (c)	1,370	1,116	737
Consolidated total assets	$ 56,669	$ 45,908	$ 40,834
Capital Expenditures			
Life Sciences Solutions	$ 118	$ 122	$ 93
Analytical Instruments	56	34	60
Specialty Diagnostics	87	72	76
Laboratory Products and Services	178	111	90
Corporate/Other	69	105	104
Consolidated capital expenditures	$ 508	$ 444	$ 423

(c) Corporate assets consist primarily of cash and cash equivalents, short-term investments, property and equipment at the company's corporate offices.

Geographical Information

(In millions)	2017	2016	2015
Revenues (d)			
United States	$ 10,177	$ 9,086	$ 8,607
China	2,058	1,730	1,376
Other	8,683	7,458	6,982
Consolidated revenues	$ 20,918	$ 18,274	$ 16,965
Long-lived Assets (e)			
United States	$ 2,349	$ 1,630	$ 1,532
United Kingdom	277	217	261
Other	1,421	731	656
Consolidated long-lived assets	$ 4,047	$ 2,578	$ 2,449

(d) Revenues are attributed to countries based on customer location.

(e) Includes property, plant and equipment, net.

Note 4. Other Expense, Net

The components of other expense, net, in the accompanying statement of income are as follows:

(In millions)	2017	2016	2015
Interest Income	$ 81	$ 48	$ 31
Interest Expense	(592)	(469)	(415)
Other Items, Net	(28)	(4)	(16)
Other Expense, Net	$ (539)	$ (425)	$ (400)

Other Items, Net

In all periods, other items, net includes currency transaction gains and losses on monetary assets and liabilities. In 2017, other items, net includes $32 million of charges related to amortization of fees paid to obtain bridge financing commitments related to the Patheon acquisition (Note 2) and $4 million of losses on the early extinguishment of debt, offset in part by $17 million of gains on investments.

In 2016, other items, net includes $22 million of charges related to amortization of fees paid to obtain bridge financing commitments for the acquisition of FEI (Note 2) and $9 million of losses on the early extinguishment of debt, offset in part by $13 million of gains on investments. The investment gains include an $8 million gain on the sale of a joint venture for net proceeds of $65 million.

In 2015, other items, net includes costs of $7 million associated with entering into interest rate swap arrangements and losses of $12 million for the early extinguishment of debt.

Note 5. Stock-based Compensation Expense

The company has stock-based compensation plans for its key employees, directors and others. These plans permit the grant of a variety of stock and stock-based awards, including restricted stock units, stock options or performance-based shares, as determined by the compensation committee of the company's Board of Directors or, for certain non-officer grants, by the company's employee equity committee, which consists of its chief executive officer. The company generally issues new shares of its common stock to satisfy option exercises and restricted unit vestings. Grants of stock options and restricted units generally provide that in the event of both a change in control of the company and a qualifying termination of an option or unit holder's employment, all options and service-based restricted unit awards held by the recipient become immediately vested (unless an employment or other agreement with the employee provides for different treatment).

Compensation cost is based on the grant-date fair value and is recognized ratably over the requisite vesting period or to the date based on qualifying retirement eligibility, if earlier.

The components of stock-based compensation expense are primarily included in selling, general and administrative expenses and are as follows:

(In millions)	2017	2016	2015
Stock Option Awards	$ 53	$ 41	$ 44
Restricted Unit Awards	106	92	81
Total Stock-based Compensation Expense	$ 159	$ 133	$ 125

The company measures the tax benefit associated with excess tax deductions related to stock-based compensation expense by multiplying the excess tax deductions by the statutory tax rates. The company uses the incremental tax benefit approach for utilization of tax attributes. Following the adoption of new guidance discussed in Note 1, tax benefits recognized as a reduction of the income tax provision were $65 million in 2017. Tax benefits recognized in capital in excess of par value in the accompanying balance sheet were $53 million and $63 million, respectively, in 2016 and 2015.

Stock Options

The company's practice is to grant stock options at fair market value. Options vest over 3-5 years with terms of 7-10 years, assuming continued employment with certain exceptions. Vesting of the option awards is contingent upon meeting certain service conditions. The fair value of most option grants is estimated using the Black-Scholes option pricing model. For option grants that require the achievement of both service and market conditions, a lattice model is used to estimate fair value. The fair value is then amortized on a straight-line basis over the requisite service periods of the awards, which is generally the vesting period. Use of a valuation model requires management to make

certain assumptions with respect to selected model inputs. Expected volatility was calculated based on the historical volatility of the company's stock. Historical data on exercise patterns is the basis for estimating the expected life of an option. The risk-free interest rate is based on U.S. Treasury zero-coupon issues with a remaining term which approximates the expected life assumed at the date of grant. The expected annual dividend rate was calculated by dividing the company's annual dividend, based on the most recent quarterly dividend rate, by the closing stock price on the grant date. The compensation expense recognized for all stock-based awards is net of estimated forfeitures. Forfeitures are estimated based on an analysis of actual option forfeitures.

The weighted average assumptions used in the Black-Scholes option pricing model are as follows:

	2017	2016	2015
Expected Stock Price Volatility	20%	21%	24%
Risk Free Interest Rate	1.9%	1.2%	1.4%
Expected Life of Options (years)	4.3	4.3	4.3
Expected Annual Dividend	0.4%	0.5%	0.5%

The weighted average per share grant-date fair values of options granted during 2017, 2016 and 2015 were $30.73, $24.54 and $27.04, respectively. The total intrinsic value of options exercised during the same periods was $199 million, $176 million and $181 million, respectively. The intrinsic value is the difference between the market value of the shares on the exercise date and the exercise price of the option.

A summary of the company's option activity for the year ended December 31, 2017 is presented below:

	Shares (in millions)	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term (in years)	Aggregate Intrinsic Value (a) (in millions)
Outstanding at December 31, 2016	8.8	$ 98.69		
Granted	2.6	167.59		
Issued in connection with an acquisition	0.3	114.06		
Exercised	(2.2)	79.16		
Canceled/Expired	(0.5)	134.56		
Outstanding at December 31, 2017	9.0	$ 121.78	4.2	
Vested and Unvested Expected to Vest at December 31, 2017	8.5	$ 119.92	4.1	$ 597
Exercisable at December 31, 2017	4.1	$ 90.31	2.6	$ 413

(a) Market price per share on December 31, 2017 was $189.88. The intrinsic value is zero for options with exercise prices above the market price.

As of December 31, 2017, there was $99 million of total unrecognized compensation cost related to unvested stock options granted. The cost is expected to be recognized through 2021 with a weighted average amortization period of 2.6 years.

Restricted Share/Unit Awards

Awards of restricted units convert into an equivalent number of shares of common stock. The awards generally vest over 3-4 years, assuming continued employment, with some exceptions. Vesting of the awards is contingent upon meeting certain service conditions and may also be contingent upon meeting certain performance and/or market conditions. The fair market value of the award at the time of the grant is amortized to expense over the requisite service period of the award, which is generally the vesting period. Recipients of restricted units have no voting rights but are entitled to accrue dividend equivalents. The fair value of service- and performance-based restricted unit awards is determined based on the number of units granted and the market value of the company's shares on the

grant date. For awards with market-based vesting conditions, the company uses a lattice model to estimate the grant-date fair value of the award.

A summary of the company's restricted unit activity for the year ended December 31, 2017 is presented below:

	Units (in millions)	Weighted Average Grant-Date Fair Value
Unvested at December 31, 2016	1.3	$ 129.80
Granted	0.8	157.80
Issued in connection with an acquisition	0.2	180.52
Vested	(0.7)	132.67
Forfeited	(0.2)	138.44
Unvested at December 31, 2017	1.4	$ 150.23

The total fair value of shares vested during 2017, 2016 and 2015 was $97 million, $91 million and $80 million, respectively.

As of December 31, 2017, there was $147 million of total unrecognized compensation cost related to unvested restricted stock unit awards. The cost is expected to be recognized through 2021 with a weighted average amortization period of 2.0 years.

Employee Stock Purchase Plans

Qualifying employees are eligible to participate in an employee stock purchase plan sponsored by the company. Shares may be purchased under the program at 95% of the fair market value at the end of the purchase period and the shares purchased are not subject to a holding period. Shares are purchased through payroll deductions of up to 10% of each participating employee's gross wages. The company issued 0.1 million, 0.2 million and 0.2 million shares, respectively, of its common stock for the 2017, 2016 and 2015 plan years, which ended on December 31.

Note 6. Pension and Other Postretirement Benefit Plans

401(k) Savings Plan and Other Defined Contribution Plans

The company's 401(k) savings and other defined contribution plans cover the majority of the company's eligible U.S. and certain non-U.S. employees. Contributions to the plans are made by both the employee and the company. Company contributions are based on the level of employee contributions. Company contributions to these plans are based on formulas determined by the company. In 2017, 2016 and 2015, the company charged to expense $161 million, $140 million and $131 million, respectively, related to its defined contribution plans.

Defined Benefit Pension Plans

Employees of a number of the company's non-U.S. and certain U.S. subsidiaries participate in defined benefit pension plans covering substantially all full-time employees at those subsidiaries. Some of the plans are unfunded, as permitted under the plans and applicable laws. The company also maintains postretirement healthcare programs at several acquired businesses where certain employees are eligible to participate. The costs of the postretirement healthcare programs are generally funded on a self-insured and insured-premium basis.

The company recognizes the funded status of defined benefit pension and other postretirement benefit plans as an asset or liability. This amount is defined as the difference between the fair value of plan assets and the benefit obligation. The company is required to recognize as a component of other comprehensive income, net of tax, the actuarial gains/losses and prior service costs/credits that arise but were not previously required to be recognized as components of net periodic benefit cost. Other comprehensive income is adjusted as these amounts are later recognized in income as components of net periodic benefit cost.

When a company with a pension plan is acquired, any excess of projected benefit obligation over the plan assets is recognized as a liability and any excess of plan assets over the projected benefit obligation is recognized as an asset. The recognition of a new liability or a new asset results in the elimination of (a) previously existing unrecognized net gain or loss and (b) unrecognized prior service cost or credits.

The company funds annually, at a minimum, the statutorily required minimum amount as actuarially determined. During 2017, 2016 and 2015, the company made cash contributions of approximately $200 million, $43 million and $38 million,

respectively. Additionally, in 2016, the company contributed insurance contracts valued at $16 million to two of its German defined benefit plans. Contributions to the plans included in the following table are estimated at between $35 and $65 million for 2018.

The following table provides a reconciliation of benefit obligations and plan assets of the company's domestic and non-U.S. pension plans and postretirement benefit plans:

	Domestic Pension Benefits		Non-U.S. Pension Benefits		Postretirement Benefits	
(In millions)	2017	2016	2017	2016	2017	2016
Change in Projected Benefit Obligations						
Benefit Obligation at Beginning of Year	$ 1,249	$ 1,213	$ 1,116	$ 1,036	$ 50	$ 49
Business combinations	—	33	185	1	6	—
Service costs	—	—	26	24	1	1
Interest costs	43	51	21	27	2	2
Settlements	—	—	(60)	(8)	—	—
Plan participants' contributions	—	—	5	4	1	1
Actuarial (gains) losses	92	30	(34)	150	6	1
Benefits paid	(84)	(78)	(37)	(30)	(4)	(4)
Currency translation and other	—	—	102	(88)	1	—
Benefit Obligation at End of Year	$ 1,300	$ 1,249	$ 1,324	$ 1,116	$ 63	$ 50
Change in Fair Value of Plan Assets						
Fair Value of Plan Assets at Beginning of Year	$ 944	$ 945	$ 853	$ 817	$ 8	$ 7
Business combinations	—	—	101	—	—	—
Actual return on plan assets	161	71	32	125	1	1
Employer contribution	160	6	37	50	3	3
Settlements	—	—	(60)	(8)	—	—
Plan participants' contributions	—	—	5	4	1	1
Benefits paid	(84)	(78)	(37)	(30)	(4)	(4)
Currency translation and other	—	—	80	(105)	—	—
Fair Value of Plan Assets at End of Year	$ 1,181	$ 944	$ 1,011	$ 853	$ 9	$ 8
Funded Status	$ (119)	$ (305)	$ (313)	$ (263)	$ (54)	$ (42)
Accumulated Benefit Obligation	$ 1,300	$ 1,249	$ 1,256	$ 1,048		
Amounts Recognized in Balance Sheet						
Non-current asset	$ —	$ —	$ 100	$ 63	$ 6	$ 4
Current liability	(7)	(10)	(10)	(6)	(3)	(3)
Non-current liability	(112)	(295)	(403)	(320)	(57)	(43)

Net amount recognized	$ (119)	$ (305)	$ (313)	$ (263)	$ (54)	$ (42)
Amounts Recognized in Accumulated Other Comprehensive Loss						
Net actuarial loss	$ 156	$ 171	$ 126	$ 170	$ 11	$ 6
Prior service credits	—	—	10	8	—	—
Net amount recognized	$ 156	$ 171	$ 136	$ 178	$ 11	$ 6

The actuarial assumptions used to compute the funded status for the plans are based upon information available as of December 31, 2017 and 2016 and are as follows:

	Domestic Pension Benefits		Non-U.S. Pension Benefits		Postretirement Benefits	
	2017	2016	2017	2016	2017	2016
Weighted Average Assumptions Used to Determine Projected Benefit Obligations						
Discount rate	3.55 %	4.07 %	2.10 %	1.95 %	3.43 %	3.77 %
Average rate of increase in employee compensation	4.00 %	4.00 %	2.59 %	3.09 %	—	—
Initial healthcare cost trend rate					6.73 %	6.70 %
Ultimate healthcare cost trend rate					5.04 %	5.08 %

The actuarial assumptions used to compute the net periodic pension benefit cost (income) are based upon information available as of the beginning of the year, as presented in the following table:

	Domestic Pension Benefits			Non-U.S. Pension Benefits		
	2017	2016	2015	2017	2016	2015
Weighted Average Assumptions Used to Determine Net Benefit Cost (Income)						
Discount rate	4.06 %	4.25 %	4.00 %	1.95 %	2.83 %	2.69 %
Average rate of increase in employee compensation	4.00 %	4.00 %	4.00 %	3.10 %	3.06 %	3.03 %
Expected long-term rate of return on assets	6.50 %	7.00 %	7.00 %	3.11 %	3.74 %	4.21 %

The ultimate healthcare cost trend rates for the postretirement benefit plans are expected to be reached between 2018 and 2033.

The discount rate reflects the rate the company would have to pay to purchase high-quality investments that would provide cash sufficient to settle its current pension obligations. The discount rate is determined based on a range of factors, including the rates of return on high-quality, fixed-income corporate bonds and the related expected duration of the obligations or, in certain instances, the company has used a hypothetical portfolio of high quality instruments with maturities that mirror the benefit obligation in order to accurately estimate the discount rate relevant to a particular plan.

The company utilizes a full yield curve approach in the estimation of these components by applying the specific spot-rates along the yield curve used in the determination of the benefit obligation to the relevant projected cash flows.

The expected long-term rate of return on plan assets reflects the average rate of earnings expected on the funds invested, or to be invested, to provide for the benefits included in the projected benefit obligations. In determining the expected long-term rate of return on plan assets, the company considers the relative weighting of plan assets, the historical performance of total plan assets and individual asset classes and economic and other indicators of future performance. In addition, the company may consult with and consider the opinions of financial and other professionals in developing appropriate return benchmarks.

Asset management objectives include maintaining an adequate level of diversification to reduce interest rate and market risk and providing adequate liquidity to meet immediate and future benefit payment requirements.

The expected rate of compensation increase reflects the long-term average rate of salary increases and is based on historic salary increase experience and management's expectations of future salary increases.

The amounts in accumulated other comprehensive income expected to be recognized as components of net periodic benefit cost in 2018 are not material.

The projected benefit obligation and fair value of plan assets for the company's qualified and non-qualified pension plans with projected benefit obligations in excess of plan assets are as follows:

	Pension Plans	
(In millions)	2017	2016
Pension Plans with Projected Benefit Obligations in Excess of Plan Assets		
Projected benefit obligation	$ 2,059	$ 1,907
Fair value of plan assets	1,527	1,276

The accumulated benefit obligation and fair value of plan assets for the company's qualified and non-qualified pension plans with accumulated benefit obligations in excess of plan assets are as follows:

	Pension Plans	
(In millions)	2017	2016
Pension Plans with Accumulated Benefit Obligations in Excess of Plan Assets		
Accumulated benefit obligation	$ 1,962	$ 1,847
Fair value of plan assets	1,495	1,275

The measurement date used to determine benefit information is December 31 for all plan assets and benefit obligations.

The net periodic pension benefit cost (income) includes the following components:

	Domestic Pension Benefits			Non-U.S. Pension Benefits		
(In millions)	2017	2016	2015	2017	2016	2015
Components of Net Benefit Cost (Income)						
Service cost-benefits earned	$ —	$ —	$ —	$ 26	$ 24	$ 25
Interest cost on benefit obligation	43	51	50	21	27	28
Expected return on plan assets	(56)	(49)	(54)	(29)	(28)	(33)
Amortization of actuarial net loss	2	—	—	9	7	9
Settlement/curtailment loss (gain)	1	—	—	5	—	1
Special termination benefits	—	—	—	—	—	1
Net periodic benefit cost (income)	$ (10)	$ 2	$ (4)	$ 32	$ 30	$ 31

The net periodic postretirement benefit cost was not material in 2017, 2016 and 2015.

Expected benefit payments are estimated using the same assumptions used in determining the company's benefit obligation at December 31, 2017. Benefit payments will depend on future employment and compensation levels, average years employed and average life spans, among other factors, and changes in any of these factors could significantly affect these estimated future benefit payments. Estimated future benefit payments during the next five years and in the aggregate for the five fiscal years thereafter, are as follows:

(In millions)	Domestic Pension	Non-U.S. Pension	Post-retirement

	Benefits	Benefits	Benefits
Expected Benefit Payments			
2018	$ 87	$ 46	$ 3
2019	84	37	3
2020	83	39	3
2021	85	41	3
2022	82	43	3
2023-2027	394	250	16

A change in the assumed healthcare cost trend rate by one percentage point effective January 2017 would not have caused a material change in the accumulated postretirement benefit obligation as of December 31, 2017 and the 2017 aggregate of service and interest costs.

Domestic Pension Plan Assets

The company's overall objective is to manage the assets in a liability framework where investments are selected that are expected to have similar changes in fair value as the related liabilities will have upon changes in interest rates. The company invests in a portfolio of both return-seeking and liability-hedging assets, primarily through the use of institutional collective funds, to achieve long-term growth and to insulate the funded position from interest rate volatility. The strategic asset allocation uses a combination of risk controlled and index strategies in fixed income and global equities. The company also has a small portfolio (comprising less than 1% of invested assets) of private equity investments. The target allocations for the remaining investments are approximately 10% to funds investing in U.S. equities, approximately 10% to funds investing in international equities and approximately 80% to funds investing in fixed income securities. The portfolio maintains enough liquidity at all times to meet the near-term benefit payments.

Non-U.S. Pension Plan Assets

The company maintains specific plan assets for many of the individual pension plans outside the U.S. The investment strategy of each plan has been uniquely established based on the country specific standards and characteristics of the plans. Several of the plans have contracts with insurance companies whereby the market risks of the benefit obligations are borne by the insurance companies. When assets are held directly in investments, generally the objective is to invest in a portfolio of diversified assets with a variety of fund managers. The investments may include hedge funds, multi-asset funds, alternative investments and derivative funds with the target asset allocations ranging from approximately 0% - 25% for equities, 0% - 100% for fixed income, 0% - 20% for hedge funds, 0% - 45% for multi-asset funds, 0% to 15% for alternative investments and 0% - 22% for funds holding derivatives. The derivatives held by the funds are primarily interest rate swaps intended to match the movements in the plan liabilities as well as equity futures in a synthetic equity fund which provide targeted exposure to equity markets without the fund holding individual equity positions. Each plan maintains enough liquidity at all times to meet the near-term benefit payments.

The fair values of the company's plan assets at December 31, 2017 and 2016, by asset category are as follows:

(In millions)	December 31, 2017	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Not Subject to Leveling (1)
Domestic Pension Plan Assets					
U.S. equity funds	$ 163	$ —	$ —	$ —	$ 163
International equity funds	180	—	—	—	180
Fixed income funds	761	—	—	—	761
Private equity funds	2	—	—	—	2
Money market funds	75	—	—	—	75
Total Domestic Pension Plans	$ 1,181	$ —	$ —	$ —	$ 1,181
Non-U.S. Pension Plan Assets					
Equity funds	$ 75	$ —	$ —	$ —	$ 75
Fixed income funds	312	—	—	—	312
Hedge funds	77	—	—	—	77
Multi-asset funds	79	—	—	—	79

Derivative funds	194	—	—	—	194
Alternative investments	17	—	—	—	17
Insurance contracts	202	—	202	—	—
Cash / money market funds	55	40	—	—	15
Total Non-U.S. Pension Plans	$ 1,011	$ 40	$ 202	$ —	$ 769

(1) Investments measured at the net asset value per share (or its equivalent) practical expedient have not been classified in the fair value hierarchy.

(In millions)	December 31, 2016	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Not Subject to Leveling (1)
Domestic Pension Plan Assets					
U.S. equity funds	$ 259	$ —	$ —	$ —	$ 259
International equity funds	229	—	—	—	229
Fixed income funds	437	—	—	—	437
Private equity funds	2	—	—	—	2
Money market funds	17	—	—	—	17
Total Domestic Pension Plans	$ 944	$ —	$ —	$ —	$ 944
Non-U.S. Pension Plan Assets					
Equity funds	$ 123	$ 56	$ —	$ —	$ 67
Fixed income funds	294	20	—	—	274
Hedge funds	80	—	—	—	80
Multi-asset funds	12	—	—	—	12
Derivative funds	158	—	—	—	158
Insurance contracts	177	—	177	—	—
Cash / money market funds	9	5	—	—	4
Total Non-U.S. Pension Plans	$ 853	$ 81	$ 177	$ —	$ 595

(1) Investments measured at the net asset value per share (or its equivalent) practical expedient have not been classified in the fair value hierarchy.

The tables above present the fair value of the company's plan assets in accordance with the fair value hierarchy (Note 12). Certain pension plan assets are measured at net asset value per share and are reported as a level 2 investment above due to the company's ability to redeem its investment either at the balance sheet date or within limited time restrictions. Certain investments that are measured at fair value using the net asset value per share practical expedient have not been classified in the fair value hierarchy. The fair value amounts of these investments presented in the above tables are intended to permit reconciliation of the fair value hierarchy to the amounts presented for the total pension plan assets. These investments were also redeemable at the balance sheet date or within limited time restrictions.

Note 7. Income Taxes

The components of income from continuing operations before provision for income taxes are as follows:

(In millions)	2017	2016	2015
U.S.	$ 655	$ 493	$ 851
Non-U.S.	1,774	1,531	1,085
Income from Continuing Operations	$ 2,429	$ 2,024	$ 1,936

The components of the provision for income taxes of continuing operations are as follows:

(In millions)	2017	2016	2015
Current Income Tax Provision			
Federal	$ 1,259	$ 280	$ 184
Non-U.S.	576	349	363
State	62	9	9
	1,897	638	556
Deferred Income Tax Provision (Benefit)			
Federal	$ (1,437)	$ (510)	$ (297)
Non-U.S.	(271)	(104)	(288)
State	12	(25)	(15)
	(1,696)	(639)	(600)
Provision for (benefit from) income taxes	$ 201	$ (1)	$ (44)

The company generally receives a tax deduction upon the exercise of non-qualified stock options by employees, or the vesting of restricted stock units held by employees, for the difference between the exercise price and the market price of the underlying common stock on the date of exercise. Prior to 2017, the amount of the tax deduction in excess of compensation cost recognized was allocated to capital in excess of par value. Beginning in 2017, these excess tax benefits reduce the tax provision as described in Note 1. In 2017, the company's tax provision was reduced by $65 million of such benefits. In 2016 and 2015, $53 million and $63 million, respectively, of such benefits were allocated to capital in excess of par value.

On December 22, 2017, the Tax Cuts and Jobs Act of 2017 was enacted. The Tax Act includes significant changes to existing U.S. tax laws that affect the company, including a reduction of the U.S. corporate income tax rate from 35% to 21% beginning in 2018 and creation of a territorial tax system with a one-time transition tax on deemed repatriated earnings and profits of foreign subsidiaries (transition tax). The company recognized a net charge for certain aspects of the Tax Act in its 2017 financial statements for which the accounting is provisional, but reasonable estimates could be determined.

The company recognized a $1.25 billion income tax charge for the year ended December 31, 2017, related to the transition tax. The company also remeasured its net U.S. deferred tax balances affected by the Tax Act’s reduction in the U.S. corporate income tax rate, which resulted in a $1.06 billion income tax benefit for the year ended December 31, 2017. Although the net $204 million charge represents what the company believes is a reasonable estimate of the impact of the Tax Act, the components of the net charge are provisional and may change. For example, these estimates may be impacted by the need for further analysis and future clarification and guidance regarding available tax accounting methods and elections, earnings and profits computations and state tax conformity to federal tax changes.

The provision for income taxes in the accompanying statement of income differs from the provision calculated by applying the statutory federal income tax rate of 35% to income from continuing operations before provision for income taxes due to the following:

(In millions)	2017	2016	2015
Provision for Income Taxes at Statutory Rate	$ 850	$ 708	$ 678
Increases (Decreases) Resulting From:			
Foreign rate differential	(380)	(322)	(275)
Foreign exchange loss on inter-company debt refinancing	(237)	—	—
Income tax credits	(273)	(318)	(316)
Manufacturing deduction	(42)	(38)	(38)
Withholding taxes	55	—	—
Singapore tax holiday	(25)	(23)	(21)
Impact of change in tax laws and apportionment on deferred taxes	(1,121)	2	(38)
Transition tax	1,250	—	—
Provision of tax reserves, net	99	12	18
Excess tax benefits from stock options and restricted stock units	(65)	—	—
Tax return reassessments and settlements	8	(41)	(54)
Other, net	82	19	2
Provision for (benefit from) income taxes	$ 201	$ (1)	$ (44)

The company has operations and a taxable presence in approximately 50 countries outside the U.S. The company's effective income tax rate differs from the U.S. federal statutory rate each year due to certain operations that are subject to tax incentives, state and local taxes, and foreign taxes that are different than the U.S. federal statutory rate.

The foreign tax credits discussed below are the result of foreign earnings and profits remitted or deemed remitted to the U.S. during the reporting year and the U.S. treatment of taxes paid in the foreign jurisdictions in the years those profits were originally earned.

In 2017, the company continued to implement tax planning initiatives related to non U.S. subsidiaries. These non-U.S. subsidiaries incurred foreign tax obligations, and made cash and deemed distributions to the company’s U.S. operations which resulted in no net tax cost. As a result of these distributions, the company benefitted from U.S. foreign tax credits of $86 million, offset in part by additional U.S. income taxes of $53 million on the related foreign income (which reduced the benefit from the foreign rate differential in 2017). The company also implemented foreign tax credit planning in Sweden which resulted in $20 million of foreign tax credits, with no related incremental U.S. income tax expense.

In 2016, the company continued to implement tax planning initiatives related to non-U.S. subsidiaries. These non-U.S. subsidiaries incurred foreign tax obligations, and made cash and deemed distributions to the company’s U.S. operations which resulted in no net tax cost. As a result of these distributions, the company benefitted from U.S. foreign tax credits of $91 million, offset in part by additional U.S. income taxes of $37 million on the related foreign income (which reduced the benefit from the foreign rate differential in 2016). The company also implemented foreign tax credit planning in Sweden which resulted in $100 million of foreign tax credits, with no related incremental U.S. income tax expense.

In 2015, the company implemented tax planning initiatives related to non-U.S. subsidiaries. These non-U.S. subsidiaries incurred foreign tax obligations, and made cash and deemed distributions to the company’s U.S. operations which resulted in no net tax cost. As a result of these distributions, the company benefitted from U.S. foreign tax credits of $111 million, offset in part by additional U.S. income taxes of $46 million on the related

foreign income (which reduced the benefit from the foreign tax rate differential in 2015). The company also implemented foreign tax credit planning in Sweden which resulted in $80 million of foreign tax credits, with no related incremental U.S. income tax expense. Also in 2015, the company recorded benefits totaling $54 million related to additional prior year foreign tax and other credits as well as restructuring and other costs associated with the 2014 acquisition of Life Technologies.

In 2017 the company refinanced certain long term inter-company debt which resulted in an income tax benefit of $237 million related to a foreign exchange loss recognized for income tax purposes.

The company has significant activities in Singapore and has received considerable tax incentives. The local taxing authority granted the company pioneer company status which provides an incentive encouraging companies to undertake

activities that have the effect of promoting economic or technological development in Singapore. This incentive equates to a tax exemption on earnings associated with most of the company's manufacturing activities in Singapore and continues through December 31, 2026. In 2017, 2016 and 2015, the impact of this tax holiday decreased the annual effective tax rates by 1.0 percentage points, 1.1 percentage points and 1.1 percentage points, respectively, and increased diluted earnings per share by approximately $0.06, $0.06 and $0.05, respectively. In connection with the March 2017 extension of this agreement until 2026, the company recorded a benefit in Q1 2017 of approximately $65 million ($0.16 per diluted share) for the effect on deferred tax balances of the extended tax holiday.

Net deferred tax asset (liability) in the accompanying balance sheet consists of the following:

(In millions)	2017	2016
Deferred Tax Asset (Liability)		
Depreciation and amortization	$ (3,957)	$ (4,219)
Net operating loss and credit carryforwards	1,150	1,453
Reserves and accruals	139	192
Accrued compensation	265	372
Foreign undistributed earnings	—	(156)
Inventory basis difference	81	110
Other capitalized costs	61	84
Unrealized losses on hedging instruments	125	36
Other, net	126	66
Deferred tax assets (liabilities), net before valuation allowance	(2,010)	(2,062)
Less: Valuation allowance	256	113
Deferred tax assets (liabilities), net	$ (2,266)	$ (2,175)

The company estimates the degree to which tax assets and loss and credit carryforwards will result in a benefit based on expected profitability by tax jurisdiction and provides a valuation allowance for tax assets and loss and credit carryforwards that it believes will more likely than not expire unutilized. At December 31, 2017, all of the company's valuation allowance relates to deferred tax assets, primarily net operating losses, for which any subsequently recognized tax benefits will reduce income tax expense.

The changes in the valuation allowance are as follows:

	Year Ended December 31,		
(In millions)	2017	2016	2015
Beginning Balance	$ 113	$ 109	$ 116
Additions charged to income tax provision	28	—	—
Additions due to acquisitions	108	25	—
Currency translation and other	7	(21)	(7)
Ending Balance	$ 256	$ 113	$ 109

At December 31, 2017, the company had federal, state and non-U.S. net operating loss carryforwards of $195 million, $1.86 billion and $4.09 billion, respectively. Use of the carryforwards is limited based on the future income of certain subsidiaries. The federal and state net operating loss carryforwards expire in the years 2018 through 2037.

Of the non-U.S. net operating loss carryforwards, $1.43 billion expire in the years 2018 through 2037, and the remainder do not expire.

The company operates in various jurisdictions around the world. A provision has not been made for certain U.S. state income taxes or additional non-U.S. taxes on $13.21 billion of undistributed earnings of international subsidiaries that could be subject to taxation if remitted to the U.S. because such amounts are intended to be reinvested outside the United States indefinitely. It is not practicable to estimate the unrecognized tax liability due to i) the extent of uncertainty as to which remittance structure would be used (among several possibilities) should a decision be made to repatriate; and ii) the implications of indirect taxes, including withholding taxes that could potentially be required depending on the repatriation structure.

Unrecognized Tax Benefits

As of December 31, 2017, the company had $1.41 billion of unrecognized tax benefits which, if recognized, would reduce the effective tax rate.

A reconciliation of the beginning and ending amounts of unrecognized tax benefits is as follows:

(In millions)	2017	2016	2015
Balance at beginning of year	$ 802	$ 350	$ 214
Additions due to acquisitions	31	54	—
Additions for tax positions of current year	565	342	14
Additions for tax positions of prior years	51	94	121
Closure of tax years	—	(28)	(5)
Settlements	(40)	(10)	6
Balance at end of year	$ 1,409	$ 802	$ 350

During 2017, the company's unrecognized tax benefits provisionally increased $511 million as a result of uncertain tax positions relating to the scope of the Tax Act's one-time transition tax, $54 million relating to foreign tax positions, $43 million as a result of a foreign exchange loss recognized on the refinancing of certain long term inter-company debt and $31 million due to an acquisition. All of the total $1.41 billion liability is classified as a long-term liability. The company does not expect its unrecognized tax benefits to change significantly over the next twelve months.

During 2016, the company's unrecognized tax benefits increased $342 million due to the uncertainty around the deductibility of a foreign exchange loss on intercompany investments, $54 million due to acquisitions, $43 million due to tax planning related to prior years that resulted in amended tax filings, $35 million relating to foreign tax positions and $14 million due to the utilization of deferred tax assets. In 2016, the company also settled the Life Technologies tax audit for the 2012 to 2014 tax years which reduced the reserve on unrecognized tax benefits by $10 million.

During 2015, the company's unrecognized tax benefits increased $70 million due to the utilization of deferred tax assets and $28 million relating to foreign net operating losses on which the company has a deferred tax asset established. This increase was offset in part by a reduction of $10 million from a resolution of an IRS audit of Life Technologies for which a reserve had previously been established.

The company classified interest and penalties related to unrecognized tax benefits as income tax expense. The total amount of interest and penalties related to uncertain tax positions and recognized in the balance sheet as of December 31, 2017 and 2016 was $31 million and $24 million, respectively.

The company conducts business globally and, as a result, Thermo Fisher or one or more of its subsidiaries files income tax returns in the U.S. federal jurisdiction and various state and foreign jurisdictions. In the normal course of business, the company is subject to examination by taxing authorities throughout the world, including such major jurisdictions as Australia, Canada, China, Denmark, Finland, France, Germany, Japan, Singapore, Sweden, the United Kingdom and the United States. With few exceptions, the company is no longer subject to U.S. federal, state and local, or non-U.S., income tax examinations for years before 2011.

Note 8. Earnings per Share

(In millions except per share amounts)	2017	2016	2015
Income from Continuing Operations	$ 2,228	$ 2,025	$ 1,980
Loss from Discontinued Operations	(3)	(3)	(5)
Net Income	$ 2,225	$ 2,022	$ 1,975
Basic Weighted Average Shares	395	395	399
Plus Effect of:			
Stock options and restricted units	3	2	3
Diluted Weighted Average Shares	398	397	402
Basic Earnings per Share:			
Continuing operations	$ 5.65	$ 5.13	$ 4.97
Discontinued operations	(0.01)	(0.01)	(0.01)
Basic Earnings per Share	$ 5.64	$ 5.12	$ 4.96
Diluted Earnings per Share:			
Continuing operations	$ 5.60	$ 5.10	$ 4.93
Discontinued operations	(0.01)	(0.01)	(0.01)
Diluted Earnings per Share	$ 5.59	$ 5.09	$ 4.92
Antidilutive Stock Options Excluded from Diluted Weighted Average Shares	2	2	3

Note 9. Debt and Other Financing Arrangements

(Dollars in millions)	Effective Interest Rate at December 31, 2017	December 31, 2017	December 31, 2016
Commercial Paper	(0.26)%	$ 960	$ 953
Term Loan		—	825
1.85% 5-Year Senior Notes, Due 1/15/2018		—	500
Floating Rate 2-Year Senior Notes, Due 8/9/2018 (euro-denominated)	0.37 %	721	631
2.15% 3-Year Senior Notes, Due 12/14/2018	2.35 %	450	450
2.40% 5-Year Senior Notes, Due 2/1/2019	2.59 %	900	900
Floating Rate 2-Year Senior Notes, Due 7/24/2019 (euro-denominated)	0.10 %	600	—
6.00% 10-Year Senior Notes, Due 3/1/2020	2.97 %	750	750
4.70% 10-Year Senior Notes, Due 5/1/2020	4.23 %	300	300
1.50% 5-Year Senior Notes, Due 12/1/2020 (euro-denominated)	1.62 %	510	447
5.00% 10-Year Senior Notes, Due 1/15/2021	3.24 %	400	400
4.50% 10-Year Senior Notes, Due 3/1/2021	5.37 %	1,000	1,000
3.60% 10-Year Senior Notes, Due 8/15/2021	5.19 %	1,100	1,100
3.30% 7-Year Senior Notes, Due 2/15/2022	3.43 %	800	800
2.15% 7-Year Senior Notes, Due 7/21/2022 (euro-denominated)	2.28 %	600	526
3.15% 10-Year Senior Notes, Due 1/15/2023	3.31 %	800	800
3.00% 7-Year Senior Notes, Due 4/15/2023	5.42 %	1,000	1,000
4.15% 10-Year Senior Notes, Due 2/1/2024	4.16 %	1,000	1,000
0.75% 8-Year Senior Notes, Due 9/12/2024 (euro-denominated)	0.95 %	1,201	1,052
2.00% 10-Year Senior Notes, Due 4/15/2025 (euro-denominated)	2.10 %	768	673
3.65% 10-Year Senior Notes, Due 12/15/2025	3.77 %	350	350
1.40% 8.5-Year Senior Notes, Due 1/23/2026 (euro-denominated)	1.53 %	840	—
2.95% 10-Year Senior Notes, Due 9/19/2026	3.19 %	1,200	1,200
1.45% 10-Year Senior Notes, Due 3/16/2027 (euro-denominated)	1.66 %	600	—
3.20% 10-Year Senior Notes, Due 8/15/2027	3.39 %	750	—
1.375% 12-Year Senior Notes, Due 9/12/2028 (euro-denominated)	1.46 %	721	631
1.95% 12-Year Senior Notes, Due 7/24/2029 (euro-denominated)	2.08 %	840	—
2.875% 20-Year Senior Notes, Due 7/24/2037 (euro-denominated)	2.94 %	840	—
5.30% 30-Year Senior Notes, Due 2/1/2044	5.37 %	400	400
4.10% 30-Year Senior Notes, Due 8/15/2047	4.23 %	750	—
Other		24	13
Total Borrowings at Par Value		21,175	16,701
Fair Value Hedge Accounting Adjustments		(70)	(50)
Unamortized (Discount) Premium, Net		(2)	52
Unamortized Debt Issuance Costs		(95)	(76)

Total Borrowings at Carrying Value	21,008	16,627
Less: Short-term Obligations and Current Maturities	2,135	1,255
Long-term Obligations	$ 18,873	$ 15,372

The effective interest rates for the fixed-rate debt include the stated interest on the notes, the accretion of any discount or amortization of any premium, the amortization of any debt issuance costs and, if applicable, adjustments related to hedging.

See Note 12 for fair value information pertaining to the company's long-term obligations.

As of December 31, 2017, the annual repayment requirements for debt obligations are as follows:

(In millions)	
2018	$ 2,135
2019	1,505
2020	1,564
2021	2,503
2022	1,403
2023 and Thereafter	12,065
	$ 21,175

As of December 31, 2017 and 2016, short-term obligations and current maturities of long-term obligations in the accompanying balance sheet included $960 million and $953 million, respectively, of commercial paper, short-term bank borrowings and borrowings under lines of credit of certain of the company's subsidiaries. The weighted average interest rate for short-term borrowings was (0.26)% and 0.15% at December 31, 2017 and 2016, respectively. In addition to available borrowings under the company's revolving credit agreements, discussed below, the company had unused lines of credit of $73 million as of December 31, 2017. These unused lines of credit generally provide for short-term unsecured borrowings at various interest rates.

Credit Facilities

The company has a revolving credit facility with a bank group that provides for up to $2.50 billion of unsecured multi-currency revolving credit. The facility expires in July 2021. The agreement calls for interest at either a LIBOR-based rate, a EURIBOR-based rate (for funds drawn in Euro) or a rate based on the prime lending rate of the agent bank, at the company's option. The agreement contains affirmative, negative and financial covenants, and events of default customary for financings of this type. The covenants in our revolving credit facility (the Facility) include a Consolidated Leverage Ratio (total debt-to-Consolidated EBITDA) and a Consolidated Interest Coverage ratio (Consolidated EBITDA to Consolidated Interest Expense), as such terms are defined in the Facility. Specifically, the company has agreed that, so long as any lender has any commitment under the Facility, any letter of credit is outstanding under the Facility, or any loan or other obligation is outstanding under the Facility, it will maintain a maximum Consolidated Leverage Ratio of 4.0:1.0 for the first and second quarters of 2018 and then stepping down to 3.5:1.0 for the third quarter of 2018 and thereafter. The company has also agreed that so long as any lender has any commitment under the Facility or any letter of credit is outstanding under the Facility, or any loan or other obligation is outstanding under the Facility, it will maintain a minimum Consolidated Interest Coverage Ratio of 3.0:1.0 as of the last day of any fiscal quarter. As of December 31, 2017, no borrowings were outstanding under the Facility, although available capacity was reduced by approximately $77 million as a result of outstanding letters of credit.

Commercial Paper Programs

The company has commercial paper programs pursuant to which it may issue and sell unsecured, short-term promissory notes (CP Notes). Under the U.S. program, a) maturities may not exceed 397 days from the date of issue and b) the CP Notes are issued on a private placement basis under customary terms in the commercial paper market and are not redeemable prior to maturity nor subject to voluntary prepayment. Under the euro program, maturities may not exceed 183 days and may be denominated in euro, U.S. dollars, Japanese yen, British pounds sterling, Swiss franc, Canadian dollars or other currencies. Under both programs, the CP Notes are issued at a discount from par (or premium to par, in the case of negative interest rates), or, alternatively, are sold at par and bear varying interest rates on a fixed or floating basis. As of December 31, 2017, outstanding borrowings under these programs were $960 million, with a weighted average remaining period to maturity of 49 days and are classified as short-term obligations in the accompanying balance sheet.

Senior Notes

Interest on the floating rate senior notes is payable quarterly. Interest is payable annually on the other euro-denominated senior notes and semi-annually on all other senior notes. Each of the notes may be redeemed at a

redemption price of 100% of the principal amount plus a specified make-whole premium plus accrued interest. The company is subject to certain affirmative and negative covenants under the indentures governing the senior notes, the most restrictive of which limits the ability of the company to pledge principal properties as security under borrowing arrangements.

In 2016, Thermo Fisher Scientific (Finance I) B.V., a wholly-owned finance subsidiary of the company issued the Floating Rate Senior Notes due 2018 included in the table above. This subsidiary has no independent function other than financing

activities. The Floating Rate Senior Notes due 2018 are fully and unconditionally guaranteed by the company and no other subsidiaries of the company have guaranteed the obligations.

Prior to issuing the 3.00% Senior Notes due 2023, the company had entered into an agreement to hedge its exposure related to the interest rate on the anticipated borrowings (described under the heading *"Cash Flow Hedge Arrangements"* in Note 12) that was terminated in April 2016. The company had a cash outlay of $75 million in 2016 associated with termination of the arrangement, included in other financing activities, net, in the accompanying statement of cash flows.

Interest Rate Swap Arrangements

In 2016, the company terminated certain of its fixed to floating rate swap arrangements. The terminated swaps were accounted for as fair value hedges. As a result of terminating these arrangements, the company received $61 million (excluding accrued interest) in cash in 2016, included in other financing activities, net, in the accompanying statement of cash flows. The proceeds were recorded as part of the carrying value of the underlying debt and will be amortized as a reduction to interest expense over the remaining terms of the respective debt instruments. Subsequently, the company entered into new swap arrangements which are included in the table below.

The company has entered into LIBOR-based interest rate swap arrangements with various banks on several of its outstanding senior notes. The aggregate amounts of the swaps are equal to the principal amounts of the notes and the payment dates of the swaps coincide with the interest payment dates of the notes. The swap contracts provide for the company to pay a variable interest rate and receive a fixed rate. The variable interest rates reset monthly. The swaps have been accounted for as fair value hedges of the notes. See Note 12 for additional information. The following table summarizes the outstanding interest rate swap arrangements on the company's senior notes at December 31, 2017:

(Dollars in millions)	Aggregate Notional Amount	Pay Rate	Pay Rate as of December 31, 2017	Receive Rate
4.50% Senior Notes due 2021	1,000	1-month LIBOR + 3.4420%	4.8027 %	4.50 %
3.60% Senior Notes due 2021	1,100	1-month LIBOR + 2.5150%	3.9920 %	3.60 %
3.00% Senior Notes due 2023	1,000	1-month LIBOR + 1.7640%	3.2410 %	3.00 %

Note 10. Commitments and Contingencies

Operating Leases

The company leases certain logistics, office, and manufacturing facilities. Income from continuing operations includes expense from operating leases of $198 million, $182 million and $181 million in 2017, 2016 and 2015, respectively. The following is a summary of annual future minimum lease and rental commitments under noncancelable operating leases as of December 31, 2017:

(In millions)	
2018	$ 188
2019	154
2020	123
2021	92
2022	80
2023 and Thereafter	169

	$ 806

Purchase Obligations

The company has entered into unconditional purchase obligations, in the ordinary course of business, that include agreements to purchase goods, services or fixed assets and to pay royalties that are enforceable and legally binding and that specify all significant terms including: fixed or minimum quantities to be purchased; fixed, minimum or variable price provisions; and the approximate timing of the transaction. Purchase obligations exclude agreements that are cancelable at any

time without penalty. The aggregate amount of the company's unconditional purchase obligations totaled $733 million at December 31, 2017 and the majority of these obligations are expected to be settled during 2018.

Letters of Credit, Guarantees and Other Commitments

Outstanding letters of credit and bank guarantees totaled $183 million at December 31, 2017. Substantially all of these letters of credit and guarantees expire before 2024.

Outstanding surety bonds and other guarantees totaled $35 million at December 31, 2017. The expiration of these bonds and guarantees ranges through 2020.

The letters of credit, bank guarantees and surety bonds principally secure performance obligations, and allow the holder to draw funds up to the face amount of the letter of credit, bank guarantee or surety bond if the applicable business unit does not perform as contractually required.

The company is a guarantor of pension plan obligations of a divested business. The purchaser of the divested business has agreed to pay for the pension benefits, however the company was required to guarantee payment of these pension benefits should the purchaser fail to do so. The amount of the guarantee at December 31, 2017 was $43 million.

In connection with the sale of businesses of the company, the buyers have assumed certain contractual obligations of such businesses and have agreed to indemnify the company with respect to those assumed liabilities. In the event a third-party to a transferred contract does not recognize the transfer of obligations or a buyer defaults on its obligations under the transferred contract, the company could be liable to the third-party for such obligations. However, in such event, the company would be entitled to seek indemnification from the buyer.

In 2016, the company entered into an off-balance sheet build-to-suit financing arrangement with a financial institution to fund construction of an operating facility in the U.S. Upon completion of construction in 2018, a five-year lease will commence with options to purchase the facility or renew the lease for up to three 5-year terms. The company has agreed with the lessor to comply with certain financial covenants consistent with its other debt arrangements (Note 9), and has guaranteed the facility's residual value at the end of the lease. The company has also guaranteed the residual value of two other leased operating facilities with initial lease terms ending in 2019 and 2020. The aggregate maximum guarantee under these three lease arrangements is $155 million.

Indemnifications

In conjunction with certain transactions, primarily divestitures, the company has agreed to indemnify the other parties with respect to certain liabilities related to the businesses that were sold or leased properties that were abandoned (e.g., retention of certain environmental, tax, employee and product liabilities). The scope and duration of such indemnity obligations vary from transaction to transaction. Where appropriate, an obligation for such indemnifications is recorded as a liability. Generally, a maximum obligation cannot be reasonably estimated. Other than obligations recorded as liabilities at the time of divestiture, historically the company has not made significant payments for these indemnifications.

In connection with the company's efforts to reduce the number of facilities that it occupies, the company has vacated some of its leased facilities or sublet them to third parties. When the company sublets a facility to a third-party, it remains the primary obligor under the master lease agreement with the owner of the facility. As a result, if a third-party vacates the sublet facility, the company would be obligated to make lease or other payments under the master lease agreement. The company believes that the financial risk of default by sublessors is individually and in the aggregate not material to the company's financial position or results of operations.

In connection with the sale of products in the ordinary course of business, the company often makes representations affirming, among other things, that its products do not infringe on the intellectual property rights of others and agrees to indemnify customers against third-party claims for such infringement. The company has not been required to make material payments under such provisions.

Environmental Matters

The company is currently involved in various stages of investigation and remediation related to environmental matters. The company cannot predict all potential costs related to environmental remediation matters and the possible impact on future operations given the uncertainties regarding the extent of the required cleanup, the complexity and

interpretation of applicable laws and regulations, the varying costs of alternative cleanup methods and the extent of the company's responsibility. Expenses for environmental remediation matters related to the costs of installing, operating and maintaining groundwater-treatment systems and other remedial activities related to historical environmental contamination at the company's domestic and international facilities were not material in any period presented. The company records accruals for environmental remediation

liabilities, based on current interpretations of environmental laws and regulations, when it is probable that a liability has been incurred and the amount of such liability can be reasonably estimated. The company calculates estimates based upon several factors, including reports prepared by environmental specialists and management's knowledge of and experience with these environmental matters. The company includes in these estimates potential costs for investigation, remediation and operation and maintenance of cleanup sites. At December 31, 2017, the company's total environmental liability was approximately $52 million. While management believes the accruals for environmental remediation are adequate based on current estimates of remediation costs, the company may be subject to additional remedial or compliance costs due to future events such as changes in existing laws and regulations, changes in agency direction or enforcement policies, developments in remediation technologies or changes in the conduct of the company's operations, which could have a material adverse effect on the company's financial position, results of operations or cash flows.

Litigation and Related Contingencies

There are various lawsuits and claims pending against the company including matters involving product liability, intellectual property, employment and commercial issues. The company determines the probability and range of possible loss based on the current status of each of these matters. A liability is recorded in the financial statements if it is believed to be probable that a loss has been incurred and the amount of the loss can be reasonably estimated. The company establishes a liability that is an estimate of amounts expected to be paid in the future for events that have already occurred. The company accrues the most likely amount or at least the minimum of the range of probable loss when a range of probable loss can be estimated. The accrued liabilities are based on management's judgment as to the probability of losses for asserted and unasserted claims and, where applicable, actuarially determined estimates. Accrual estimates are adjusted as additional information becomes known or payments are made. The amount of ultimate loss may differ from these estimates. Due to the inherent uncertainties associated with pending litigation or claims, the company cannot predict the outcome, nor, with respect to certain pending litigation or claims where no liability has been accrued, make a meaningful estimate of the reasonably possible loss or range of loss that could result from an unfavorable outcome. The company has no material accruals for pending litigation or claims for which accrual amounts are not disclosed below, nor are material losses deemed probable for such matters. It is reasonably possible, however, that an unfavorable outcome that exceeds the company's current accrual estimate, if any, for one or more of the matters described below could have a material adverse effect on the company's results of operations, financial position and cash flows.

Product Liability, Workers Compensation and Other Personal Injury Matters

The range of probable loss for product liability, workers compensation and other personal injury matters of the company's continuing operations at December 31, 2017, was approximately $237 million to $388 million on an undiscounted basis. The portion of these liabilities assumed in the 2006 merger with Fisher was recorded at its fair (present) value at the date of merger. The company's accrual for all such matters in total, including the discounted liabilities, was $220 million at December 31, 2017 (or $242 million undiscounted). The accrual includes estimated defense costs and is gross of estimated amounts due from insurers of $93 million at December 31, 2017 (or $107 million undiscounted) that are included in other assets in the accompanying balance sheet. The portion of these insurance assets assumed in the merger with Fisher was also recorded at its fair value at the date of merger. In addition to the above accrual, as of December 31, 2017, the company had a product liability accrual of $10 million (undiscounted) relating to divested businesses.

The assets and liabilities assumed at the Fisher merger date were ascribed a fair value based on the present value of expected future cash flows, using a discount rate equivalent to the risk free rate of interest for monetary assets with comparable maturities (weighted average discount rate of 4.67%). The discount on the liabilities of approximately $22 million and the discount on the assets of approximately $14 million (net discount $8 million) are being accreted to interest expense over the expected settlement period.

Although the company believes that the amounts accrued and estimated recoveries are probable and appropriate based on available information, including actuarial studies of loss estimates, the process of estimating losses and insurance recoveries involves a considerable degree of judgment by management and the ultimate amounts could vary materially. Insurance contracts do not relieve the company of its primary obligation with respect to any losses incurred. The collectability of amounts due from its insurers is subject to the solvency and willingness of the insurer

to pay, as well as the legal sufficiency of the insurance claims. Management monitors the payment history as well as the financial condition and ratings of its insurers on an ongoing basis.

Intellectual Property Matters

On June 6, 2004, Enzo Biochem, Enzo Life Sciences and Yale University filed a complaint against Life Technologies in United States District Court for the District of Connecticut. The plaintiffs allege patent infringement by Applera's labeled DNA

terminator products used in DNA sequencing and fragment analysis. The plaintiff sought damages for alleged willful infringement, attorneys' fees, costs, prejudgment interest, and injunctive relief. In November 2012, the jury awarded damages of $49 million. Prejudgment interest of $12 million was also granted. The $61 million judgment and interest was accrued by Life Technologies and the liability was assumed by the company as of the date of the acquisition. In March 2015 the United States Court of Appeals for the Federal Circuit vacated the judgment and returned the case to the District Court for further proceedings. In February 2016, the District Court granted the company's motion for summary judgment of non-infringement and entered judgment in its favor. Enzo appealed that decision to the Federal Circuit in March 2016. In August 2017, the Federal Circuit affirmed the District Court's judgment that the company's products at issue in the litigation do not infringe Enzo's patent. Enzo's right to appeal lapsed in the fourth quarter of 2017 and the company reversed the accrual as a reduction of restructuring and other costs in the accompanying income statement.

On May 26, 2010, Promega Corp. & Max-Planck-Gesellschaft Zur Forderung Der Wissenschaften EV filed a complaint against Life Technologies in the United States District Court for the Western District of Wisconsin. The plaintiffs allege patent infringement by sales and uses of Applied Biosystems' short tandem repeat DNA identification products outside the scope of a 2006 license agreement. The plaintiff sought damages for alleged willful infringement, attorneys' fees, costs, prejudgment interest, and injunctive relief. Although a jury initially found willful infringement and assessed damages at $52 million the District Court subsequently overturned the verdict on the grounds that the plaintiff had failed to prove infringement. The District Court entered judgment in favor of Life Technologies; and plaintiffs and Life Technologies filed cross-appeals with the United States Court of Appeals for the Federal Circuit. The $52 million award was accrued by Life Technologies and the liability was assumed by the company as of the date of the acquisition. On December 15, 2014, the Court of Appeals issued a decision invalidating four of the plaintiffs' patents, but finding infringement by Life Technologies of the remaining fifth patent. The Court of Appeals also ordered a new trial on damages in the District Court. Life Technologies' petition to the U.S. Supreme Court seeking review of the Court of Appeals' judgment was granted on June 27, 2016, and the case was stayed in the District Court pending the outcome of the Supreme Court's review. On February 22, 2017, the Supreme Court issued a decision reversing the Court of Appeals' judgment and remanding the case to the Court of Appeals for further proceedings in view of the Supreme Court's legal interpretation of the patent law statute in question. On November 13, 2017 the Court of Appeals issued a decision holding that Promega is not entitled to recover any damages and affirming the District Court's grant of judgment in favor of Life Technologies and denial of Promega's motion for a new trial. The Court of Appeals denied Promega's petition for rehearing on February 14, 2018, and Promega has 90 days therefrom to file a petition with the U.S. Supreme Court seeking review of the Court of Appeals' decision. The company has maintained the $52 million accrual, pending conclusion of this matter.

On June 3, 2013, Unisone Strategic IP filed a complaint against Life Technologies in the United States District Court for the Southern District of California alleging patent infringement by Life Technologies' supply chain management system software, which operates with product "supply centers" installed at customer sites. Plaintiff seeks damages for alleged willful infringement, attorneys' fees, costs, and injunctive relief. On August 24, 2017, Unisone filed an appeal from a decision by the Patent Trial and Appeal Board that found the challenged patent claims invalid.

Commercial Matters

On May 5, 2015, and February 12, 2016, the Academy of Allergy & Asthma in Primary Care and United Biologics, LLC d/b/a United Allergy Services, a provider of on-site services to physicians in the delivery of testing and treatment of allergies, filed a complaint against Phadia U.S. Inc. (a subsidiary of the company) and Thermo Fisher Scientific Inc., respectively, in the United States District Court for the Western District of Texas. The plaintiffs alleged various claims of anticompetitive activities in violation of antitrust laws, tortious interference with contracts and existing and prospective business relations, and civil conspiracy. The litigation was settled in December 2017 for a payment of an immaterial amount by the company.

Note 11. Comprehensive Income and Shareholders' Equity

Comprehensive Income (Loss)

Comprehensive income (loss) combines net income and other comprehensive items. Other comprehensive items represent certain amounts that are reported as components of shareholders' equity in the accompanying balance sheet.

In the fourth quarter of 2017, the company recorded an out of period adjustment to correct an error in the accounting for income taxes associated with the partial hedge of its net investment in a foreign operation in 2014 through the third quarter of 2017. The adjustment affected deferred income taxes and other comprehensive income and, in the aggregate, increased comprehensive income by $101 million for the year ended December 31, 2017. The adjustment does not have any impact on

the company's statements of income or cash flows. The company determined that the adjustment was not material to the consolidated financial statements for any previously reported annual or interim periods.

Changes in each component of accumulated other comprehensive items, net of tax are as follows:

(In millions)	Currency Translation Adjustment	Unrealized Gains (Losses) on Available-for-Sale Investments	Unrealized Losses on Hedging Instruments	Pension and Other Postretirement Benefit Liability Adjustment	Total
Balance at December 31, 2016	(2,343)	1	(57)	(237)	(2,636)
Other comprehensive income (loss) before reclassifications	588	(1)	—	23	610
Amounts reclassified from accumulated other comprehensive items	—	(1)	7	17	23
Net other comprehensive items	588	(2)	7	40	633
Balance at December 31, 2017	(1,755)	(1)	(50)	(197)	(2,003)

Shareholders' Equity

At December 31, 2017, the company had reserved 30 million unissued shares of its common stock for possible issuance under stock-based compensation plans.

Note 12. Fair Value Measurements and Fair Value of Financial Instruments

Fair Value Measurements

The company uses the market approach technique to value its financial instruments and there were no changes in valuation techniques during 2017. The company's financial assets and liabilities carried at fair value are primarily comprised of insurance contracts, investments in money market funds, derivative contracts, mutual funds holding publicly traded securities and other investments in unit trusts held as assets to satisfy outstanding deferred compensation and retirement liabilities; and acquisition-related contingent consideration.

The fair value accounting guidance requires that assets and liabilities carried at fair value be classified and disclosed in one of the following three categories:

Level 1: Quoted market prices in active markets for identical assets or liabilities that the company has the ability to access.

Level 2: Observable market based inputs or unobservable inputs that are corroborated by market data such as quoted prices, interest rates and yield curves.

Level 3: Inputs are unobservable data points that are not corroborated by market data.

The following tables present information about the company's financial assets and liabilities measured at fair value on a recurring basis as of December 31, 2017 and December 31, 2016:

(In millions)	December 31, 2017	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets				
Cash equivalents	$ 22	$ 22	$ —	$ —
Bank time deposits	2	2	—	—
Investments in mutual funds and other similar instruments	13	13	—	—
Warrants	2	—	2	—
Insurance contracts	116	—	116	—
Derivative contracts	10	—	10	—
Total Assets	$ 165	$ 37	$ 128	$ —
Liabilities				
Derivative contracts	$ 139	$ —	$ 139	$ —
Contingent consideration	35	—	—	35
Total Liabilities	$ 174	$ —	$ 139	$ 35

(In millions)	December 31, 2016	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets				
Cash equivalents	$ 65	$ 65	$ —	$ —
Bank time deposits	2	2	—	—
Investments in mutual funds and other similar instruments	15	15	—	—
Warrants	2	—	2	—
Insurance contracts	102	—	102	—
Derivative contracts	16	—	16	—
Total Assets	$ 202	$ 82	$ 120	$ —
Liabilities				
Derivative contracts	$ 122	$ —	$ 122	$ —
Contingent consideration	3	—	—	3
Total Liabilities	$ 125	$ —	$ 122	$ 3

The company determines the fair value of its insurance contracts by obtaining the cash surrender value of the contracts from the issuer. The fair value of derivative contracts is the estimated amount that the company would receive/pay upon liquidation of the contracts, taking into account the change in interest rates and currency exchange rates. The company determines the fair value of acquisition-related contingent consideration based on the probability-weighted discounted cash flows associated with such future payments. Changes to the fair value of contingent consideration are recorded in selling, general and administrative expense.

The notional amounts of derivative contracts outstanding, consisting of interest rate swaps and currency exchange contracts, totaled $6.02 billion and $6.70 billion at December 31, 2017 and December 31, 2016, respectively.

While certain derivatives are subject to netting arrangements with counterparties, the company does not offset derivative assets and liabilities within the consolidated balance sheet. The following tables present the fair value of derivative instruments in the consolidated balance sheet and statement of income.

	Fair Value – Assets		Fair Value – Liabilities	
(In millions)	December 31, 2017	December 31, 2016	December 31, 2017	December 31, 2016
Derivatives Designated as Hedging Instruments				
Interest rate swaps (a)	$ —	$ —	$ 124	$ 110
Derivatives Not Designated as Hedging Instruments				
Currency exchange contracts (b)	10	16	15	12

(a) The fair value of the interest rate swaps is included in the consolidated balance sheet under the caption other long-term liabilities.

(b) The fair value of the currency exchange contracts is included in the consolidated balance sheet under the captions other current assets or other accrued expenses.

	Gain (Loss) Recognized	
(In millions)	2017	2016
Derivatives Designated as Fair Value Hedges		
Interest rate swaps - effective portion	$ —	$ 21
Interest rate swaps - ineffective portion	(5)	(1)
Derivatives Not Designated as Hedging Instruments		
Currency exchange contracts		
Included in cost of revenues	$ (1)	$ (15)
Included in other expense, net	92	(99)

Gains and losses recognized on currency exchange contracts and the effective portion of interest rate swaps are included in the consolidated statement of income together with the corresponding, offsetting losses and gains on the underlying hedged transactions. Gains and losses recognized on the ineffective portion of interest rate swaps are included in other expense, net in the accompanying statement of income.

The company also uses foreign currency-denominated debt to partially hedge its net investments in foreign operations against adverse movements in exchange rates. The company's euro-denominated senior notes have been designated as, and are effective as, economic hedges of part of the net investment in a foreign operation. Accordingly, foreign currency transaction gains or losses due to spot rate fluctuations on the euro-denominated debt instruments are included in currency translation adjustment within other comprehensive income and shareholders' equity. In 2017 and 2016, pre-tax net (losses) gains of $(664) million and $172 million, respectively, from the euro-denominated notes were included in currency translation adjustment.

Cash Flow Hedge Arrangements

In 2015, the company entered into interest rate swap arrangements to mitigate the risk of interest rates rising prior to completion of a debt offering in 2016. Based on the company's conclusion that a debt offering was probable as a result of debt maturing in 2016 and that such debt would carry semi-annual interest payments over a 10-year term, the swaps hedged the cash flow risk for each of the semi-annual fixed-rate interest payments on $1.00 billion of principal amount of the planned fixed-rate debt issue. The hedge was terminated in advance of completing a debt offering in April 2016 (Note 9). The fair value of the hedge at that time, $46 million, net of tax, was classified as a

reduction to accumulated other comprehensive items and is being amortized to interest expense over the term of the debt.

Fair Value of Other Financial Instruments

The carrying value and fair value of the company's notes receivable and debt obligations are as follows:

	December 31, 2017		December 31, 2016	
(In millions)	Carrying Value	Fair Value	Carrying Value	Fair Value
Notes Receivable	$ 89	$ 93	$ 56	$ 59
Debt Obligations:				
Senior notes	$ 20,024	$ 20,639	$ 14,838	$ 15,184
Term loan	—	—	823	825
Commercial paper	960	960	953	953
Other	24	24	13	13
	$ 21,008	$ 21,623	$ 16,627	$ 16,975

The fair value of debt obligations was determined based on quoted market prices and on borrowing rates available to the company at the respective period ends which represent level 2 measurements.

Note 13. Supplemental Cash Flow Information

(In millions)	2017	2016	2015
Cash Paid For:			
Interest	$ 533	$ 458	$ 438
Income Taxes	$ 479	$ 663	$ 477
Non-cash Activities			
Declared but unpaid dividends	$ 61	$ 60	$ 61
Issuance of stock upon vesting of restricted stock units	$ 125	$ 127	$ 131
Fair value of investments contributed to defined benefit plans	$ —	$ 16	$ —

Cash, cash equivalents and restricted cash is included in the consolidated balance sheet as follows:

(In millions)	December 31, 2017	December 31, 2016
Cash and Cash Equivalents	$ 1,335	$ 786
Restricted Cash Included in Other Current Assets	24	18
Restricted Cash Included in Other Assets	2	7

Cash, Cash Equivalents and Restricted Cash	$ 1,361	$ 811

Amounts included in restricted cash represent funds held as collateral for bank guarantees and incoming cash in China awaiting government administrative clearance.

Note 14. Restructuring and Other Costs, Net

Restructuring and other costs in 2017 included continuing charges for headcount reductions and facility consolidations in an effort to streamline operations, including the closure and consolidation of operations within several facilities in the U.S., Europe and Asia; costs to achieve synergies related to acquisitions, including severance and abandoned facility costs; third-party acquisition transaction and integration costs primarily associated with the acquisitions of FEI and Patheon; sales of inventories revalued at the date of acquisition; charges to conform the accounting policies of Patheon to the company's accounting policies; charges for changes in estimates of acquisition contingent consideration; hurricane response/impairment costs; net charges for the settlement/curtailment of retirement plans; and net credits for litigation matters. In 2017, severance actions associated with facility consolidations and cost reduction measures affected less than 2% of the company’s workforce.

Restructuring and other costs in 2016 included continuing charges for headcount reductions and facility consolidations in an effort to streamline operations, including the closure and consolidation of operations within several facilities in the U.S., Europe and Asia; third-party acquisition transaction and integration costs primarily associated with the acquisitions of FEI and Affymetrix; sales of inventories revalued at the date of acquisition; costs to conform the accounting policies of FEI and Affymetrix to the company's accounting policies; costs to achieve synergies related to acquisitions, including severance and abandoned facility costs; and net charges for environmental and litigation-related matters. These charges were partially offset by gains on sales of assets. In 2016, severance actions associated with facility consolidations and cost reduction measures affected less than 3% of the company’s workforce.

Restructuring and other costs in 2015 primarily included continuing charges for headcount reductions and facility consolidations in an effort to streamline operations, including the closure and consolidation of operations within several facilities in the U.S., Europe and Asia; charges associated with product liability litigation and litigation at acquired businesses; impairment of acquired technology in development; and third-party acquisition transaction and integration costs related to recent acquisitions. These charges were partially offset by gains on the sale of a small product line and real estate, and, to a lesser extent, changes in estimates of contingent consideration. In 2015, severance actions associated with facility consolidations and cost reduction measures affected approximately 2% of the company’s workforce.

As of February 28, 2018, the company has identified restructuring actions that will result in additional charges of approximately $105 million, primarily in 2018 which will be recorded when specified criteria are met, such as communication of benefit arrangements and abandonment of leased facilities.

2017

During 2017, the company recorded net restructuring and other costs by segment as follows:

(In millions)	Cost of Revenues	Selling, General and Administrative Expenses	Restructuring and Other Costs, Net	Total
Life Sciences Solutions	$ 1	$ 29	$ (16)	$ 14
Analytical Instruments	31	(2)	30	59
Specialty Diagnostics	1	(2)	39	38
Laboratory Products and Services	90	61	41	192
Corporate	—	(8)	3	(5)
	$ 123	$ 78	$ 97	$ 298

The principal components of net restructuring and other costs by segment are as follows:

Life Sciences Solutions

In 2017, the Life Sciences Solutions segment recorded $14 million of net restructuring and other charges. The segment recorded $29 million of charges to selling, general and administrative expenses, principally for changes in estimates of acquisition contingent consideration. The segment also recorded $16 million of restructuring and other income, net, including $64 million of net credits principally for pre-acquisition litigation-related matters, and, to a lesser extent, net gains on the settlement of retirement plans. These credits were largely offset by $48 million of cash restructuring costs, including $23 million of severance and related costs primarily to achieve acquisition synergies, and $25 million of abandoned facilities costs primarily for the consolidation of facilities in the U.S.

Analytical Instruments

In 2017, the Analytical Instruments segment recorded $59 million of net restructuring and other charges. The segment recorded charges to cost of revenues of $31 million for the sales of inventory revalued at the date of acquisition, as well as $30 million of restructuring and other costs, primarily for severance and other costs to achieve acquisition synergies, as well as charges for the settlement of retirement plans.

Specialty Diagnostics

In 2017, the Specialty Diagnostics segment recorded $38 million of net restructuring and other charges, principally charges for litigation-related matters, and, to a lesser extent, cash costs for employee severance and other costs associated with headcount reductions in the U.S. and Europe.

Laboratory Products and Services

In 2017, the Laboratory Products and Services segment recorded $192 million of net restructuring and other charges. The segment recorded charges to cost of revenues of $90 million, including $33 million to conform the accounting policies of Patheon to the company's accounting policies and $55 million for sales of inventory revalued at the date of acquisition. The segment also recorded $61 million of charges to selling, general, and administrative expenses, including $55 million for third-party acquisition transaction costs, as well as $6 million to conform the accounting policies of Patheon to the company's accounting policies. The segment also recorded $41 million of restructuring and other costs, primarily for employee severance and compensation due at Patheon on the date of acquisition, and, to a lesser extent, hurricane response/impairment charges.

Corporate

In 2017, the company recorded $5 million of net restructuring and other income, principally $8 million of income from favorable results of product liability litigation, partially offset by charges for the settlement of a retirement plan and severance at its corporate operations.

2016

During 2016, the company recorded net restructuring and other costs by segment as follows:

(In millions)	Cost of Revenues	Selling, General and Administrative Expenses	Restructuring and Other Costs, Net	Total
Life Sciences Solutions	$ 31	$ 36	$ 88	$ 155
Analytical Instruments	63	46	68	177
Specialty Diagnostics	—	—	15	15
Laboratory Products and Services	8	1	17	26
Corporate	—	21	1	22
	$ 102	$ 104	$ 189	$ 395

Life Sciences Solutions

In 2016, the Life Sciences Solutions segment recorded $155 million of net restructuring and other charges. The segment recorded charges to cost of revenues of $31 million, including $27 million for sales of inventories revalued at the date of acquisition and $4 million to conform the accounting policies of Affymetrix to the company's accounting policies. The segment recorded $36 million of charges to selling, general and administrative expenses, including $34 million of third-party transaction and integration costs primarily related to the acquisition of Affymetrix, $4 million for accelerated depreciation at facilities closing due to real estate consolidation, offset in part by credits of $2 million from changes in estimates of contingent acquisition consideration. In addition, the segment recorded $78 million of cash restructuring costs, including $60 million of severance and related costs primarily to achieve acquisition synergies, and $18 million of abandoned facilities costs principally for the consolidation of

facilities in the U.S. The segment also recorded $10 million of other costs, net, primarily for charges associated with litigation-related matters at acquired businesses.

Analytical Instruments

In 2016, the Analytical Instruments segment recorded $177 million of net restructuring and other charges. The segment recorded charges to cost of revenues of $63 million, including $21 million to conform the accounting policies of FEI to the

company's accounting policies and $42 million for the sales of inventory revalued at the date of acquisition. The segment recorded $46 million of charges to selling, general, and administrative expense, including $38 million of third-party transaction costs related to the acquisition of FEI, as well as $9 million of charges to conform the accounting policies of FEI to the company's accounting policies. The segment also recorded $68 million of cash restructuring costs primarily for severance obligations payable to former FEI executives and charges associated with abandoned facilities, including remediation and other closure costs of a manufacturing facility in the U.S.

Specialty Diagnostics

In 2016, the Specialty Diagnostics segment recorded $15 million of net restructuring and other charges. These costs were principally comprised of $10 million for charges associated with litigation-related matters and $6 million of cash restructuring costs for severance and other costs associated with headcount reductions and facility consolidations. The segment also recorded $1 million of other income, net, primarily gains on the sale of real estate, offset in part by charges for the settlement of retirement plans.

Laboratory Products and Services

In 2016, the Laboratory Products and Services segment recorded $26 million of net restructuring and other charges. The segment recorded charges to cost of revenues of $8 million, including $6 million for sales of inventories revalued at the date of acquisition, and $2 million for accelerated depreciation at facilities closing due to real estate consolidation. The segment recorded $11 million of cash restructuring costs, primarily for employee severance and other costs associated with headcount reductions and facility consolidations. In addition, the segment recorded $8 million of charges for an increase in environmental remediation cost estimates associated with a Superfund site in the U.S., offset in part by $1 million of gains on the settlement of litigation.

Corporate

In 2016, the company recorded $22 million of restructuring and other costs, principally within selling, general, and administrative expenses, including $17 million of charges for product liability litigation and $4 million of accelerated depreciation on information systems to be abandoned due to integration synergies. The segment also recorded $1 million of restructuring charges for severance and other costs associated with facility consolidation at its corporate operations.

2015

During 2015, the company recorded net restructuring and other costs by segment as follows:

(In millions)	Cost of Revenues	Selling, General and Administrative Expenses	Restructuring and Other Costs, Net	Total
Life Sciences Solutions	$ 2	$ 13	$ 65	$ 80
Analytical Instruments	—	—	27	27
Specialty Diagnostics	1	—	9	10
Laboratory Products and Services	6	6	13	25
Corporate	—	27	2	29
	$ 9	$ 46	$ 116	$ 171

The components of net restructuring and other costs by segment are as follows:

Life Sciences Solutions

In 2015, the Life Sciences Solutions segment recorded $80 million of net restructuring and other charges. The segment recorded charges to cost of revenues of $2 million for accelerated depreciation at facilities closing due to real estate consolidation and sales of inventories revalued at the date of acquisition. The segment also recorded $13 million of charges to selling, general and administrative expenses, including $6 million of third-party transaction and

integration costs related to the acquisitions of Life Technologies and Advanced Scientifics, as well as $9 million for accelerated depreciation at facilities closing due to real estate consolidation. These charges were partially offset by $2 million of income for changes in estimates of contingent consideration. In addition, the segment recorded $65 million of restructuring and other costs, net, $40 million of which were cash costs. These costs included $5 million of cash compensation contractually due to employees of an acquired business on the date of acquisition; $1 million of charges associated with a previous sale of a business; and $35 million of costs

primarily associated with headcount reductions and facility consolidations in the U.S. and Europe, including $24 million for severance, $4 million of abandoned facility costs, and $7 million of other cash costs, including retention and outplacement costs. The segment also recorded $20 million of charges for pre-acquisition litigation related matters and $15 million of impairment of acquired technology in development. These costs were partially offset by a $8 million gain on the sale of a small product line and a $3 million gain on the sale of real estate.

Analytical Instruments

In 2015, the Analytical Instruments segment recorded $27 million of net restructuring and other charges, $22 million of which were cash costs primarily associated with abandoned facilities, including remediation and other closure costs, and, to a lesser extent, headcount reductions. The segment also recorded $5 million of non-cash expense primarily for real estate writedowns of abandoned facilities held for sale.

Specialty Diagnostics

In 2015, the Specialty Diagnostics segment recorded $10 million of net restructuring and other charges. The segment recorded charges to cost of revenues of $1 million for accelerated depreciation at facilities closing due to real estate consolidation and $9 million of restructuring and other costs, net, primarily cash costs for employee severance and other costs associated with headcount reductions, as well as consolidation of facilities in the U.S. and Europe.

Laboratory Products and Services

In 2015, the Laboratory Products and Services segment recorded $25 million of net restructuring and other charges. The segment recorded charges to cost of revenues of $6 million for sales of inventories revalued at the date of acquisition, as well as $6 million of charges to selling, general and administrative expenses, primarily associated with third party transaction costs related to the acquisition of Alfa Aesar. In addition, the segment recorded $8 million of cash restructuring costs primarily for employee severance and other costs associated with headcount reductions. The segment also recorded $5 million of charges primarily associated with a litigation-related matter of a divested business.

Corporate

In 2015, the company recorded $29 million of restructuring and other costs, principally within selling, general and administrative expenses, including $19 million of charges for product liability litigation and $8 million of accelerated depreciation on information systems to be abandoned due to integration synergies. The segment also recorded $2 million of cash restructuring costs primarily for severance at its corporate operations.

The following table summarizes the cash components of the company's restructuring plans. The non-cash components and other amounts reported as restructuring and other costs, net, in the accompanying statement of income have been summarized in the notes to the tables. Accrued restructuring costs are included in other accrued expenses in the accompanying balance sheet.

(In millions)	Severance	Abandonment of Excess Facilities	Other (a)	Total
Balance at December 31, 2014	$ 38	$ 10	$ 6	$ 54
Costs incurred in 2015 (c)	57	19	14	90
Reserves reversed (b)	(12)	(1)	(2)	(15)
Payments	(67)	(15)	(15)	(97)
Currency translation	(1)	—	—	(1)
Balance at December 31, 2015	15	13	3	31
Costs incurred in 2016 (d)	109	46	12	167
Reserves reversed (b)	(2)	—	(1)	(3)
Payments	(83)	(27)	(12)	(122)
Currency translation	(1)	—	—	(1)
Balance at December 31, 2016	38	32	2	72
Costs incurred in 2017 (e)	62	27	17	106
Reserves reversed (b)	(9)	—	—	(9)
Payments	(62)	(19)	(12)	(93)
Currency translation	1	—	(1)	—
Balance at December 31, 2017	$ 30	$ 40	$ 6	$ 76

(a) Other includes cash charges to monetize certain equity awards held by employees of Life Technologies at the date of acquisition, relocation and moving expenses associated with facility consolidations, as well as employee retention costs which are accrued ratably over the period through which employees must work to qualify for a payment.

(b) Represents reductions in cost of plans.

(c) Excludes $25 million of provision for losses on litigation-related matters; $15 million of impairment of acquired technology in development; a $8 million gain on the sale of a product line; $5 million of cash compensation contractually due to employees of an acquired business on the date of acquisition; $1 million of charges associated with a previous sale of a business; and an aggregate of $1 million of non-cash charges, net.

(d) Excludes $24 million of provision for losses on litigation-related matters; $8 million of provision for environmental remediation; $5 million of net gains on the sale of real estate; and an aggregate of $3 million of non-cash income, net.

(e) Excludes $27 million of net credits associated with litigation-related matters, and $27 million of other restructuring charges, net, primarily for hurricane response/impairment, charges associated with the settlement/curtailment of retirement plans, and non-cash compensation due at an acquired business.

The company expects to pay accrued restructuring costs as follows: severance, employee-retention obligations and other costs, primarily through 2018; and abandoned-facility payments, over lease terms expiring through 2027.

Note 15. Unaudited Quarterly Information

	2017			
(In millions except per share amounts)	First (a)	Second (b)	Third (c)	Fourth (d)
Revenues	$ 4,765	$ 4,990	$ 5,116	$ 6,047
Gross Profit	2,192	2,283	2,300	2,670
Net Income	551	612	534	528
Earnings per Share:				
Basic	1.41	1.57	1.35	1.32
Diluted	1.40	1.56	1.34	1.30
Cash Dividend Declared per Common Share	0.15	0.15	0.15	0.15

Amounts reflect aggregate restructuring and other items, net, as follows:

(a) Costs of $86 million.

(b) Costs of $30 million.

(c) Costs of $131 million.

(d) Costs of $51 million.

	2016			
(In millions except per share amounts)	First (a)	Second (b)	Third (c)	Fourth (d)
Revenues	$ 4,295	$ 4,535	$ 4,491	$ 4,953
Gross Profit	1,958	2,078	2,054	2,279
Net Income	402	517	473	630
Earnings per Share:				
Basic	1.02	1.31	1.20	1.60
Diluted	1.01	1.30	1.19	1.59
Cash Dividend Declared per Common Share	0.15	0.15	0.15	0.15

Amounts reflect aggregate restructuring and other items, net, as follows:

(a) Costs of $90 million.

(b) Costs of $57 million.

(c) Costs of $150 million.

(d) Costs of $98 million.