Notes to the Income Statements

6. Net sales

Total reported net sales for 2018 amounted to €39,586 million, rising by €4,571 million, or 13.1%, compared with 2017. They were derived primarily from product deliveries. Breakdowns of net sales by segment and geographical area are given in the overview provided in Note [4].

Sales of €667 million were recognized in 2018 from performance obligations already satisfied in previous years. These sales primarily resulted from adjustments to refund liabilities for expected product returns, from rebates to be granted and from right-to-use licenses granted against sales-based royalties. Contractually agreed sales volumes pertaining to performance obligations not yet satisfied as of December 31, 2018, are expected to be reclassified to profit or loss as follows, taking into account anticipated sales deductions:

B 6/1

Allocation of Transaction Price to Unfulfilled Performance Obligations

€ million	
Transaction price outstanding as of Dec. 31, 2018	**2,107**
of which to be recognized within 1 year	281
of which to be recognized between 1 and 2 years	266
of which to be recognized between 2 and 3 years	220
of which to be recognized between 3 and 4 years	163
of which to be recognized between 4 and 5 years	155
of which to be recognized after more than 5 years	1,022

The description above only accounts for customer contracts with an original contractual term of more than one year.

The change in contract liabilities between January 1, 2018, and December 31, 2018, was due to the following factors:

B 6/2

Roll Forward of Contract Liabilities

€ million	
Contract liability balance as of Jan. 1, 2018	**1,530**
Changes due to business combinations	418
Additions	5,845
Revenue recognized in the current year that was included in the contract liability balance as of Jan. 1	(770)
Revenue recognized in the current year that was not included in the contract liability balance as of Jan. 1	(2,782)
Exchange differences	(20)
Contract liability balance as of Dec. 31, 2018	**4,221**

Contract liabilities mainly result from advance payments by customers for product deliveries and are predominantly recognized as sales within one year. In connection with the acquisition of Monsanto, certain Crop Science businesses were transferred to BASF. Portions of the purchase price were recognized as contract liabilities since certain payment components were not yet earned. Further significant amounts of contract liabilities comprised milestone payments already received for right-to-access licenses. The contract liabilities relating to these two factors will be recognized as sales over a period of more than five years.

7. Other operating income

Other operating income was comprised as follows:

B 7/1

Other Operating Income

€ million	2017	2018
Gains on retirements of noncurrent assets	173	4,310
Reversal of impairment losses on receivables	23	184
Reversals of unutilized provisions	26	12
Gains from derivatives	291	217
Miscellaneous operating income	351	334
Total	**864**	**5,057**

Gains on retirements of noncurrent assets included proceeds of €4.1 billion from the sale of certain Crop Science businesses to BASF in connection with the acquisition of Monsanto (Crop Science segment). Furthermore, the divestment of several noncore brands at Consumer Health resulted in a gain of €49 million. The sale of a property in Berlin resulted in a gain of €41 million (Pharmaceuticals segment). The sale of the U.S. prescription dermatology business to LEO Pharma A/S, Ballerup, Denmark, generated a further gain of €25 million (Consumer Health segment).

Income from the reversal of impairment losses on receivables primarily resulted from the reversal of impairment losses under IFRS 9 and from improved receivables management in Brazil.

Within miscellaneous operating income, the proportionate assumption of costs by Janssen Research & Development, LLC, United States, a subsidiary of Johnson & Johnson, in connection with a development collaboration resulted in income of €189 million (Pharmaceuticals segment).

In the previous year, gains on retirements of noncurrent assets included a gain of €81 million from the sale of trademark rights (Consumer Health segment). Furthermore, the sale of capitalized transfer rights by Bayer 04 Leverkusen Fußball GmbH, Germany, resulted in a gain of €49 million (All Other Segments).

8. Other operating expenses

Other operating expenses were comprised as follows:

B 8/1

Other Operating Expenses

€ million	2017	2018
Losses on retirements of noncurrent assets	(39)	(35)
Impairment losses on receivables	(139)	(199)
Expenses related to significant legal risks	(258)	(677)
Losses from derivatives	(258)	(209)
Miscellaneous operating expenses	(254)	(1,874)
Total	**(948)**	**(2,994)**

Of the impairment losses on receivables, €75 million (2017: €74 million) pertained to past-due receivables in Brazil.

Miscellaneous operating expenses included €1,547 million in impairment losses recognized on the goodwill of Consumer Health, along with donations to charitable causes (all segments) and subsidies for patient assistance programs with government agencies and partners of health care systems (Pharmaceuticals segment) in the amount of €123 million (2017: €52 million).

Information on the legal risks can be found in Note [29].

9. Personnel expenses and employee numbers

Personnel expenses for continuing operations rose by €2,020 million to €11,548 million in 2018 (2017: €9,528 million). The change was mainly due to the higher headcount in connection with the acquisition of Monsanto.

B 9/1

Personnel Expenses

€ million	2017	2018
Salaries	7,567	9,192
Social expenses and expenses for pensions and other benefits	1,961	2,356
of which for defined contribution pension plans	488	495
of which for defined benefit and other pension plans	445	429
Total	**9,528**	**11,548**

The interest portion of the allocation to personnel-related provisions – mainly for pensions and other post-employment benefits – is included in the financial result under other financial expenses (Note [10.3]).

The average numbers of employees, classified by corporate function, were as shown in the table below:

B 9/2

Employees

	2017	2018
Production	39,298	44,734
Marketing and distribution	37,147	40,295
Research and development	13,958	16,538
General administration	9,359	9,271
Total	**99,762**	**110,838**
Apprentices	1,918	1,823

The number of employees on either permanent or temporary contracts is stated in full-time equivalents (FTE), with part-time employees included on a pro-rated basis in line with their contractual working hours. The figures do not include apprentices.

10. Financial result

The financial result for 2018 was minus €1,596 million (2017: minus €1,326 million), comprising equity-method income of €68 million (2017: €20 million), financial expenses of €2,574 million (2017: €1,635 million) and financial income of €910 million (2017: €289 million). Details of the components of the financial result are provided in the following sections.

10.1 Income (loss) from investments in affiliated companies

The net income (loss) from investments in affiliated companies was comprised as follows:

B 10.1/1

Income (Loss) from Investments in Affiliated Companies

€ million	2017	2018
Net income (loss) from investments accounted for using the equity method (equity-method income/loss)	20	68
Expenses		
Losses from the sale of investments in affiliated companies	(1)	–
Miscellaneous expenses from investments in affiliated companies	(1)	(459)
Income		
Gains from the sale of investments in affiliated companies	5	304
Miscellaneous income from investments in affiliated companies	7	–
Total	**30**	**(87)**

Income from investments in affiliated companies accounted for using the equity method primarily comprised equity-method income of €103 million (2017: €51 million) from the interest in Covestro, which until May 2018 was accounted for in the Bayer Group consolidated financial statements as an associate using the equity method. The other main components of this item were equity-method losses of €26 million (2017: €15 million) from the BlueRock joint ventures and €22 million (2017: €16 million) from the Casebia Group.

Miscellaneous expenses from investments in affiliated companies included changes in the fair value of the remaining interest in Covestro, which has been presented as an equity instrument since May 2018.

Gains from the sale of investments in affiliated companies included the income from the sale of our interest in Covestro AG, which was accounted for using the equity method.

Further details of the companies accounted for using the equity method are given in Note [16].

10.2 Net interest expense

The net interest expense was comprised as follows:

B 10.2/1

Net Interest Expense

€ million	2017	2018
Interest and similar expenses	**(685)**	**(1,386)**
of which interest expense relating to nonfinancial liabilities	(54)	(92)
Interest and similar income	**272**	**321**
of which interest income relating to nonfinancial assets	96	65
Total	**(413)**	**(1,065)**

The change in the liability of a redeemable noncontrolling interest (IAS 32) is reflected in interest income or expense. In 2018, a €3 million (2017: €49 million) increase in this liability was recognized as interest expense.

10.3 Other financial income and expenses

Other financial income and expenses were comprised as follows:

B 10.3/1

Other Financial Income and Expenses

€ million	2017	2018
Expenses		
Interest portion of interest-bearing provisions	(189)	(202)
Exchange gain (loss)	(326)	(271)
Miscellaneous financial expenses	(433)	(256)
Income		
Miscellaneous financial income	5	285
Total	**(943)**	**(444)**

The interest portion of noncurrent provisions comprised €168 million (2017: €191 million) in interest expense for pension and other post-employment benefit provisions and minus €34 million (2017: €2 million) in effects of interest expense and interest-rate fluctuations for other provisions and corresponding overfunding. The interest expense for pension and other post-employment benefit provisions included €584 million (2017: €539 million) for the unwinding of discount on the present value of the defined benefit obligation and €416 million (2017: €348 million) in interest income from plan assets.

The miscellaneous financial expenses included €124 million (2017: €210 million) in commitment fees and other fees related to the syndicated bank financing for the acquisition of Monsanto. The €230 million in positive fair value changes (2017: €172 million in negative fair value changes) of the debt instruments (exchangeable bond) issued in June 2017 was recognized in miscellaneous financial income.

11. Taxes

The breakdown of tax expenses by origin was as follows:

B 11/1

Tax Expense by Origin

€ million	2017	2017 Of which income taxes	2018	2018 Of which income taxes
Taxes paid or accrued				
Current income taxes				
Germany	(794)	(794)	(1,210)	(1,210)
Other countries	(737)	(737)	(1,329)	(1,329)
Other taxes				
Germany	(87)		(75)	
Other countries	(118)		(162)	
	(1,736)	**(1,531)**	**(2,776)**	**(2,539)**
Deferred taxes				
from temporary differences	70	70	2,058	2,058
from tax loss and interest carryforwards and tax credits	132	132	(126)	(126)
	202	**202**	**1,932**	**1,932**
Total	**(1,534)**	**(1,329)**	**(844)**	**(607)**

Other taxes mainly included land, vehicle and other indirect taxes and are reflected in the respective functional cost items.

The deferred tax assets and liabilities were allocable to the following items in the statements of financial position:

B 11/2

Deferred Tax Assets and Liabilities

€ million	Dec. 31, 2017 Deferred tax assets	Dec. 31, 2017 Deferred tax liabilities	Dec. 31, 2018 Deferred tax assets	Dec. 31, 2018 Deferred tax liabilities
Intangible assets	799	1,469	860	6,995
Property, plant and equipment	79	323	451	882
Financial assets	204	81	158	193
Inventories	1,117	15	1,405	214
Receivables	60	464	154	568
Other assets	39	2	177	176
Provisions for pensions and other post-employment benefits	2,520	367	2,792	408
Other provisions	610	64	1,580	54
Liabilities	534	101	831	285
Tax loss and interest carryforwards	486	–	540	–
Tax credits	200	–	483	–
	6,648	**2,886**	**9,431**	**9,775**
of which noncurrent	5,194	2,214	7,159	8,715
Set-off	(1,733)	(1,733)	(5,154)	(5,154)
Total	**4,915**	**1,153**	**4,278**	**4,621**

The use of tax loss carryforwards reduced current income taxes in 2018 by €157 million (2017: €47 million). The use of tax credits reduced current income taxes by €78 million (2017: €16 million).

Of the total tax loss and interest carryforwards of €8,677 million, including interest carryforwards of €174 million (2017: €6,443 million, including interest carryforwards of €148 million), an amount of €4,254 million, including interest carryforwards of €0 million (2017: €2,890 million, including interest carryforwards of €1 million) is expected to be usable within a reasonable period. The increase in tax loss and interest carryforwards mainly resulted from the transfer of tax loss carryforwards from Monsanto, and from impairments. Deferred tax assets of €540 million (2017: €486 million) were recognized for the amount of tax loss and interest carryforwards expected to be usable.

The use of €4,442 million of tax loss and interest carryforwards, including interest carryforwards of €174 million (2017: €3,553 million, including interest carryforwards of €147 million) was subject to legal or economic restrictions. Consequently, no deferred tax assets were recognized for this amount. If these tax loss and interest carryforwards had been fully usable, deferred tax assets of €378 million (2017: €351 million) would have been recognized.

Tax credits of €509 million were recognized in 2018 (2017: €200 million) as deferred tax assets. The increase in tax credits was mainly due to the acquisition of Monsanto. The use of €32 million (2017: €28 million) of tax credits was subject to legal or economic restrictions. Consequently, no deferred tax assets were recognized for this amount.

B 11/3

Expiration of Unusable Tax Credits and of Tax Loss and Interest Carryforwards

	Tax credits		Tax loss and interest carryforwards	
€ million	Dec. 31, 2017	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2018
Within one year	4	1	17	22
Within two years	–	1	15	105
Within three years	–	2	114	222
Within four years	1	2	28	91
Within five years	19	–	70	69
Thereafter	4	26	3,309	3,913
Total	**28**	**32**	**3,553**	**4,422**

In 2018, subsidiaries that reported losses for 2018 or 2017 recognized net deferred tax assets totaling €1,487 million (2017: €2,303 million) from temporary differences and tax loss carryforwards. These assets were considered to be unimpaired because the companies concerned were expected to generate taxable income in the future.

Deferred tax liabilities of €44 million were recognized in 2018 (2017: €22 million) for planned dividend payments by subsidiaries. Deferred tax liabilities were not recognized for differences on €15,827 million (2017: €18,272 million) of retained earnings of subsidiaries because these earnings are to be reinvested for an indefinite period.

The reconciliation of expected to reported income tax expense (2018: €52 million; 2017: €246 million) and of the expected to the effective tax rate for the Group was as follows:

B 11/4

Reconciliation of Expected to Actual Income Tax Expense

	2017		2018	
	€ million	%	€ million	%
Expected income tax expense[1] and expected tax rate	**1,083**	**23.7**	**555**	**23.9**
Reduction in taxes due to tax-free income				
Income related to the operating business	(135)	(3.0)	(216)	(9.3)
Income from affiliated companies and divestment proceeds	(16)	(0.3)	(164)	(7.1)
First-time recognition of previously unrecognized deferred tax assets on tax loss and interest carryforwards	(31)	(0.7)	(58)	(2.5)
Use of tax loss and interest carryforwards on which deferred tax assets were not previously recognized	(4)	(0.1)	(11)	(0.5)
Increase in taxes due to non-tax-deductible expenses				
Expenses related to the operating business	168	3.7	215	9.3
Impairment losses on investments in affiliated companies	–	–	14	0.6
New tax loss and interest carryforwards unlikely to be usable	69	1.5	64	2.8
Existing tax loss and interest carryforwards on which deferred tax assets were previously recognized but which are unlikely to be usable	1	–	76	3.3
Tax income (–) and expenses (+) relating to other periods	(128)	(2.8)	(42)	(1.8)
Tax effects of changes in tax rates	384	8.4	(208)	(9.0)
Other tax effects	(62)	(1.4)	382	16.5
Actual income tax expense and effective tax rate	**1,329**	**29.0**	**607**	**26.2**

[1] Expected income tax expense is calculated by applying an expected weighted average tax rate to the pre-tax income of the Group. This average rate was determined on the basis of expected tax rates for the individual Group companies.

The reported tax expense contains a one-time effect in the amount of €175 million that is due to the integration of Monsanto into Bayer's corporate structures, along with an amount of €140 million resulting from the impairment losses recognized on the goodwill of Consumer Health. The reported tax expense for 2017 contained one-time effects of €455 million in connection with the tax reform in the United States (€409 million from changes in the tax rate and €46 million due to prior-period tax expense).

12. Income/losses attributable to noncontrolling interest

Income attributable to noncontrolling interest amounted to €16 million (2017: €791 million). Losses attributable to noncontrolling interest amounted to €0 million (2017: €33 million). This income primarily related to BCS Limited, India. The income and losses in the prior year were mainly attributable to Covestro.

13. Earnings per share

Earnings per share are determined according to IAS 33 by dividing the net income for the period attributable to Bayer AG stockholders by the weighted average number of shares. As no dilutive financial instruments were in circulation at the end of the reporting period, diluted earnings per share were equivalent to basic earnings per share.

In April 2018, the Republic of Singapore subscribed to 31 million new Bayer shares through a subsidiary, for total gross proceeds of €3 billion. The subscription rights of existing stockholders were excluded from this capital increase. In June 2018, a capital increase with subscription rights for existing stockholders was implemented, raising around €6 billion in net proceeds. Approximately 74.6 million new shares were issued.

In November 2016, Bayer placed €4 billion in mandatory convertible notes without granting subscription rights to existing stockholders of the company. According to IAS 33.23, the weighted average number of shares increases as soon as the notes contract is signed, and this increase must be taken into account in calculating earnings per share. The new weighted average number of shares is based on the maximum conversion ratio resulting from the currently applicable minimum conversion price of €83.99. In accordance with the terms, the minimum conversion price had to be adjusted following the payment of the dividend and the capital increase with subscription rights. An adjustment is not undertaken for financing expenses incurred in connection with the mandatory convertible notes because the interest component was recognized outside profit or loss when the notes were placed.

Further details of the mandatory convertible notes and capital increases are provided in Note [21].

B 13/1

Earnings per Share

	€ million		Earnings per share (€)	
	2017	2018	2017	2018
Income after income taxes (attributable to Bayer AG stockholders)	**7,336**	**1,695**	**8.29**	**1.80**
of which income after income taxes from continuing operations (attributable to Bayer AG stockholders)	3,249	1,695	3.67	1.80
of which income after income taxes from discontinued operations (attributable to Bayer AG stockholders)	4,087	–	4.62	–
Weighted average number of shares[1]	**885,186,889**	**940,754,504**		

[1] The weighted average number of shares was restated for all periods prior to June 2018 to reflect the effect of the bonus component of the subscription rights issued for the June 2018 capital increase.

Notes to the Statements of Financial Position

14. Goodwill and other intangible assets

Changes in intangible assets in 2018 were as follows:

B 14/1

Changes in Intangible Assets

€ million	Acquired goodwill	Patents and technol-ogies	Trade-marks	Marketing and distribution rights	Production rights	R&D projects	Other rights and advance payments	Total
Cost of acquisition or generation, December 31, 2017	**14,751**	**12,861**	**10,453**	**1,911**	**1,923**	**1,044**	**1,564**	**44,507**
Acquisitions	24,503	17,152	3,941	845	11	4,637	360	51,449
Capital expenditures	–	46	–	358	–	53	243	700
Retirements	–	(26)	(7)	(55)	–	(149)	(41)	(278)
Transfers	–	3	–	334	–	(280)	(57)	–
Transfers (IFRS 5)	(318)	(273)	(40)	(17)	(76)	(109)	(22)	(855)
Divestments/Changes in scope of consolidation	–	–	(4)	–	–	–	(2)	(6)
Inflation adjustment (IAS 29)	20	6	–	1	–	–	6	33
Exchange differences	737	498	299	50	(1)	126	24	1,733
December 31, 2018	**39,693**	**30,267**	**14,642**	**3,427**	**1,857**	**5,322**	**2,075**	**97,283**
Accumulated amortization and impairments, December 31, 2017	**–**	**9,638**	**4,041**	**1,283**	**1,836**	**117**	**1,167**	**18,082**
Retirements	–	(23)	(10)	(31)	–	(149)	(27)	(240)
Amortization and impairment losses	1,547	1,300	1,477	149	23	65	202	4,763
Amortization	–	1,300	429	138	23	–	200	2,090
Impairment losses	1,547	–	1,048	11	–	65	2	2,673
Impairment loss reversals	–	–	–	–	–	–	–	–
Transfers	–	–	–	–	–	46	(46)	–
Transfers (IFRS 5)	–	(230)	(29)	(8)	(76)	–	(24)	(367)
Divestments/Changes in scope of consolidation	–	–	3	–	–	–	–	3
Inflation adjustment (IAS 29)	–	6	–	1	–	–	5	12
Exchange differences		47	56	24	(1)	–	12	138
December 31, 2018	**1,547**	**10,738**	**5,538**	**1,418**	**1,782**	**79**	**1,289**	**22,391**
Carrying amounts, December 31, 2018	**38,146**	**19,529**	**9,104**	**2,009**	**75**	**5,243**	**786**	**74,892**
Carrying amounts, December 31, 2017	**14,751**	**3,223**	**6,412**	**628**	**87**	**927**	**397**	**26,425**

In the Consumer Health segment, an impairment loss of €1,547 million was recognized on goodwill due especially to a further increase in competition, challenges posed by the transformation of the Consumer Health business as a result of changes in consumer behavior, and a higher cost of capital. Against this backdrop, impairment losses were also recognized on other intangible assets, primarily allergy brands (Claritin™ €584 million, Aerius™ €37 million) and cold medicines (Afrin™ €292 million) acquired in 2014 from Merck & Co. We also recognized impairment losses on skincare brands (Kang Wang™ €78 million and Pi Kang Wang™ €43 million) acquired in 2014 from Dihon Pharmaceutical Group Co. Ltd.

In the Pharmaceuticals segment, impairment losses were recognized in connection with the termination of research and development projects, primarily in the field of ophthalmology (€43 million), oncology (€10 million) and pulmonology / anti-infectives (€8 million).

Details of acquisitions and divestments are provided in Notes [5.2] and [5.3]. The impairment testing procedure for goodwill and other intangible assets is explained in Note [3].

Changes in intangible assets in 2017 were as follows:

B 14/2

Changes in Intangible Assets (Previous Year)

€ million	Acquired goodwill	Patents and technol-ogies	Trade-marks	Marketing and distribution rights	Production rights	R&D projects	Other rights and advance payments	Total
Cost of acquisition or generation, December 31, 2016	**16,312**	**13,162**	**11,045**	**2,044**	**2,138**	**887**	**2,666**	**48,254**
Acquisitions	51	–	85	–	4	–	–	140
Capital expenditures	–	78	–	54	–	458	167	757
Retirements	–	(61)	(31)	(4)	–	(220)	(365)	(681)
Transfers	–	–	1	45	–	17	(63)	–
Transfers (IFRS 5)	(481)	(123)	(40)	(14)	(118)	(43)	(403)	(1,222)
Divestments / Changes in scope of consolidation	(254)	(31)	(5)	(105)	(96)	–	(322)	(813)
Inflation adjustment (IAS 29)	5	–	–	–	–	–	–	5
Exchange differences	(882)	(164)	(602)	(109)	(5)	(55)	(116)	(1,933)
December 31, 2017	**14,751**	**12,861**	**10,453**	**1,911**	**1,923**	**1,044**	**1,564**	**44,507**
Accumulated amortization and impairments, December 31, 2016	**–**	**9,312**	**3,673**	**1,268**	**2,027**	**235**	**1,860**	**18,375**
Retirements	–	(36)	(20)	(4)	–	(201)	(356)	(617)
Amortization and impairment losses	–	596	580	170	21	98	228	1,693
Amortization	–	596	369	133	21	–	118	1,237
Impairment losses	–	–	211	37	–	98	110	456
Impairment loss reversals	–	–	–	–	–	–	–	–
Transfers	–	–	–	1	–	–	(1)	–
Transfers (IFRS 5)	–	(86)	(39)	(9)	(118)	(2)	(199)	(453)
Divestments / Changes in scope of consolidation	–	(13)	(5)	(77)	(90)	–	(295)	(480)
Exchange differences	–	(135)	(148)	(66)	(4)	(13)	(70)	(436)
December 31, 2017	**–**	**9,638**	**4,041**	**1,283**	**1,836**	**117**	**1,167**	**18,082**
Carrying amounts, December 31, 2017	**14,751**	**3,223**	**6,412**	**628**	**87**	**927**	**397**	**26,425**
Carrying amounts, December 31, 2016	**16,312**	**3,850**	**7,372**	**776**	**111**	**652**	**806**	**29,879**

Goodwill and other intangible assets with an indefinite useful life that are of material significance for the Bayer Group are allocated to the following cash-generating units or unit groups as of the end of the reporting period:

B 14/3

Intangible Assets with an Indefinite Useful Life

Reporting segment	Cash-generating unit/unit group	Goodwill (€ million)	Material intangible assets with indefinite useful life (€ million)
Pharmaceuticals	Pharmaceuticals	7,247	510
Consumer Health	Consumer Care	4,274	32
Crop Science	Crop Science	26,528	4,788
Animal Health	Animal Health	97	21

In the case of research and development projects, the point in time from which a capitalized asset can be expected to generate an economic benefit for the company cannot be determined. Such assets are therefore classified as having an indefinite useful life. Research and development projects were capitalized at a total amount of €5,243 million as of the end of 2018 (2017: €927 million).

Another intangible asset classified as having an indefinite useful life is the Bayer Cross, which was reacquired for the North America region in 1994, having been awarded to the United States and Canada under the reparations agreements at the end of the First World War. The period for which the Bayer Group will derive an economic benefit from this name cannot be determined as Bayer intends to make continuous use of it. The Bayer Cross is capitalized at €108 million.

15. Property, plant and equipment

Changes in property, plant and equipment in 2018 were as follows:

B 15/1

Changes in Property, Plant and Equipment

€ million	Land and buildings	Plant installations and machinery	Furniture, fixtures and other equipment	Construction in progress and advance payments	Total
Cost of acquisition or construction, December 31, 2017	**6,706**	**8,646**	**1,721**	**1,763**	**18,836**
Acquisitions	2,209	2,167	318	961	5,655
Capital expenditures	196	378	183	1,108	1,865
Retirements	(79)	(370)	(174)	(6)	(629)
Transfers	370	704	49	(1,123)	–
Transfers (IFRS 5)	(356)	(329)	(79)	170	(594)
Divestments/Changes in the scope of consolidation	(2)	–	4	1	3
Inflation adjustment (IAS 29)	63	58	13	10	144
Exchange differences	88	79	1	11	179
December 31, 2018	**9,195**	**11,333**	**2,036**	**2,895**	**25,459**
Accumulated depreciation and impairments, December 31, 2017	**3,661**	**6,267**	**1,256**	**19**	**11,203**
Retirements	(39)	(353)	(150)	(6)	(548)
Depreciation and impairment losses	473	802	235	471	1,981
Depreciation	316	752	233	–	1,301
Impairment losses	157	50	2	471	680
Impairment loss reversals	–	–	–	–	–
Transfers	4	7	(11)	–	–
Transfers (IFRS 5)	(116)	(101)	(47)	–	(264)
Divestments/Changes in the scope of consolidation	–	–	2	–	2
Inflation adjustment (IAS 29)	34	46	10	–	90
Exchange differences	28	26	(4)	1	51
December 31, 2018	**4,045**	**6,694**	**1,291**	**485**	**12,515**
Carrying amounts, December 31, 2018	**5,150**	**4,639**	**745**	**2,410**	**12,944**
Carrying amounts, December 31, 2017	**3,046**	**2,380**	**466**	**1,744**	**7,636**

Impairment losses on property, plant and equipment amounted to €680 million, including in particular €519 million resulting from the decision regarding Factor VIII facilities in Wuppertal and Berkeley in the Pharmaceuticals segment, along with €132 million pertaining to a Chinese production facility in the Consumer Health segment.

In 2018, borrowing costs of €56 million (2017: €31 million) were capitalized as components of the cost of acquisition or construction of qualifying assets, applying an average interest rate of 3.5% (2017: 2.5%).

Capitalized property, plant and equipment included assets with a total net value of €353 million (2017: €231 million) held under finance leases. The cost of acquisition or construction of these assets as of the closing date totaled €511 million (2017: €368 million). They comprised buildings with a carrying amount of €136 million (2017: €98 million), plant installations and machinery with a carrying amount of €151 million (2017: €75 million), and other property, plant and equipment with a carrying amount of €66 million (2017: €58 million). For information on the liabilities arising from finance leases, see Note [24].

In 2018, rental payments of €565 million (2017: €385 million) were made for assets leased under operating leases as defined in IAS 17 (Leases).

Sublease agreements exist primarily for company cars and accommodation for employees on overseas assignments. Minimum lease payments expected to be received under these subleases in the future amount to €30 million, while the rental expenses thereunder in 2018 amounted to €26 million.

Through its acquisition of Monsanto, Bayer acquired a property that was transferred to the County of St. Louis, Missouri, United States, in 2013 in return for industrial revenue bonds. This property was then leased back to Monsanto through December 31, 2026. A buyback option exists at the end of the rental period. In view of the economic substance of the agreement, the rental payment obligations are netted against the right to receive payment from the industrial revenue bonds in the statement of financial position.

Bayer leases buildings under operating leases, some of which Bayer can extend when the original term of the lease expires. Of these leases, some contain an early termination option that in certain cases involves a compensation payment. Some leases are subject to price adjustments based on the market rates prevailing at the time or due to changes in the value of regional price indices.

Changes in property, plant and equipment in 2017 were as follows:

B 15/2

Changes in Property, Plant and Equipment (Previous Year)

€ million	Land and buildings	Plant installations and machinery	Furniture, fixtures and other equipment	Construction in progress and advance payments	Total
Cost of acquisition or construction, December 31, 2016	**10,346**	**20,335**	**2,297**	**2,551**	**35,529**
Acquisitions	–	–	–	–	–
Capital expenditures	286	460	193	1,022	1,961
Retirements	(82)	(304)	(143)	–	(529)
Transfers	282	699	52	(1,033)	–
Transfers (IFRS 5)	(498)	(601)	(66)	(240)	(1,405)
Divestments/Changes in the scope of consolidation	(3,167)	(11,059)	(500)	(455)	(15,181)
Inflation adjustment (IAS 29)	5	–	–	–	5
Exchange differences	(466)	(884)	(112)	(82)	(1,544)
December 31, 2017	**6,706**	**8,646**	**1,721**	**1,763**	**18,836**
Accumulated depreciation and impairments, December 31, 2016	**5,592**	**15,111**	**1,685**	**27**	**22,415**
Retirements	(60)	(280)	(125)	–	(465)
Depreciation and impairment losses	334	893	223	5	1,455
Depreciation	310	860	222	–	1,392
Impairment losses	24	33	1	5	63
Impairment loss reversals	(7)	(6)	–	–	(13)
Transfers	6	4	(1)	(9)	–
Transfers (IFRS 5)	(82)	(214)	(31)	–	(327)
Divestments/Changes in the scope of consolidation	(1,923)	(8,631)	(420)	(1)	(10,975)
Exchange differences	(199)	(610)	(75)	(3)	(887)
December 31, 2017	**3,661**	**6,267**	**1,256**	**19**	**11,203**
Carrying amounts, December 31, 2017	**3,045**	**2,379**	**465**	**1,744**	**7,633**
Carrying amounts, December 31, 2016	**4,754**	**5,224**	**612**	**2,524**	**13,114**

Investment property

The total carrying amount of investment property as of December 31, 2018, was €96 million (December 31, 2017: €97 million). The fair value of this property was €383 million (2017: €336 million). The rental income from investment property was €14 million (2017: €14 million), and the operating expenses directly allocable to this property amounted to €5 million (2017: €4 million).

16. Investments accounted for using the equity method

Five (2017: four) associates and 10 (2017: eight) joint ventures were accounted for in the consolidated financial statements using the equity method. A list of these companies is available at www.bayer.com/shareownership2018.

The following table contains a summary of the aggregated income statement data and aggregated carrying amounts of the associates and joint ventures accounted for using the equity method (excluding the Covestro Group):

B 16/1

Earnings Data and Carrying Amounts of Companies Accounted for Using the Equity Method

	Associates		Joint ventures	
€ million	2017	2018	2017	2018
Income after income taxes	7	(2)	(48)	(75)
Other comprehensive income after income taxes	28	30	–	–
Total comprehensive income after income taxes	35	28	(48)	(75)
Share of income after income taxes	**1**	**(1)**	**(32)**	**(34)**
Share of total comprehensive income after income taxes	29	17	(32)	(34)
Carrying amount as of December 31	**37**	**95**	**343**	**420**

Information on the Covestro Group

The Covestro Group was deconsolidated at the end of the third quarter of 2017, and, in view of Bayer's remaining significant influence, was then recognized for the first time as an associate and accounted for using the equity method. The equity-method carrying amount recognized at that time was €3.6 billion.

In the first quarter of 2018, Bayer sold 21.0 million shares of Covestro AG to institutional investors at a price of €86.25 per share. In the second quarter of 2018, Bayer sold a further 28.81 million shares of Covestro AG to institutional investors at a price of €75.50. In addition, 13.79 million shares of Covestro AG were acquired from Bayer Pension Trust e. V., which no longer holds any Covestro shares. Bayer AG now holds a 7.5% interest in Covestro to service the exchangeable bond issued in 2017 that matures in 2020. The total gain from the disposals in 2018 amounted to €304 million.

Through May 2018, the Covestro interest was accounted for in the Bayer Group consolidated financial statements as an associate using the equity method. The share disposals outlined in the previous paragraph led to the loss of significant influence on the financial and business policy decisions of Covestro. This in turn resulted in a change in the accounting method applied. Since May 2018, Bayer has reported the Covestro interest as an equity instrument, with changes in its fair value recognized through profit and loss.

In 2018, the equity-method income of the Covestro Group amounted to €103 million (2017: €51 million), while its carrying amount was €0 (2017: €3,627 million).

17. Other financial assets

The other financial assets were comprised as follows:

B 17/1

Other Financial Assets

€ million	Dec. 31, 2017 Total	Dec. 31, 2017 Of which current	Dec. 31, 2018 Total	Dec. 31, 2018 Of which current
LaR [1]	1,718	1,501	–	–
AfS [1]	2,728	1,502	–	–
of which debt instruments	2,463	1,499	–	–
of which equity instruments	265	3	–	–
HtM [1]	57	15	–	–
AC [2]	–	–	430	285
FVTPL [2]	–	–	2,355	665
of which debt instruments	–	–	1,759	665
of which equity instruments	–	–	596	–
FVTOCI [2]	–	–	330	–
of which equity instruments (no recycling)	–	–	330	–
Receivables from derivatives	647	509	253	216
Receivables under lease agreements	13	2	10	–
Total	**5,163**	**3,529**	**3,378**	**1,166**

[1] Measurement category in accordance with IAS 39; applicable until December 31, 2017
AfS: available for sale; at fair value through other comprehensive income
HtM: held to maturity; at amortized cost
LaR: loans and receivables; at amortized cost
[2] Measurement category in accordance with IFRS 9; applicable as of January 1, 2018
AC: at amortized cost
FVTOCI: at fair value through other comprehensive income
FVTPL: at fair value through profit or loss

The AC category included €270 million (2017, LaR category: €1,390 million) in bank deposits. No material impairment losses were recognized for expected credit losses in 2018.

The debt instruments in the FVTPL category included capital of €643 million (2017, AfS category: €605 million) provided to Bayer-Pensionskasse VVaG (Bayer-Pensionskasse) for its effective initial fund, and jouissance right capital (Genussrechtskapital) of €152 million (2017, AfS category: €152 million), also provided to Bayer-Pensionskasse. Also reported in this category were investments of €598 million (2017, AfS category: €1,497 million) in money market funds.

The equity instruments in the FVTPL category comprised the interest in Covestro AG.

The equity instruments in the FVTOCI category comprised the following investments:

B 17/2

Equity Instruments Measured at Fair Value Through Other Comprehensive Income

Company name	Fair value as of Dec. 31, 2017 [1]	Fair value as of Dec. 31, 2018
CRISPR Therapeutics AG, Switzerland	101	143
Innovative Seed Solutions LLC, U.S.A.	–	41
Flagship Ventures Fund V, L.P., U.S.A.	12	20
Medopad Ltd., U.K.	–	13
Hokusan Co. Ltd., Japan	6	12
Other investments	146	101
Total	**265**	**330**

[1] In 2017, equity instruments were recognized in the AfS category in accordance with IAS 39.

No material equity investments were deconsolidated in 2018 and no material dividends were received.

Further information on the accounting for receivables from derivatives is given in Note [27].

18. Inventories

Inventories were comprised as follows:

B 18/1

Inventories

€ million	Dec. 31, 2017	Dec. 31, 2018
Raw materials and supplies	1,761	2,541
Work in process, finished goods and goods purchased for resale	4,776	7,205
Rights of return	–	85
Advance payments	13	1,130
Total	**6,550**	**10,961**

Inventories increased by €4,411 million, mainly due to the acquisition of Monsanto.

Impairment losses recognized on inventories were reflected in the cost of goods sold. They were comprised as follows:

B 18/2

Impairments of Inventories

€ million	2017	2018
Accumulated impairment losses, January 1	**(416)**	**(331)**
Divestments/changes in the scope of consolidation	13	–
Impairment losses in the reporting period	(235)	(240)
Impairment loss reversals or utilization	261	321
Exchange differences	45	24
Transfers (IFRS 5)	1	95
Accumulated impairment losses, December 31	**(331)**	**(131)**

19. Trade accounts receivable

Trade accounts receivable less impairment losses amounted to €11,836 million (2017: €8,582 million) on the closing date and were comprised as follows: This increase was attributable to the acquired Monsanto business. There are significant concentrations in the following regions and countries:

B 19/1

Trade Accounts Receivable

€ million	2017	2018
North America	1,379	3,248
of which U.S.A.	1,291	3,066
Europe/Middle East/Africa	3,488	3,764
of which Germany	1,365	1,202
Asia/Pacific	1,648	2,054
Latin America	2,492	3,413
of which Brazil	1,668	1,952
Trade accounts receivable (before impairments)	**9,007**	**12,479**
Accumulated impairment losses	(425)	(643)
Carrying amount, December 31	8,582	11,836
of which noncurrent	97	665

Noncurrent trade accounts receivable comprised receivables of €540 million in connection with rights to use technologies that were outlicensed to a customer acquired through the acquisition of Monsanto. Beyond this, there are no material concentrations of individual customers.

The gross carrying amounts of trade accounts receivable were broken down as follows:

B 19/2

Trade Accounts Receivable – Gross Carrying Amounts

€ million	Trade accounts receivable for which lifetime expected credit losses are calculated (collectively assessed)	Trade accounts receivable that are credit-impaired	Total
Gross carrying amounts as of January 1, 2018	**8,209**	**798**	**9,007**
Changes resulting from trade accounts receivable recognized, derecognized or written-off in the reporting period	(1,714)	(535)	(2,249)
Transfer to credit-impaired trade accounts receivable	(367)	367	–
Other changes:			
From acquisitions/divestments	6,015	16	6,031
From exchange differences	(276)	(34)	(310)
Gross carrying amounts as of December 31, 2018	**11,867**	**612**	**12,479**

Credit losses on trade accounts receivable were as follows:

B 19/3

Trade Accounts Receivable – Loss Allowances

€ million	Lifetime expected credit losses (collectively assessed)	Trade accounts receivable that are credit-impaired	Total
Loss allowances as of January 1, 2018	**113**	**405**	**518**
Changes resulting from loss allowances newly recognized or derecognized in the reporting period and additions/reductions to existing loss allowances	23	78	101
Changes due to write-offs		(27)	(27)
Transfer to loss allowances for credit-impaired trade accounts receivable	(106)	106	–
Other changes:			
From changes in the scope of consolidation	101	16	117
From exchange differences	(19)	(47)	(66)
Loss allowances as of December 31, 2018	**112**	**531**	**643**

Receivables from government health service institutions, especially in Greece, Italy, Portugal and Spain, are under special observation in view of the government debt crisis. Although there were no material defaults on such receivables in 2018 or 2017, it is possible that future developments in these countries could result in payment delays and/or defaults. This could necessitate the recognition of impairment losses due to new occurrences. Trade accounts receivable from government health service institutions in the above countries at the end of 2018 totaled €103 million (2017: €102 million).

An excess-of-loss policy exists for the Pharmaceuticals, Consumer Health and Animal Health segments as part of a global credit insurance program. More than 80% of the receivables of these segments are insured up to a maximum total annual compensation payment of €150 million (2017: €150 million). A global excess-of-loss policy is in place for the Crop Science segment (excluding the newly acquired Monsanto business). In this global credit insurance program, more than 80% of this segment's receivables are insured up to a maximum total annual compensation payment of €300 million (2017: €300 million). Local credit insurance contracts are in place in certain countries for the newly acquired Monsanto business.

A further €992 million (2017: €696 million) of receivables was secured by advance payments, letters of credit or guarantees or by liens on land, buildings or harvest yields.

20. Other receivables

Other receivables were comprised as follows:

B 20/1

Other Receivables

	Dec. 31, 2017		Dec. 31, 2018	
€ million	Total	Of which current	Total	Of which current
Other tax receivables	554	541	794	734
Deferred charges	298	192	390	344
Reimbursement claims	85	71	84	80
Net defined benefit asset	36	–	84	–
Receivables from employees	47	46	46	46
Miscellaneous receivables	656	426	988	671
Total	**1,676**	**1,276**	**2,386**	**1,875**

Other receivables are stated net of impairment losses of €71 million (2017: €70 million), of which €66 million related to tax reimbursement claims that were impaired in 2018. The prior-year figure included an impairment loss recognized on a receivable in the amount of €67 million from the Venezuelan exchange control authority reflecting the right to receive U.S. dollars at a preferential rate.

21. Equity

The foremost objectives of our financial management are to help bring about a sustained increase in Bayer's value for the benefit of all stakeholders and to ensure the Group's creditworthiness and liquidity. The pursuit of these goals means reducing our cost of capital, optimizing our capital structure, improving our financing cash flow and effectively managing risk.

Due to the acquisition of Monsanto, the contracted rating agencies have adjusted their ratings and now assess Bayer as follows: S & P Global gives Bayer a long-term rating of BBB and a short-term rating of A-2 with stable outlook. Moody's gives a Baa1 / P-2 with negative outlook and Fitch an A- / F2 with stable outlook. These investment grade ratings from all three agencies reflect the company's high solvency and ensure access to a broad investor base for financing purposes. Our stated aim is to also achieve the single "A" rating category in the long term from S & P Global Ratings and Moody's.

Apart from utilizing cash inflows from our operating business to reduce net financial debt, we are implementing our financial strategy by way of vehicles such as the subordinated hybrid bonds issued in July 2014 and April 2015, the mandatory convertible notes issued in November 2016, the authorized and conditional capital, and a potential share buyback program.

On April 16, 2018, the Republic of Singapore subscribed to 31 million new Bayer shares through a subsidiary, at an issue price close to market prices (for total gross proceeds of €3.0 billion). This corresponded to around 3.6% of the capital stock as of the acquisition date. The transaction increased Temasek's interest in Bayer AG to approximately 4%. This capital increase against cash contributions excluded the subscription rights of existing shareholders.

On June 3, 2018, with the consent of the Supervisory Board, the Board of Management of Bayer AG resolved to execute a capital increase out of authorized capital against cash contributions and with subscription rights for existing Bayer stockholders. For this purpose, Bayer issued 74,604,156 new registered (no-par value) shares with an entitlement to dividends as of January 1, 2018.

For every 23 Bayer shares they held, stockholders were able to acquire two new shares at a subscription price of €81.00 per new share by way of indirect subscription rights. This option was exercised for 73,343,177 shares. The 1,261,039 shares not subscribed to were purchased by institutional investors at an average placement price of €96.6437 per share under a private placement. After deducting transaction costs, net proceeds totaled €6 billion.

Together with the mandatory convertible notes issued in November 2016, the two capital increases completed the equity component, announced in September 2016, to finance the acquisition of Monsanto.

Capital stock

The capital stock of Bayer AG on December 31, 2018, amounted to €2,387 million (2017: €2,117 million), divided into 932,551,964 (2017: 826,947,808) registered no-par shares, and was fully paid in. Each no-par share confers one voting right.

Authorized and conditional capital

The authorized and conditional capital was comprised as follows:

B 21/1

Authorized and Conditional Capital

Capital	Resolution	Amount / shares	Expires	Purpose
Authorized capital I	April 29, 2014	€530 million	April 28, 2019	Increase the capital stock by issuing new no-par shares against cash contributions and / or contributions in kind, the latter not to exceed €423 million
Authorized capital II	April 29, 2014	€212 million	April 28, 2019	Increase the capital stock by issuing new no-par shares against cash contributions
Conditional capital	April 29, 2014	€212 million / up to 82,694,750 no-par shares	April 28, 2019	Increase the capital stock by granting no-par shares to the holders of bonds with warrants or convertible notes, profit participation certificates or income bonds; the authorizations to issue such instruments are limited to a total nominal amount of €6 billion.

Capital increases are effected by issuing new, registered no-par shares. Stockholders must normally be granted subscription rights. However, subscription rights may be excluded under certain conditions stated in the authorization resolution. Absent a further resolution by the Annual Stockholders' Meeting on the exclusion of stockholders' subscription rights, the Board of Management will only use the existing authorizations to increase the capital stock out of the authorized capital or the conditional capital – while excluding stockholders' subscription rights – up to a total amount of 20% of the capital stock that existed when the respective resolutions were adopted by the Annual Stockholders' Meeting on April 29, 2014. All issuances or sales of no-par shares or of bonds with warrants or conversion rights or obligations that are effected while excluding stockholders' subscription rights also count toward this 20% limit. Details of the authorized and conditional capital are provided in the Notice of the Annual Stockholders' Meeting of April 29, 2014, and on the Bayer website.

The capital increase resolved on June 3, 2018, and implemented thereafter entailed the utilization of €191 million out of authorized capital I. The amount of authorized capital I still available as of December 31, 2018, was therefore €339 million.

The capital increase implemented on April 16, 2018, resulted in the utilization of €79 million out of authorized capital II. The amount of authorized capital II still available as of December 31, 2018, was therefore €133 million.

On November 22, 2016, Bayer placed mandatory convertible notes in the amount of €4.0 billion without granting subscription rights to existing stockholders of the company. The notes, denominated in units of €100,000, were issued by Bayer Capital Corporation B.V., Netherlands, under the subordinated guarantee of Bayer AG. At maturity, the outstanding amount of the notes will be mandatorily converted into registered no-par shares of Bayer AG. The proceeds were the subject of an intra-Group transfer to Bayer AG. The mandatory convertible notes are reflected in payables to subsidiaries until maturity. The issuance of the mandatory convertible notes constituted a utilization of conditional capital.

Accumulated comprehensive income

Accumulated comprehensive income comprises retained earnings and accumulated other comprehensive income. The retained earnings comprise prior years' undistributed income of consolidated companies and all remeasurements of the net defined benefit liability for pension or other post-employment benefits that are recognized outside profit or loss. The accumulated other comprehensive income comprises exchange differences, the changes in fair values of cash flow hedges and equity instruments (until 2017: changes in fair values of available-for-sale financial assets), the revaluation surplus and reserves for the change in the company's own credit risk. In 2018, an amount of €4 million (2017: €4 million) corresponding to the annual amortization/depreciation of the respective assets was transferred from the revaluation surplus to retained earnings.

Dividend

Under the German Stock Corporation Act (AktG), the dividend payment is determined by the distributable profit reported in the annual financial statements of Bayer AG, which are prepared according to the German Commercial Code. Retained earnings were diminished by payment of the dividend of €2.80 per share for 2017. The proposed dividend for the 2018 fiscal year is €2.80 per share, which – based on the current number of shares – would result in a total dividend payment of €2,611 million. Payment of the proposed dividend is contingent upon approval by the stockholders at the Annual Stockholders' Meeting and therefore is not recognized as a liability in the consolidated financial statements.

Equity attributable to non-controlling interest

The changes in noncontrolling interest in equity during 2017 and 2018 are shown in the following table:

B 21/2

Changes in Noncontrolling Interest in Equity

€ million	2017	2018
January 1	**1,564**	**60**
Changes in equity not recognized in profit or loss		
Remeasurements of the net liability under defined benefit pension plans	49	(1)
Changes in fair value of cash flow hedges	–	–
Changes in fair value of securities	–	–
Exchange differences on translation of operations outside the eurozone	(155)	(7)
Other changes in equity	(2,025)	108
Dividend payments	(131)	(5)
Income after income taxes	**758**	**16**
December 31	**60**	**171**

As of December 31, 2018, there were two principal subsidiaries with third-party noncontrolling interest holders: Bayer CropScience Limited, India, where the interest and share of voting rights attributable to noncontrolling interest amounted to 31.3% as of December 31, 2018 (December 31, 2017: 31.3%), and the equity attributable to this noncontrolling interest stood at €42 million (2017: €52 million); and Monsanto India Ltd, India, where the interest and share of voting rights attributable to noncontrolling interest amounted to 20.6% as of December 31, 2018, and the equity attributable to this noncontrolling interest stood at €121 million.

22. Provisions for pensions and other post-employment benefits

Provisions were established for defined benefit obligations pertaining to pensions and other post-employment benefits. The net liability was accounted for as follows:

B 22/1

Net Defined Benefit Liability Reflected in the Statement of Financial Position

	Pensions		Other post-employment benefits		Total	
€ million	Dec. 31, 2017	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2018
Provisions for pensions and other post-employment benefits (net liability)	**7,798**	**8,445**	**222**	**272**	**8,020**	**8,717**
of which Germany	6,778	7,215	–	–	6,778	7,215
of which other countries	1,020	1,230	222	272	1,242	1,502
Net defined benefit asset	**36**	**83**	**–**	**1**	**36**	**84**
of which Germany	22	23	–	–	22	23
of which other countries	14	60	–	1	14	61
Net defined benefit liability	**7,762**	**8,362**	**222**	**271**	**7,984**	**8,633**
of which Germany	6,756	7,192	–	–	6,756	7,192
of which other countries	1,006	1,170	222	271	1,228	1,441

Provisions for pensions and other post-employment benefits in the amount of €389 million were assumed in connection with the acquisition of Monsanto.

The expenses for defined benefit plans for pensions and other post-employment benefits comprised the following components:

B 22/2

Expenses for Defined Benefit Plans

						Pension plans	Other post-employment benefit plans	
	Germany		Other countries		Total		Other countries	
€ million	**2017**	**2018**	**2017**	**2018**	**2017**	**2018**	**2017**	**2018**
Current service cost	312	295	93	132	405	427	13	13
Past service cost	20	11	(3)	(22)	17	(11)	(2)	(6)
of which plan curtailments	–	–	(2)	(48)	(2)	(48)	(2)	(6)
Plan settlements	–	–	8	–	8	–	–	–
Plan administration cost paid out of plan assets	3	3	1	3	4	6	–	–
Net interest	135	124	43	30	178	154	13	14
Total	**470**	**433**	**142**	**143**	**612**	**576**	**24**	**21**

In addition, a total of minus €612 million (2017: €1,236 million) in effects of remeasurements of the net defined benefit liability was recognized in 2018 outside profit or loss. Of this amount, minus €654 million (2017: €1,223 million) related to pension obligations, €34 million (2017: €1 million) to other post-employment benefit obligations, and €8 million (2017: €12 million) to the effects of the asset ceiling. The plan curtailments totaling €54 million (2017: €2 million) were primarily effected in the United States, where they mainly pertained to a former Monsanto plan.

The net defined benefit liability developed as follows:

B 22/3

Changes in Net Defined Benefit Liability

€ million	Defined benefit obligation	Fair value of plan assets	Effects of the asset ceiling	Net defined benefit liability
Germany				
January 1, 2018	**(17,837)**	**11,081**	**–**	**(6,756)**
Acquisitions	(18)	–	–	(18)
Divestments/changes in the scope of consolidation	–	–	–	–
Current service cost	(295)			(295)
Past service cost	(11)			(11)
Net interest	(333)	209	–	(124)
Net actuarial gain/(loss)	(62)			(62)
of which due to changes in financial parameters	175			175
of which due to changes in demographic parameters	(232)			(232)
of which due to experience adjustments	(5)			(5)
Return on plan assets excluding amounts recognized as interest income		(498)		(498)
Employer contributions		141		141
Employee contributions	(35)	35		–
Payments due to plan settlements	(53)	38		(15)
Benefits paid out of plan assets	201	(201)		–
Benefits paid by the company	424			424
Plan administration cost paid from plan assets		(3)		(3)
Reclassification to current assets/liabilities held for sale	71	(46)		25
December 31, 2018	**(17,948)**	**10,756**	**–**	**(7,192)**
Other countries				
January 1, 2018	**(6,655)**	**5,458**	**(31)**	**(1,228)**
Acquisitions	(2,384)	2,192		(192)
Divestments/changes in the scope of consolidation	–	–		–
Current service cost	(145)			(145)
Past service cost	28			28
Gains/(losses) from plan settlements	–			–
Net interest	(251)	210	(3)	(44)
Net actuarial gain/(loss)	423			423
of which due to changes in financial parameters	448			448
of which due to changes in demographic parameters	42			42
of which due to experience adjustments	(67)			(67)
Return on plan assets excluding amounts recognized as interest income		(483)		(483)
Remeasurement of asset ceiling			8	8
Employer contributions		75		75
Employee contributions	(15)	15		–
Payments due to plan settlements	(87)	65		(22)
Benefits paid out of plan assets	350	(350)		–
Benefits paid by the company	148			148
Plan administration costs paid out of plan assets		(3)		(3)
Reclassification to current assets/liabilities held for sale	145	(79)	–	66
Exchange differences	(178)	103	3	(72)
December 31, 2018	**(8,621)**	**7,203**	**(23)**	**(1,441)**
of which other post-employment benefits	(700)	429	–	(271)
Total, December 31, 2018	**(26,569)**	**17,959**	**(23)**	**(8,633)**

B 22/4

Changes in Net Defined Benefit Liability (Previous Year)

€ million	Defined benefit obligation	Fair value of plan assets	Effects of the asset ceiling	Net defined benefit liability
Germany				
January 1, 2017	**(20,962)**	**11,809**	**–**	**(9,153)**
Acquisitions	–	–	–	–
Divestments/changes in the scope of consolidation	3,021	(2,075)	–	946
Current service cost	(368)			(368)
Past service cost	(32)			(32)
Net interest	(358)	208	–	(150)
Net actuarial gain/(loss)	206			206
of which due to changes in financial parameters	180			180
of which due to changes in demographic parameters	(1)			(1)
of which due to experience adjustments	27			27
Return on plan assets excluding amounts recognized as interest income		755		755
Employer contributions		593		593
Employee contributions	(39)	39		–
Payments due to plan settlements	–	–		–
Benefits paid out of plan assets	216	(216)		–
Benefits paid by the company	441			441
Plan administration cost paid from plan assets		(3)		(3)
Reclassification to current assets/liabilities held for sale	38	(29)		9
December 31, 2017	**(17,837)**	**11,081**	**–**	**(6,756)**
Other countries				
January 1, 2017	**(8,033)**	**6,127**	**(49)**	**(1,955)**
Acquisitions	–	–	–	–
Divestments/changes in the scope of consolidation	840	(589)	3	254
Current service cost	(109)			(109)
Past service cost	8			8
Gains/(losses) from plan settlements	(8)			(8)
Net interest	(244)	183	(3)	(64)
Net actuarial gain/(loss)	(166)			(166)
of which due to changes in financial parameters	(191)			(191)
of which due to changes in demographic parameters	21			21
of which due to experience adjustments	4			4
Return on plan assets excluding amounts recognized as interest income		429		429
Remeasurement of asset ceiling			12	12
Employer contributions		125		125
Employee contributions	(14)	14		–
Payments due to plan settlements	32	(41)		(9)
Benefits paid out of plan assets	300	(300)		–
Benefits paid by the company	94			94
Plan administration costs paid out of plan assets		(1)		(1)
Reclassification to current assets/liabilities held for sale	10	(8)	–	2
Exchange differences	635	(481)	6	160
December 31, 2017	**(6,655)**	**5,458**	**(31)**	**(1,228)**
of which other post-employment benefits	(671)	449		(222)
Total, December 31, 2017	**(24,492)**	**16,539**	**(31)**	**(7,984)**

Covestro is included in the net defined benefit liability.

The benefit obligations pertained mainly to Germany (68%; 2017: 73%), the United States (19%; 2017: 12%) and the United Kingdom (7%; 2017: 8%). In Germany, current employees accounted for about 43% (2017: 43%), retirees or their surviving dependents for about 50% (2017: 50%) and former employees with vested pension rights for about 7% (2017: 7%) of entitlements under defined benefit plans. In the United

States, current employees accounted for about 30% (2017: 21%), retirees or their surviving dependents for about 56% (2017: 65%) and former employees with vested pension rights for about 14% (2017: 14%) of entitlements under defined benefit plans.

The actual return on the assets of defined benefit plans for pensions or other post-employment benefits amounted to minus €537 million (2017: €1,517 million) and minus €24 million (2017: €58 million), respectively.

The following table shows the defined benefit obligations for pensions and other post-employment benefits along with the funded status of the funded obligations.

B 22/5

Defined Benefit Obligation and Funded Status

	Pension obligation		Other post-employment benefit obligation		Total	
€ million	2017	2018	2017	2018	2017	2018
Defined benefit obligation	**23,821**	**25,869**	**671**	**700**	**24,492**	**26,569**
of which unfunded	1,117	1,244	64	136	1,181	1,380
of which funded	22,704	24,625	607	564	23,311	25,189
Funded status of funded obligations						
Overfunding	67	106	–	1	67	107
Underfunding	6,681	7,196	158	136	6,839	7,332

Pension and other post-employment benefit obligations

Group companies provide retirement benefits for most of their employees, either directly or by contributing to privately or publicly administered funds. The benefits vary depending on the legal, fiscal and economic conditions of each country. The obligations relate both to existing retirees' pensions and to pension entitlements of future retirees.

Bayer has set up funded pension plans for its employees in various countries. The most appropriate investment strategy is determined for each defined benefit pension plan based on the risk structure of the obligations (especially demographics, the current funded status, the structure of the expected future cash flows, interest sensitivity, biometric risks, etc.), the regulatory environment and the existing level of risk tolerance or risk capacity. A strategic target investment portfolio is then developed in line with the plan's risk structure, taking capital market factors into consideration. Further determinants are risk diversification, portfolio efficiency and the need for both a country-specific and a global risk/return profile centered on ensuring the payment of all future benefits. As the capital investment strategy for each pension plan is developed individually in light of the plan-specific conditions listed above, the investment strategies for different pension plans may vary considerably. The investment strategies are generally aligned less toward maximizing absolute returns and more toward the maximum probability of being able to finance pension commitments over the long term. For pension plans, stress scenarios are simulated and other risk analyses (such as value at risk) undertaken with the aid of risk management systems.

Bayer-Pensionskasse VVaG (Bayer-Pensionskasse), Leverkusen, Germany, is by far the most significant of the pension plans. It has been closed to new members since 2005. This legally independent fund is regarded as a life insurance company and therefore is subject to the German Insurance Supervision Act. The benefit obligations covered by Bayer-Pensionskasse comprise retirement, surviving dependents' and disability pensions. It constitutes a multi-employer plan, to which the active members and their employers contribute. The company contribution is a certain percentage of the employee contribution. This percentage is the same for all participating employers, including those outside the Bayer Group, and is set by agreement between the plan's executive committee and its supervisory board, acting on a proposal from the responsible actuary. It takes into account the differences between the actuarial estimates and the actual values for the factors used to determine liabilities and contributions. Bayer may also adjust the company contribution in agreement with the plan's executive committee and its supervisory board, acting on a proposal from the responsible actuary. The plan's liability is governed by Section 1, Paragraph 1, Sentence 3 of the German Law on the Improvement of Occupational Pensions. This means that if the pension plan exercises its right under the articles of association to reduce benefits, each participating employer has to make up the resulting difference. Bayer is not liable for the obligations of participating employers outside the Bayer Group, even if they cease to participate in the plan.

Pension entitlements for people who joined Bayer in Germany in 2005 or later are granted via Rheinische Pensionskasse VVaG, Leverkusen. Future pension payments from this plan are based on contributions and the return on plan assets; a guaranteed interest rate applies.

Another important pension provision vehicle is Bayer Pension Trust e. V. (BPT). This covers further retirement provision arrangements of the Bayer Group, such as deferred compensation, pension obligations previously administered by Schering Altersversorgung Treuhand e. V., and components of other direct commitments.

The defined benefit pension plans in the United States are frozen and no significant new entitlements can be earned under these plans. The assets of all the U.S. pension plans are held within master trusts for reasons of efficiency. The applicable regulatory framework is based on the Employee Retirement Income Security Act (ERISA), which includes a statutory 80% minimum funding requirement to avoid benefit restrictions. The actuarial risks, such as investment risk, interest-rate risk and longevity risk, remain with the company. The defined benefit pension plans in the United Kingdom have been closed to new members for some years. Plan assets in the U.K. are administered by independent trustees, who are legally obligated to act solely in the interests of the beneficiaries. A technical assessment is performed every three years in line with U.K. regulations. This serves as the basis for developing a plan to cover any potential financing requirements. Here, too, the actuarial risks remain with the company.

The other post-employment benefit obligations outside Germany mainly comprised health care benefit payments for retirees in the United States.

The fair value of the plan assets to cover pension and other post-employment benefit obligations was as follows:

B 22/6

Fair Value of Plan Assets as of December 31

	Pension obligations				Other post-employment benefit obligations	
	Germany		Other countries		Other countries	
€ million	2017	2018	2017	2018	2017	2018
Plan assets based on quoted prices in active markets						
Real estate and special real estate funds	–	–	181	214	16	15
Equities and equity funds	3,617	1,988	1,739	2,443	158	146
Callable debt instruments	–	–	27	27	–	–
Noncallable debt instruments	–	–	602	565	127	124
Bond funds	3,737	4,777	1,631	2,592	94	93
Derivatives	11	10	–	3	–	–
Cash and cash equivalents	164	611	74	77	13	9
Other	–	–	–	25	–	–
	7,529	**7,386**	**4,254**	**5,946**	**408**	**387**
Plan assets for which quoted prices in active markets are not available						
Real estate and special real estate funds	496	514	179	296	–	–
Equities and equity funds	121	143	71	69	–	–
Callable debt instruments	1,399	1,241	–	–	–	–
Noncallable debt instruments	1,394	1,366	–	–	–	–
Bond funds	–	–	74	73	–	–
Derivatives	–	–	–	–	–	–
Other	142	106	431	390	41	42
	3,552	**3,370**	**755**	**828**	**41**	**42**
Total plan assets	**11,081**	**10,756**	**5,009**	**6,774**	**449**	**429**

The fair value of plan assets in Germany included real estate leased by Group companies, recognized at a fair value of €82 million (2017: €82 million), and Bayer AG shares and bonds held through investment funds, recognized at their fair values of €21 million (2017: €37 million) and €6 million (2017: €3 million), respectively.

In May 2018, Bayer AG acquired 6.8% of Covestro shares from Bayer Pension Trust e. V. (BPT) at market value for a total amount of €1.1 billion to service the exchangeable bond that matures in 2020.

In 2018, Bayer AG did not deposit any additional shares it held in Covestro AG with BPT (2017: 8 million). The market value of BPT's total shareholding in Covestro AG amounted to €0 million as of December 31, 2018 (2017: €1,549 million).

The other plan assets comprised mortgage loans granted, other receivables and qualified insurance policies.

Risks

The risks from defined benefit plans arise partly from the defined benefit obligations and partly from the investment in plan assets. These risks include the possibility that additional contributions will have to be made to plan assets in order to meet current and future pension obligations, and negative effects on provisions and equity.

Demographic / biometric risks

Since a large proportion of the defined benefit obligations comprises lifelong pensions or surviving dependents' pensions, longer claim periods or earlier claims may result in higher benefit obligations, higher benefit expense and / or higher pension payments than previously anticipated.

Investment risks

If the actual return on plan assets were below the return anticipated on the basis of the discount rate, the net defined benefit liability would increase, assuming there were no changes in other parameters. This could happen as a result of a drop in share prices, increases in market rates of interest, default of individual debtors or the purchase of low-risk but low-interest bonds, for example.

Interest-rate risk

A decline in capital market interest rates, especially for high-quality corporate bonds, would increase the defined benefit obligation. This effect would be at least partially offset by the ensuing increase in the market values of the debt instruments held.

Measurement parameters and their sensitivities

The following weighted parameters were used to measure the obligations for pensions and other post-employment benefits as of December 31 of the respective year:

B 22/7

Parameters for Benefit Obligations

	Germany		Other countries		Total	
%	2017	2018	2017	2018	2017	2018
Pension obligations						
Discount rate	1.90	1.90	2.95	3.55	2.15	2.40
of which U.S.A.			3.40	4.20	3.40	4.20
of which U.K.			2.50	2.80	2.50	2.80
Projected future salary increases	2.75	2.75	3.60	3.65	2.95	3.00
Projected future benefit increases	1.70	1.60	3.25	3.05	2.10	2.05
Other post-employment benefit obligations						
Discount rate	–	–	4.25	4.85	4.25	4.85

In Germany the Heubeck RT 2018 G mortality tables were used, in the United States the RP-2014 Mortality Tables, and in the United Kingdom 95% of S1NXA.

In Germany, the RT 2005 G tables had been used in previous years. However, we switched to the new RT 2018 G tables when they were published as we believe that the resulting measurement reflects the economic impact on the respective closing date more accurately than measurement based on the RT 2005 G tables. If we had not switched to the RT 2018 G tables, provisions would have been €232 million lower.

Until May 2018, we applied the Macaulay Duration method when determining the discount rate for measuring pension obligations. However, Bayer decided to switch to the uniform discount rate method in June 2018 because it is used more frequently in the market and is mathematically superior. As of December 31, 2018, both methods resulted in a discount rate of 1.90%.

The following weighted parameters were used to measure the expense for pension and other post-employment benefits in the respective year:

B 22/8

Parameters for Benefit Expense

	Germany		Other countries		Total	
%	2017	2018	2017	2018	2017	2018
Pension obligations						
Discount rate	1.80	1.90	3.25	2.95	2.15	2.15
Projected future salary increases	2.75	2.75	3.50	3.60	2.95	2.95
Projected future benefit increases	1.50	1.70	3.35	3.25	1.95	2.10
Other post-employment benefit obligations						
Discount rate	–	–	4.35	4.25	4.35	4.25

The parameter sensitivities were computed by expert actuaries based on a detailed evaluation similar to that performed to obtain the data presented in Table B 22/3. Altering individual parameters by 0.5 percentage points (mortality by 10% per beneficiary) while leaving the other parameters unchanged would have impacted pension and other post-employment benefit obligations as of year-end 2018 as follows:

B 22/9

Sensitivity of Benefit Obligations

	Germany		Other countries		Total	
€ million	Increase	Decrease	Increase	Decrease	Increase	Decrease
Pension obligations						
0.5%-pt. change in discount rate	(1,408)	1,608	(479)	536	(1,887)	2,144
0.5%-pt. change in projected future salary increases	81	(76)	42	(40)	123	(116)
0.5%-pt. change in projected future benefit increases	903	(825)	132	(101)	1,035	(926)
10% change in mortality	(584)	658	(197)	203	(781)	861
Other post-employment benefit obligations						
0.5%-pt. change in discount rate	–	–	(33)	36	(33)	36
10% change in mortality	–	–	(18)	20	(18)	20

B 22/10

Sensitivity of Benefit Obligations (prior year)

	Germany		Other countries		Total	
€ million	Increase	Decrease	Increase	Decrease	Increase	Decrease
Pension obligations						
0.5%-pt. change in discount rate	(1,417)	1,620	(414)	468	(1,831)	2,088
0.5%-pt. change in projected future salary increases	87	(82)	50	(47)	137	(129)
0.5%-pt. change in projected future benefit increases	921	(841)	146	(110)	1,067	(951)
10% change in mortality	(587)	660	(172)	176	(759)	836
Other post-employment benefit obligations						
0.5%-pt. change in discount rate	–	–	(36)	39	(36)	39
10% change in mortality	–	–	(20)	22	(20)	22

Provisions are also established for the obligations, mainly of U.S. subsidiaries, to provide post-employment benefits in the form of health care cost payments for retirees. The valuation of health care costs was based on the assumption that they will increase at a rate of 6.3% (2017: 6.5%), which should gradually decline to 5.0% by 2023 (assumption in 2017: gradually decline to 5.0% by 2023). The following table shows the impact on other post-employment benefit obligations and total benefit expense of a one-percentage-point change in the assumed cost increase rates:

B 22/11

Sensitivity to Health Care Cost Increases

€ million	Increase of one percentage point 2017	Increase of one percentage point 2018	Decrease of one percentage point 2017	Decrease of one percentage point 2018
Impact on other post-employment benefit obligations	55	47	(47)	(41)
Impact on benefit expense	3	3	(3)	(2)

Payments made and expected future payments

The following payments or asset contributions correspond to the employer contributions made or expected to be made to funded benefit plans:

B 22/12

Employer Contributions Paid or Expected

€ million	Germany 2017	Germany 2018	Germany 2019 expected	Other countries 2017	Other countries 2018	Other countries 2019 expected
Pension obligations	593	141	132	146	90	79
Other post-employment benefit obligations	–	–	–	(21)	(15)	2
Total	**593**	**141**	**132**	**125**	**75**	**81**

Bayer has currently committed to make deficit contributions for its U.K. pension plans of approximately GBP27 million annually through 2023. For its U.S. pension plans, Bayer made payments of US$50 million in 2018 and expects to make zero or only minor payments in 2019 as most are closed and frozen.

Pensions and other post-employment benefits payable in the future from funded and unfunded plans are estimated as follows:

B 22/13

Future Benefit Payments

	Payments out of plan assets				Payments by the company			
	Pensions		Other post-employment benefits		Pensions		Other post-employment benefits	
€ million	Germany	Other countries	Other countries	Total	Germany	Other countries	Other countries	Total
2019	206	418	24	648	443	140	28	611
2020	209	423	23	655	444	109	27	580
2021	213	433	25	671	450	93	26	569
2022	217	439	26	682	456	96	25	577
2023	222	436	26	684	460	97	26	583
2024–2028	1,172	2,184	139	3,495	2,340	502	140	2,982

The weighted average term of the pension obligations is 17.0 years (2017: 17.0 years) in Germany and 12.8 years (2017: 13.8 years) in other countries. The weighted average term of the obligations for other post-employment benefits in other countries is 10.5 years (2017: 11.5 years).

23. Other provisions

Changes in the various provision categories in 2018 were as follows:

B 23/1

Changes in Other Provisions

€ million	Other Taxes	Environ-mental protec-tion	Restruc-turing	Trade-related commit-ments	Litigations	Personnel commit-ments	Miscella-neous	Total
December 31, 2017	**29**	**243**	**171**	**2,481**	**393**	**2,038**	**355**	**5,710**
Reclassification to refund liabilities	–	–	–	(2,427)	–	–	–	(2,427)
Reclassification to inventories	–	–	–	76	–	–	–	76
Acquisitions	–	480	33	275	596	258	339	1,981
Additions	21	57	720	732	661	2,553	626	5,370
Utilization	(7)	(41)	(122)	(524)	(228)	(1,803)	(168)	(2,893)
Reversal	(6)	(6)	(30)	(108)	(25)	(551)	(108)	(834)
Reclassification to current liabilities	–	–	(1)	–	–	(14)	–	(15)
Interest cost	–	6	–	–	4	3	3	16
Exchange differences	(2)	15	2	6	13	13	2	49
December 31, 2018	**35**	**754**	**773**	**511**	**1,414**	**2,497**	**1,049**	**7,033**
of which current	15	88	230	499	445	1,765	644	3,686

The provisions were partly offset by claims for refunds in the amount of €74 million (2017: €74 million), which were recognized as receivables. These claims predominantly related to product liability.

Restructuring

Provisions for restructuring included €691 million (2017: €116 million) for severance payments and €82 million (2017: €55 million) for other restructuring expenses, which mainly comprised other costs related to the closure of research or production facilities. The breakdown of provisions by segment was as follows: €351 million at Pharmaceuticals (2017: €45 million), €57 million at Consumer Health (2017: €33 million), €240 million at Crop Science (2017: €73 million), €6 million at Animal Health (2017: €6 million) and €119 million at Corporate Functions / All Other Segments (2017: €14 million).

In connection with an extensive restructuring program, provisions were established in almost all segments in 2018. The aim of this program is to strengthen Bayer's core businesses, adjust structures and enhance productivity and profitability by implementing a series of measures through 2022. Provisions were established in 2018 for programs that have been communicated in sufficient detail. Further provisions are anticipated for 2019.

In the Pharmaceuticals segment, provisions were primarily established in view of the planned reorganization of R&D. By integrating research and development into a joint organization, Bayer is looking to enhance value and productivity within the Pharmaceuticals portfolio.

Provisions were also established for the hemophilia business. Due to a significant increase in competition, the factor VIII facility in Wuppertal will not be utilized and the production of all recombinant factor VIII products will in the future be focused in Berkeley, California, United States, where work has already begun on the corresponding restructuring measures for our biotechnology products to enhance production process efficiency.

At Consumer Health, a comprehensive restructuring program called “Fit to Win” was launched to make this segment a market leader by driving the transformation in the health care industry and creating a more agile and faster organization with fewer decision-making levels.

In the Crop Science segment, provisions were established in connection with the restructuring of the distribution organization and the crop protection business in France. In Germany, the focus was on organizational adjustments due to the integration of Monsanto. The restructuring measures implemented in previous years at the Institute site in West Virginia, United States, in connection with the termination of thiodicarb production have for the most part been completed.

Appropriate accounting measures were also taken in the Corporate Functions segment in connection with planned restructuring as part of the integration of Monsanto.

Litigations

The legal risks currently considered to be material, and their development, are described in Note [29].

Personnel commitments

Stock-based compensation programs

Bayer offers stock-based compensation programs collectively to different groups of employees. As required by IFRS 2 (Share-based Payment) for compensation systems involving cash settlement, awards to be made under the stock-based programs are covered by provisions in the amount of the fair value of the obligations existing as of the date of the financial statements vis-à-vis the respective employee group. All resulting valuation adjustments are recognized in profit or loss.

The following table shows the changes in provisions for the various programs:

B 23/2

Changes in Provisions for Stock-Based Compensation Programs

€ million	Aspire I	Aspire II	Aspire 2.0	Total
December 31, 2017	**6**	**35**	**263**	**304**
Acquisitions/divestments	–	–	–	–
Additions	20	42	279	341
Utilization	(5)	(29)	(8)	(42)
Reversal	(22)	(48)	(254)	(324)
Exchange differences	1	–	9	10
December 31, 2018	**–**	**–**	**289**	**289**

The value of the Aspire tranches that were fully earned at the end of 2018 amounted to €0 million (2017: €34 million). As such, no payment was made in January 2019.

The net expense for all stock-based compensation programs was €21 million (2017: €194 million), including €5 million (2017: €5 million) for the BayShare stock participation program and income of €1 million (2017: expense of €1 million) pertaining to grants of virtual Bayer shares. See Note [27.3] for information on the hedging of obligations under stock-based employee compensation programs.

The fair value of the obligations under the Aspire I and Aspire II programs was calculated using the Monte Carlo simulation method based on the following key parameters:

B 23/3

Parameters for Monte Carlo Simulation

	2017	2018
Dividend yield	2.46%	3.60%
Risk-free interest rate	(0.35)%	(0.46)%
Volatility of Bayer stock	15.49%	33.26%
Volatility of EURO STOXX 50	9.27%	16.94%
Correlation between Bayer stock price and the EURO STOXX 50	0.71	0.76

Long-term incentive program for members of the Board of Management and other senior executives (Aspire I)

Between 2005 and 2015, members of the Board of Management and other senior executives were entitled to participate in Aspire I on the condition that they purchased a certain number of Bayer shares – determined for each individual according to specific guidelines – and retained them for the full term of the program. A percentage of the executive's annual base salary – according to their position – was defined as a target for variable payments (Aspire target opportunity). Depending on the performance of Bayer stock, both in absolute terms and relative to the EURO STOXX 50 index over a four-year performance period, participants receive a payment of up to 300% of their individual Aspire target opportunity at the end of the period. At the start of 2018, a payment of 20% was made for the tranche issued in 2014. No payment was made for the final tranche issued in 2015.

Long-term incentive program for middle management (Aspire II)

From 2005 through 2015, other senior managers were offered Aspire II, which was similar to Aspire I but did not require a personal investment in Bayer shares. The amount of the payment is based entirely on the absolute performance of Bayer stock over a four-year period. The maximum payment is 250% of each manager's Aspire target opportunity. At the start of 2018, a payment of 40% was made for the tranche issued in 2014. No payment was made for the final tranche issued in 2015.

Long-term incentive program Aspire 2.0

Since 2016, Aspire has been offered to all eligible employees in a new, standardized format named Aspire 2.0. For the Board of Management, there is an additional hurdle in the form of a comparison between the performance of Bayer stock and that of the EURO STOXX 50. Each tranche runs for four years. Aspire 2.0 is also based on a percentage of each employee's annual base salary, the percentage varying according to their position. This target value is multiplied by the employee's STI payment factor for the previous year to give the Aspire grant value. The STI payment factor reflects the employee's individual performance and the business performance under the global short-term incentive program (STI). The Aspire grant value is converted into virtual Bayer shares by dividing it by the share price at the start of the program. The program's performance is based on these virtual shares. The fair value of the obligations is determined from the price of Bayer stock at year-end and the dividends paid up to that time. The payment made at the end of each tranche is determined by multiplying the number of virtual shares by the Bayer share price at that time and adding an amount equivalent to the dividends paid during the period of the tranche. The maximum payment for Aspire 2.0 is 250% of the Aspire grant value.

BayShare 2018

All management levels and nonmanagerial employees are offered an annual stock participation program known as BayShare, under which Bayer subsidizes their personal investments in the company's stock. The discount under this program in 2018 was 20% (2017: 20%) of the subscription amount. Employees stated a fixed amount that they wished to invest in shares. The maximum subscription amount in Germany was set at €2,500 (2017: €2,500) or €5,000 (2017: €5,000), depending on the employee's position. These shares must be retained until December 31, 2019.

In 2018, employees purchased a total of about 369,000 shares (2017: 229,000 shares) under the BayShare program.

24. Financial liabilities

Financial liabilities were comprised as follows:

B 24/1

Financial Liabilities

	Dec. 31, 2017		Dec. 31, 2018	
€ million	Total	Of which current	Total	Of which current
Bonds and notes/promissory notes	12,436	505	35,402	2,302
Liabilities to banks	534	513	4,865	606
Liabilities under finance leases	238	32	399	50
Liabilities from derivatives	240	221	172	172
Other financial liabilities	970	664	556	552
Total	**14,418**	**1,935**	**41,394**	**3,682**

The financial liabilities of the Bayer Group increased by €27 billion in 2018, mainly due to the acquisition of Monsanto.

A breakdown of financial liabilities by contractual maturity is given below.

B 24/2

Maturities of Financial Liabilities

€ million	Dec. 31, 2017
2018	1,935
2019	2,155
2020	1,248
2021	2,096
2022	89
2023 or later	6,895
Total	**14,418**

€ million	Dec. 31, 2018
2019	3,682
2020	1,043
2021	9,035
2022	2,062
2023	3,558
2024 or later	22,014
Total	**41,394**

In addition to promissory notes in the amount of €45 million (2017: €45 million), the Bayer Group has issued the following bonds and notes:

B 24/3

Bonds and Notes

	Nominal volume as of Dec. 31, 2017	Carrying amount as of Dec. 31, 2017 € million	Nominal volume as of Dec. 31, 2018	Carrying amount as of Dec. 31, 2018 € million
Hybrid bonds[1]				
Hybrid bond 2014/2024[2]/2074	EUR 1,500 million	1,495	EUR 1,500 million	1,496
Hybrid bond 2015/2022[2]/2075	EUR 1,300 million	1,292	EUR 1,300 million	1,293
Hybrid bond 2014/2020[2]/2075	EUR 1,750 million	1,746	EUR 1,750 million	1,748
Mandatory convertible notes[1]/exchangeable bond[1]				
Mandatory convertible notes[3] 2016/2019	EUR 4,000 million	–	EUR 4,000 million	–
Exchangeable bond[4] 2017/2020	EUR 1,000 million	1,220	EUR 1,000 million	996
USD bonds[1, 5]				
Maturity < 1 year	–	–	USD 2,500 million	2,178
Maturity > 1 year < 5 years	USD 3,500 million	2,909	USD 8,250 million	7,160
Maturity > 5 years	USD 2,100 million	1,751	USD 16,414 million	14,031
EUR bonds[1, 5]				
Maturity < 1 year	–	–	–	–
Maturity > 1 year < 5 years	EUR 750 million	753	EUR 3,000 million	2,996
Maturity > 5 years	EUR 500 million	498	EUR 3,250 million	3,222
JPY bonds[1]				
Maturity < 1 year	JPY 15 billion	111	JPY 10 billion	79
Maturity > 1 year < 5 years	JPY 30 billion	222	JPY 20 billion	158
Maturity > 5 years	–	–	–	–
GBP bonds[1]				
Maturity < 1 year	GBP 350 million	394	GBP 350 million	–
Total		**12,391**		**35,357**

[1] The bonds are issued in the functional currency of the issuing entity (except GBP bonds) and mainly have a fixed coupon.
[2] Date of first option to early redeem the bond at par
[3] The mandatory convertible notes were allocated to capital reserves and to other financial liabilities.
[4] Bond can be redeemed in cash, Covestro shares or a combination thereof
[5] Bonds with a nominal volume of USD2,500 million and €750 million have a variable rate.

Hybrid bonds

The hybrid bonds issued by Bayer AG are subordinated, and 50% of their amount is treated by the rating agencies as equity. They therefore have a more limited effect on the Group's rating-specific debt indicators than senior borrowings.

Mandatory convertible notes

On November 22, 2016, Bayer Capital Corporation B.V. placed subordinated mandatory convertible notes in the amount of €4,000 million, which will be converted into no-par shares of Bayer AG at maturity. The mandatory convertible notes were recognized in capital reserves and other financial liabilities.

Exchangeable bond

On June 14, 2017, Bayer AG issued bonds with a nominal value of €1 billion which mature in 2020. The issue price was 105.25% of the principal amount and the initial exchange price was fixed at €80.93. These bonds can be settled in cash, by delivery of Covestro shares or by a combination thereof at or prior to maturity. The debt instruments were designated as financial liabilities at fair value through profit or loss upon first-time recognition. As of December 31, 2018, the fair value was €1 billion, and Bayer AG held 13.8 million Covestro shares with a fair value of €0.6 billion. Assuming repayment is made in Covestro shares, Bayer AG would have to make an additional payment of €0.4 billion.

Other bonds

Measures undertaken to finance the Monsanto acquisition included the issuance in June 2018 of US$15 billion and €5 billion in bonds via our subsidiaries Bayer U.S. Finance II LLC, Pittsburgh, United States, and Bayer Capital Corporation B.V., Mijdrecht, Netherlands, respectively.

As part of the acquisition, bonds with a nominal volume of US$6.9 billion were taken over from Monsanto. In July 2018, about 83% of these bonds were exchanged for Bayer bonds through a bond exchange program.

Liabilities under finance leases

Lease payments totaling €557 million (2017: €365 million), including €158 million (2017: €127 million) in interest, are to be made under finance leases to the respective lessors in future years.

The liabilities under finance leases mature as follows:

B 24/4

Lease Liabilities

€ million	Dec. 31, 2017		
Maturity	Lease payments	Interest component	Liabilities under finance leases
2018	49	17	32
2019	44	13	31
2020	39	12	27
2021	31	11	20
2022	25	10	15
2023 or later	177	64	113
Total	**365**	**127**	**238**

€ million	Dec. 31, 2018		
Maturity	Lease payments	Interest component	Liabilities under finance leases
2019	71	21	50
2020	59	16	43
2021	51	14	37
2022	43	13	30
2023	32	12	20
2024 or later	301	82	219
Total	**557**	**158**	**399**

Other financial liabilities

Other financial liabilities as of December 31, 2018, included €309 million (2017: €525 million) relating to the mandatory convertible notes issued in November 2016. Other financial liabilities as of December 31, 2017, included commercial paper in the amount of €292 million.

Other information

The increase in liabilities to banks mainly resulted from the utilization of the bridge financing for the acquisition of Monsanto. The outstanding acquisition financing as of December 31, 2018, amounted to US$4.9 billion.

As of December 31, 2018, the Group had undrawn credit facilities at its disposal totaling €4.5 billion (2017: €47 billion, of which €43 billion comprised bridge financing for the Monsanto acquisition).

Further information on the accounting for liabilities from derivatives is given in Note [27].

The development of financial liabilities is outlined in Note [30].

25. Trade accounts payable

Trade accounts payable comprised €5,380 million (2017: €5,116 million) due within one year and €34 million (2017: €13 million) due after one year.

26. Other liabilities

Other liabilities comprised the following:

B 26/1

Other Liabilities

€ million	Dec. 31, 2017 Total	Dec. 31, 2017 Of which current	Dec. 31, 2018 Total	Dec. 31, 2018 Of which current
Other tax liabilities	420	418	654	653
Deferred income	1,156	195	65	19
Liabilities to employees	181	164	252	231
Liabilities for social expenses	138	130	141	136
Accrued interest on liabilities	149	139	268	257
Liabilities from derivatives	321	306	327	165
Miscellaneous liabilities	403	300	764	661
Total	**2,768**	**1,652**	**2,471**	**2,122**

The deferred income included €30 million (2017: €48 million) in grants and subsidies received from governments, of which €3 million (2017: €17 million) was reversed through profit or loss.

Other miscellaneous liabilities included financing commitments of US$141 million (2017: US$195 million) for the joint venture Casebia Therapeutics LLP, United Kingdom, established in December 2015 with CRISPR Therapeutics AG, Switzerland, and a further financing commitment of US$60 million (2017: US$70 million) for the joint venture Joyn Bio LLC, United States, established in September 2017 with Ginkgo Bioworks, Inc., United States, which will operate in the area of the plant microbiome.

27. Financial instruments

The system used by the Bayer Group to manage credit risks, liquidity risks and the different types of market price risk (interest-rate, currency and commodity-price risks), together with its objectives, methods and procedures, is outlined in the Opportunity and Risk Report, which forms part of the Combined Management Report.

27.1 Financial instruments by category

The following table shows the carrying amounts and fair values of financial assets and liabilities by category of financial instrument under IFRS 9 and a reconciliation to the corresponding line items in the statements of financial position. Since the line items “Trade accounts receivable,” “Other receivables” and “Other liabilities” contain both financial instruments and nonfinancial assets or liabilities (such as other tax receivables), the reconciliation is shown in the column headed “Nonfinancial assets/liabilities.”

The transition effects from the reclassification and remeasurement of financial assets upon the first-time application of IFRS 9 are detailed in Note [2] “Effects of new financial reporting standards.”

B 27.1/1

Carrying Amounts and Fair Values of Financial Instruments

						Dec. 31, 2018
	Carried at amortized cost	Carried at fair value [fair value for information[5]]			Nonfinancial assets/ liabilities	
Measurement category (IFRS 9)[1]		Based on quoted prices in active markets (Level 1)	Based on observable market data (Level 2)	Based on unobservable inputs (Level 3)		
€ million	**Carrying amount**	**Carrying amount**	**Carrying amount**	**Carrying amount**	**Carrying amount**	**Carrying amount in the statement of financial position**
Trade accounts receivable	11,686				150	11,836
AC	11,686					11,686
Nonfinancial assets					150	150
Other financial assets	440	1,584	241	1,113		3,378
AC	440		[441]			440
FVTPL[2]		1,432	28	895		2,355
FVTOCI (no recycling)[3]		144		186		330
Derivatives that qualify for hedge accounting			101			101
Derivatives that do not qualify for hedge accounting		8	112	32		152
Other receivables	516			42	1,828	2,386
AC	516		[516]			516
FVTPL[2]				42		42
Nonfinancial assets					1,828	1,828
Cash and cash equivalents	4,052					4,052
AC	4,052		[4,052]			4,052
Total financial assets	**16,694**	**1,584**	**241**	**1,155**		**19,674**
of which AC	16,694					16,694
of which FVTPL		1,432	28	937		2,397
Financial liabilities	40,226	996	172			41,394
AC	40,226	[32,395]	[7,091]			40,226
FVTPL (nonderivative)[4]		996				996
Derivatives that qualify for hedge accounting			35			35
Derivatives that do not qualify for hedge accounting			137			137
Trade accounts payable	5,414					5,414
AC	5,414					5,414
Other liabilities	1,136	7	320	20	988	2,471
AC	1,136		[1,136]			1,136
FVTPL (nonderivative)[4]				20		20
Derivatives that qualify for hedge accounting			297			297
Derivatives that do not qualify for hedge accounting		7	23			30
Nonfinancial liabilities					988	988
Total financial liabilities	**46,776**	**1,003**	**492**	**20**		**48,291**
of which AC	46,776					46,776
of which FVTPL (nonderivative)		996		20		1,016
of which derivatives that qualify for hedge accounting			332			332
of which derivatives that do not qualify for hedge accounting		7	160			167

[1] AC: at amortized cost
FVTOCI: at fair value through other comprehensive income
FVTPL: at fair value through profit or loss

[2] Measured at fair value through profit or loss as required by IFRS 9

[3] Measured at fair value through other comprehensive income in accordance with paragraph 5.7.5 of IFRS 9

[4] Designated as FVTPL upon first-time recognition in accordance with IFRS 9

[5] Fair value of the financial instruments at amortized cost under IFRS 7 paragraph 29(a)

The category AC (measured at amortized cost) within other financial assets and financial liabilities also include receivables and liabilities under finance leases in which Bayer is the lessor or lessee and which are therefore measured in accordance with IAS 17.

Due to the short maturities of most trade accounts receivable and payable, other receivables and liabilities, and cash and cash equivalents, their carrying amounts at the closing date do not significantly differ from the fair values.

The fair values of financial assets and liabilities measured at amortized cost that are given for information are the present values of the respective future cash flows. The present values are determined by discounting the cash flows at a closing-date interest rate, taking into account the term of the assets or liabilities and the creditworthiness of the counterparty. Where a market price is available, however, this is deemed to be the fair value.

The fair values of financial assets measured at fair value correspond to quoted prices in active markets (Level 1), or are determined using valuation techniques based on observable market data as of the end of the reporting period (Level 2) or are the present values of the respective future cash flows, determined on the basis of unobservable inputs (Level 3).

The fair values of derivatives for which no publicly quoted prices exist in active markets (Level 1) are determined using valuation techniques based on observable market data as of the end of the reporting period (Level 2). In applying valuation techniques, credit value adjustments are determined to allow for the contracting party's credit risk.

Currency and commodity forward contracts are measured individually at their forward rates or forward prices on the closing date. These depend on spot rates or prices, including time spreads. The fair values of interest-rate hedging instruments and cross-currency interest-rate swaps were determined by discounting future cash flows over the remaining terms of the instruments at market rates of interest, taking into account any foreign currency translation as of the closing date.

Fair values measured using unobservable inputs are categorized within Level 3 of the fair value hierarchy. This applies to certain debt or equity instruments, in some cases to the fair values of embedded derivatives, and to obligations for contingent consideration in business combinations. Credit risk is frequently the principal unobservable input used to determine the fair values of debt instruments classified as "FVTPL – at fair value through profit or loss" by the discounted cash flow method. Here the credit spreads of comparable issuers are applied. A significant increase in credit risk could result in a lower fair value, whereas a significant decrease could result in a higher fair value. However, a relative change of 10% in the credit spread does not materially affect the fair value.

Embedded derivatives are separated from their respective host contracts, provided these are not financial instruments. Such host contracts are generally sale or purchase agreements relating to the operational business. The embedded derivatives cause the cash flows from the contracts to vary with exchange-rate or price fluctuations. The internal measurement of embedded derivatives is mainly performed using the discounted cash flow method, which is based on unobservable inputs. These include planned sales and purchase volumes, and prices derived from market data. Regular monitoring is carried out based on these fair values as part of quarterly reporting.

The financial liabilities arising from the debt instruments (exchangeable bond) issued in June 2017 that can be converted into Covestro shares are measured at fair value through profit or loss. This exchangeable bond is a hybrid financial instrument containing a debt instrument as a nonderivative host contract and multiple embedded derivatives.

Until May 2018, the interest in Covestro was accounted for in the Bayer Group consolidated financial statements as an associate using the equity method. Various share disposals led to the loss of significant influence on the financial and business policy decisions of Covestro. This in turn resulted in a change in the accounting method. Since May 2018, Bayer has reported the Covestro interest as an equity instrument. Changes in its fair value are recognized through profit or loss.

The changes in the amount of financial assets and liabilities recognized at fair value based on unobservable inputs (Level 3) for each financial instrument category were as follows:

B 27.1/2

Development of Financial Assets and Liabilities (Level 3)

€ million	Assets – FVTPL[1]	FVTOCI[1] (no recycling)	Derivatives (net)	Liabilities – FVTPL[1] (non-derivative)	Total
Carrying amounts (net), January 1, 2018	**821**	**68**	**10**	**(7)**	**892**
Gains (losses) recognized in profit or loss	28	–	5	(5)	28
of which related to assets/liabilities recognized in the statements of financial position	28	–	–	(5)	23
Gains (losses) recognized outside profit or loss	–	13	–	–	13
Additions of assets/(liabilities)	102	116	17	(10)	225
Settlements of (assets)/liabilities	(14)	(7)	–	1	(20)
Disposals from divestments/changes in scope of consolidation	–	(4)	–	1	(3)
Carrying amounts (net), December 31, 2018	**937**	**186**	**32**	**(20)**	**1,135**

[1] See table B 27.1/1 for definition of measurement categories.

The changes recognized in profit or loss were included in other operating income/expenses, as well as in the financial result in interest income, exchange gains or losses and in other financial income and expenses.

Income, expense, gains and losses on financial instruments can be assigned to the following categories:

B 27.1/3

Income, Expense, Gains and Losses on Financial Instruments

							2018
€ million	**Assets – AC[1]**	**Assets – FVTPL[1]**	**FVTOCI[1] (no recycling)**	**Derivatives that do not qualify for hedge accounting**	**Liabilities – AC[1]**	**Liabilities – FVTPL[1] (non-derivative)**	**Total**
Interest income	111	95	–	–	50	–	256
Interest expense	(65)	–	–	(2)	(1,226)	(1)	(1,294)
Income/expenses from affiliated companies	–	–	–	–	–	–	–
Changes in fair value	–	(444)	–	41	–	230	(173)
Impairment losses	(200)	–	–	–	–	–	(200)
Impairment loss reversals	185	–	–	–	–	–	185
Exchange gains/losses	249	–	–	87	(497)	–	(161)
Gains/losses from retirements	–	–	–	–	–	–	–
Other financial income/expenses	(17)	6	–	–	(15)	(2)	(28)
Net result	**263**	**(343)**	**–**	**126**	**(1,688)**	**227**	**(1,415)**

[1] See table B 27.1/1 for definition of measurement categories.

The interest income and expense from assets and liabilities within the AC category also included income and expenses from interest-rate derivatives that qualified for hedge accounting.

The changes in the fair value of assets within the FVTPL category included changes in the fair value of the Covestro interest, which has been presented as an equity instrument since May 2018. The changes in the fair value of derivatives that do not qualify for hedge accounting related mainly to forward commodity contracts and embedded derivatives.

The changes of €230 million (2017: negative changes of €172 million) in the fair value of (nonderivative) liabilities within the FVTPL category contain fair value adjustments pertaining to the debt instruments (exchangeable bond) issued in June 2017. The changes in fair value relating to credit risks were not material.

Derivatives that form part of a master netting arrangement, constitute a financial asset or liability and can only be netted in the event of breach of contract by, or insolvency of, one of the contracting parties do not satisfy, or only partially satisfy, the criteria for offsetting in the statement of financial position according to IAS 32. The volume of such derivatives with positive fair values was €166 million (2017: €654 million), and the volume with negative fair values was €455 million (2017: €520 million). Included here is an amount of €104 million (2017: €312 million) in positive and negative fair values of derivatives concluded with the same contracting party.

The following table shows the carrying amounts and fair values of financial assets and liabilities by category of financial instrument for the comparative period under IAS 39.

B 27.1/4

Carrying Amounts and Fair Values of Financial Instruments

						Dec. 31, 2017
	Carried at amortized cost	Carried at fair value [fair value for information[2]]			Nonfinancial assets/liabilities	
Measurement category (IAS 39)[1]		Based on quoted prices in active markets (Level 1)	Based on observable market data (Level 2)	Based on unobservable inputs (Level 3)		
€ million	**Carrying amount**	**Carrying amount**	**Carrying amount**	**Carrying amount**	**Carrying amount**	**Carrying amount in the statement of financial position**
Trade accounts receivable	8,582					8,582
LaR	8,582					8,582
Other financial assets	1,823	452	2,085	803		5,163
LaR	1,731		[1,731]			1,731
AfS	35	448	1,452	793		2,728
HtM	57		[58]			57
Derivatives that qualify for hedge accounting			296			296
Derivatives that do not qualify for hedge accounting		4	337	10		351
Other receivables	380			46	1,250	1,676
LaR	380		[380]			380
AfS				46		46
Nonfinancial assets					1,250	1,250
Cash and cash equivalents	7,581					7,581
LaR	7,581		[7,581]			7,581
Total financial assets	**18,366**	**452**	**2,085**	**849**		**21,752**
of which LaR	18,274					18,274
of which AfS	35	448	1,452	839		2,774
Financial liabilities	12,958	1,220	240			14,418
Carried at amortized cost	12,958	[11,327]	[2,183]			12,958
Carried at fair value (nonderivative)		1,220				1,220
Derivatives that qualify for hedge accounting			187			187
Derivatives that do not qualify for hedge accounting			53			53
Trade accounts payable	4,568				561	5,129
Carried at amortized cost	4,568					4,568
Nonfinancial liabilities					561	561
Other liabilities	681	2	319	7	1,759	2,768
Carried at amortized cost	681		[681]			681
Carried at fair value (nonderivative)				7		7
Derivatives that qualify for hedge accounting			288			288
Derivatives that do not qualify for hedge accounting		2	31			33
Nonfinancial liabilities					1,759	1,759
Total financial liabilities	**18,207**	**1,222**	**559**	**7**		**19,995**
of which at amortized cost	18,207					18,207
of which derivatives that qualify for hedge accounting			475			475
of which derivatives that do not qualify for hedge accounting		2	84			86

[1] AfS: available for sale; at fair value through other comprehensive income
HtM: held to maturity; at amortized cost
LaR: loans and receivables; at amortized cost
[2] Fair value of the financial instruments at amortized cost under IFRS 7. Paragraph 29(a)

The following table shows the changes in the financial assets and liabilities recognized at fair value based on unobservable inputs (Level 3) for each financial instrument category for the comparative period under IAS 39:

B 27.1/5

Development of Financial Assets and Liabilities (Level 3)

€ million	AfS[1]	Derivatives (net)	Liabilities – at fair value (nonderivative)	Total
Carrying amounts (net), January 1, 2017	**851**	**(8)**	**(8)**	**835**
Gains (losses) recognized in profit or loss	15	21	–	36
of which related to assets/liabilities recognized in the statements of financial position	15	21	–	36
Gains (losses) recognized outside profit or loss	(16)	–	–	(16)
Additions of assets/(liabilities)	6	–	–	6
Settlements of (assets)/liabilities	(17)	–	1	(16)
Disposals from divestments/changes in scope of consolidation	–	(3)	–	(3)
Carrying amounts (net), December 31, 2017	**839**	**10**	**(7)**	**842**

[1] See table 27.1/4 for definition of measurement category.

The following table shows the income, expense, gains and losses on financial instruments for the comparative period under IAS 39:

B 27.1/6

Income, Expense, Gains and Losses on Financial Instruments

	2017						
€ million	LaR[1]	HtM[1]	AfS[1]	Held for trading	Liabilities – at amortized cost	Liabilities – at fair value (non-derivative)	Total
Interest income	61	–	37	–	78	–	176
Interest expense	–	–	–	(3)	(628)	–	(631)
Income/expenses from affiliated companies	–	–	2	–	–	–	2
Changes in fair value	–	–	–	17	–	(172)	(155)
Impairment losses	(139)	–	(1)	–	–	–	(140)
Impairment loss reversals	23	–	5	–	–	–	28
Exchange gains/losses	(733)	–	–	(232)	620	–	(345)
Gains/losses from retirements	–	–	5	–	–	–	5
Other financial income/expenses	(14)	–	(7)	–	–	–	(21)
Net result	**(802)**	**–**	**41**	**(218)**	**70**	**(172)**	**(1,081)**

[1]See table 27.1/4 for definition of measurement categories.

27.2 Maturity analysis

The liquidity risks to which the Bayer Group was exposed from its financial instruments at the end of the reporting period comprised obligations for future interest and repayment installments on financial liabilities and the liquidity risk arising from derivatives.

There were also loan commitments under an as yet unpaid €965 million (2017: €1,005 million) portion of the effective initial fund of Bayer-Pensionskasse VVaG, which may result in further payments by Bayer AG in subsequent years.

B 27.2/1

Maturity Analysis of Financial Instruments

€ million	Dec. 31, 2018 Carrying amount	2019	2020	2021	2022	2023	after 2023
							Interest and repayment
Refund liabilities	3,789	3,622	152	15	–	–	–
Financial liabilities							
Bonds and notes/promissory notes	35,402	3,235	2,094	5,762	2,951	4,414	29,610
Liabilities to banks	4,865	751	158	4,345	–	–	3
Remaining liabilities	955	627	60	53	43	32	303
Trade accounts payable	5,414	5,380	32	1	1	–	–
Other liabilities							
Accrued interest on liabilities	268	257	1	1	1	1	7
Remaining liabilities	888	791	56	17	8	3	13
Liabilities from derivatives							
Derivatives that qualify for hedge accounting	332	172	66	70	26	–	–
Derivatives that do not qualify for hedge accounting	167	167	–	–	–	–	–
Receivables from derivatives							
Derivatives that qualify for hedge accounting	101	42	9	3	–	–	–
Derivatives that do not qualify for hedge accounting	152	121	(1)	(10)	–	–	–
Loan commitments	–	965	–	–	–	–	–
Financial guarantees	–	–	–	–	–	–	–

B 27.2/2

Maturity Analysis of Financial Instruments

€ million	Dec. 31, 2017 Carrying amount	2018	2019	2020	2021	2022	after 2022
							Interest and repayment
Financial liabilities							
Bonds and notes/promissory notes	12,436	719	2,096	1,487	2,288	236	7,125
Liabilities to banks	534	527	20	–	–	–	–
Remaining liabilities	1,208	716	359	40	32	26	177
Trade accounts payable	4,568	4,555	11	2	–	–	–
Other liabilities							
Accrued interest on liabilities	149	140	1	1	1	1	5
Remaining liabilities	539	455	66	3	2	2	11
Liabilities from derivatives							
Derivatives that qualify for hedge accounting	475	443	34	–	6	–	–
Derivatives that do not qualify for hedge accounting	86	88	1	2	–	–	–
Receivables from derivatives							
Derivatives that qualify for hedge accounting	296	144	62	17	2	–	–
Derivatives that do not qualify for hedge accounting	351	331	4	1	1	–	–
Loan commitments	–	1,005	–	–	–	–	–
Financial guarantees	–	12	–	–	–	–	–

27.3 Information on derivatives

Asset and liability fair values and future cash flows are exposed to currency, interest-rate and commodity price risks. Derivatives are used to reduce this risk. In some cases they are designated as hedging instruments in a hedge accounting relationship.

Currency risks

Foreign currency receivables and liabilities are hedged using foreign exchange derivatives without the existence of a hedge accounting relationship. A bond of Bayer AG denominated in British pounds was swapped on the issuance date into a fixed-rate euro bond by means of a cross-currency interest-rate swap, which was designated as a cash flow hedge. Cross-currency interest-rate swaps used to hedge intra-Group loans were also designated as cash flow hedges.

Fluctuations in future cash flows resulting from forecasted foreign currency transactions and procurement activities are avoided partly through derivatives contracts, most of which are designated as cash flow hedges.

Foreign currency risks related to the acquisition of Monsanto Company were partially hedged with currency derivatives designated as cash flow hedges. The fair value of these derivatives was reclassified from other comprehensive income to goodwill in the statement financial position as of the acquisition date.

Interest-rate risk

The interest-rate risks from fixed-interest borrowings are managed in part using interest-rate swaps. Two interest-rate swaps in the total amount of €200 million were designated as fair value hedges for the €750 million bond issued in 2014 and maturing in 2021. The carrying amount of this bond as of December 31, 2018, was €747 million. A hedge-related fair value adjustment of €6 million resulted in the carrying amount increasing to €753 million. No material ineffective portions of hedges required recognition through profit or loss in 2018 or 2017.

Interest-rate risks in connection with the financing of the Monsanto acquisition were partially hedged through interest-rate derivatives designated as cash flow hedges. The fair values of these derivatives as of the acquisition date will be amortized from reserves for cash flow hedges into interest income and expense over the term of the bonds issued to finance the acquisition.

Commodity price risks

Hedging contracts are also used to partly reduce exposure to fluctuations in future cash outflows and inflows resulting from price changes on procurement and selling markets. Some of these contracts are designated as cash flow hedges or fair value hedges.

The carrying amount of inventories designated as the hedged item in fair value hedges was €63 million as of December 31, 2018. A hedge-related fair value adjustment of minus €11 million reduced the carrying amount to €52 million. No material ineffective portions of hedges required recognition through profit or loss in 2018.

Hedging of obligations under stock-based employee compensation programs

A portion of the obligations to make variable payments to employees under stock-based compensation programs (Aspire) is hedged against share price fluctuations using derivatives contracts that are settled in cash at maturity. These derivatives are designated as cash flow hedges.

Further information on cash flow hedges

Other comprehensive income from cash flow hedges increased by €125 million in 2018 (2017: decreased by €144 million) due to changes in the fair values of derivatives. Total changes of €124 million in the fair values of derivatives were expensed in 2018 (2017: €3 million).

The following table shows changes in reserves for cash flow hedges (before taxes), broken down by risk category:

B 27.3/1

Changes in Reserves for Cash Flow Hedges (before taxes)

€ million	Currency hedging of recorded transactions	Currency hedging of forecasted transactions	Interest-rate hedging of forecasted transactions	Commodity price hedging	Hedging of stock-based employee compen-sation programs	Total
December 31, 2017	**21**	**(95)**	**(19)**	**–**	**(4)**	**(97)**
Changes in fair values	(10)	100	283	(17)	(231)	125
Reclassified to profit or loss	–	(3)	(19)	–	146	124
Reclassified to goodwill	–	(37)	–	–	–	(37)
December 31, 2018	**11**	**(35)**	**245**	**(17)**	**(89)**	**115**

No material ineffective portions of hedges required recognition through profit or loss in 2018.

The fair values of the derivatives in the major categories as of year-end are indicated in the following table together with the included volumes of hedges.

B 27.3/2

Fair Values of Derivatives

€ million	Dec. 31, 2017 Notional amount[1]	Dec. 31, 2017 Positive fair value	Dec. 31, 2017 Negative fair value	Dec. 31, 2018 Notional amount[1]	Dec. 31, 2018 Positive fair value	Dec. 31, 2018 Negative fair value
Currency hedging of recorded transactions[2,3]	**12,321**	**233**	**(240)**	**18,165**	**129**	**(172)**
Forward exchange contracts	10,399	144	(53)	16,942	83	(137)
Cross-currency interest-rate swaps	1,922	89	(187)	1,223	46	(35)
of which cash flow hedges	1,880	87	(187)	1,198	45	(35)
Currency hedging of forecasted transactions[2,4]	**9,475**	**116**	**(194)**	**4,233**	**35**	**(70)**
Forward exchange contracts	9,292	105	(194)	4,169	35	(69)
of which cash flow hedges	9,205	103	(192)	3,941	34	(64)
Currency options	183	11	–	64	–	(1)
of which cash flow hedges	183	11	–	64	–	(1)
Interest-rate hedging of recorded transactions[2,3]	**200**	**11**	**–**	**200**	**8**	**–**
Interest-rate swaps	200	11	–	200	8	–
of which fair value hedges	200	11	–	200	8	–
	–	–	–	–	–	–
Interest-rate hedging of forecasted transactions[2,4]	**9,086**	**64**	**(81)**	**–**	**–**	**–**
Interest-rate swaps	9,086	64	(81)	–	–	–
of which cash flow hedges	9,086	64	(81)	–	–	–
Commodity price hedging[2,4]	**420**	**6**	**(3)**	**936**	**32**	**(14)**
Forward commodity contracts	414	6	(3)	934	31	(14)
of which fair value hedges	–	–	–	87	–	(3)
of which cash flow hedges	–	–	–	464	14	(3)
Commodity option contracts	6	–	–	2	1	–
of which fair value hedges	–	–	–	–	–	–
of which cash flow hedges	–	–	–	–	–	–
Hedging of stock-based employee compensation programs[2,4]	**544**	**20**	**(15)**	**731**	**–**	**(226)**
Share price options	75	5	–	–	–	–
of which cash flow hedges	75	5	–	–	–	–
Forward share transactions	469	15	(15)	731	–	(226)
of which cash flow hedges	469	15	(15)	731	–	(226)
Total	**32,046**	**450**	**(533)**	**24,265**	**204**	**(482)**
of which current derivatives	30,259	317	(499)	23,169	171	(320)
for currency hedging	20,678	242	(415)	22,253	145	(242)
for interest-rate hedging[5]	9,086	64	(81)	–	–	–
for commodity price hedging	420	6	(3)	746	26	(14)
for hedging of stock-based employee compensation programs	75	5	–	170	–	(64)

[1] The notional amount is reported as gross volume, which also contains economically closed hedges.
[2] Derivatives with positive fair values are recognized under "Other financial assets" in the statement of financial position.
[3] Derivatives with negative fair values are recognized under "Financial liabilities" in the statement of financial position.
[4] Derivatives with negative fair values are recognized under "Other liabilities" in the statement of financial position.
[5] The portion of the fair value of long-term interest-rate swaps that relates to current interest payments was classified as current.

The following table provides an overview of the hedging rates for the material derivatives that existed at year-end and qualified for hedge accounting:

B 27.3/3

Hedging Rates of Derivatives that Qualify for Hedge Accounting

				Dec. 31, 2018
	Short-term derivatives		Long-term derivatives	
	Nominal value (million)	**Ø hedging rate**	**Nominal value (million)**	**Ø hedging rate**
Currency hedging of recorded transactions				
Cross-currency interest-rate swaps – cash flow hedges				
	Sell			
EUR/TRY	120 TRY	3.2287	–	–
EUR/USD	1,350 USD	1.1544	–	–
Currency hedging of forecasted transactions				
Forward exchange contracts – cash flow hedges				
	Sell			
EUR/AUD	243 AUD	1.6242	–	–
EUR/BRL	1,685 BRL	4.5360	–	–
EUR/CAD	499 CAD	1.5765	–	–
EUR/CNH	5,900 CNH	8.1207	–	–
EUR/GBP	326 GBP	0.8918	–	–
EUR/JPY	51,690 JPY	130.1871	–	–
EUR/KRW	122,670 KRW	1,322.7477	–	–
EUR/MXN	2,629 MXN	24.7583	–	–
EUR/RUB	16,835 RUB	78.8858	–	–
EUR/TWD	1,929 TWD	35.5132	–	–
EUR/USD	883 USD	1.1998	–	–
EUR/ZAR	1,236 ZAR	16.9930	–	–
USD/CAD	151 CAD	1.3050	–	–
	Buy			
EUR/USD	150 USD	1.1813	–	–
AUD/USD	14 USD	0.7145	–	–
Hedging of stock-based employee compensation programs	**Number of shares (thousands)**	**Ø hedging rate (€)**	**Number of shares (thousands)**	**Ø hedging rate (€)**
Forward share transactions – cash flow hedges				
	Buy		Buy	
Bayer shares	1,517	104.29	6,971	82.42

28. Contingent liabilities and other financial commitments

Contingent liabilities

The following warranty contracts, guarantees and other contingent liabilities existed at the end of the reporting period:

B 28/1

Contingent Liabilities

€ million	Dec. 31, 2017	Dec. 31, 2018
Warranties	88	88
Guarantees	148	82
Other contingent liabilities	614	816
Total	**850**	**986**

The guarantees mainly comprise a declaration issued by Bayer AG to the trustees of the U.K. pension plans guaranteeing the pension obligations of Bayer Public Limited Company, Reading, United Kingdom, and Bayer CropScience Limited, Cambridge, United Kingdom. Under the declaration, Bayer AG – in addition to the two companies – undertakes to make further payments into the plans upon receipt of a payment request from the trustees. The net liability with respect to these defined benefit plans as of December 31, 2018, declined to €82 million (December 31, 2017: €148 million).

Other financial commitments

The other financial commitments were as follows:

B 28/2

Other Financial Commitments

€ million	Dec. 31, 2017	Dec. 31, 2018
Operating leases	801	1,271
Commitments under purchase agreements for property, plant and equipment	493	811
Contractual obligation to acquire intangible assets	83	224
Capital contribution commitments	149	464
Binding acquisition agreement with Monsanto Company, St. Louis, Missouri, U.S.A.[1]	47,000	–
Unpaid portion of the effective initial fund	1,005	965
Potential payment obligations under collaboration agreements	2,349	2,121
Revenue-based milestone payment commitments	1,923	2,187
Total	**53,803**	**8,043**

[1] The contingent financial commitment of approximately US$56 billion was translated at the closing rate and rounded.

On June 7, 2018, Bayer acquired 100% of the outstanding shares of Monsanto Company, St. Louis, Missouri, United States, against a cash payment of US$128 per share. Further details of the acquisition of the Monsanto Company, St. Louis, Missouri, United States, are given in Note [5.2].

The maturities of the other financial commitments are as follows:

B 28/3

Maturities of Other Financial Liabilities

	Operating leases		Payment obligations under collaboration agreements		Revenue-based milestone payment commitments	
€ million	2017	2018	2017	2018	2017	2018
Maturing within 1 year	166	356	157	315	21	87
Maturing in 1–5 years	433	626	850	715	138	65
Maturing after 5 years	202	289	1,342	1,091	1,764	2,035
Total	**801**	**1,271**	**2,349**	**2,121**	**1,923**	**2,187**

The Bayer Group has entered into cooperation agreements with third parties under which it has agreed to fund various projects or has assumed other payment obligations based on the achievement of certain milestones or other specific conditions. The amounts shown represent the maximum payments to be made, and it is unlikely that they will all fall due. Since the achievement of the conditions for payment is highly uncertain, both the amounts and the dates of the actual payments may vary considerably from those stated in the table.

29. Legal risks

As a global company with a diverse business portfolio, the Bayer Group is exposed to numerous legal risks, particularly in the areas of product liability, competition and antitrust law, anticorruption, patent disputes, tax assessments and environmental matters. The outcome of any current or future proceedings cannot normally be predicted. It is therefore possible that legal or regulatory judgments or future settlements could give rise to expenses that are not covered, or not fully covered, by insurers' compensation payments and could significantly affect our revenues and earnings.

Legal proceedings currently considered to involve material risks are outlined below. The legal proceedings referred to do not represent an exhaustive list.

Product-related litigation

Mirena™: As of January 28, 2019, lawsuits from approximately 2,360 users of Mirena™, a levonorgestrel-releasing intrauterine system providing long-term contraception, had been served upon Bayer in the United States (excluding lawsuits no longer pending). Plaintiffs allege personal injuries resulting from the use of Mirena™, including perforation of the uterus, ectopic pregnancy or idiopathic intracranial hypertension, and seek compensatory and punitive damages. Plaintiffs claim, inter alia, that Mirena™ is defective and that Bayer knew or should have known of the risks associated with it and failed to adequately warn its users. Additional lawsuits are anticipated. In 2017, most of the cases pending in U.S. federal courts in which plaintiffs allege idiopathic intracranial hypertension were consolidated in a multidistrict litigation ("MDL") proceeding for common pre-trial management. As of January 28, 2019, lawsuits from approximately 700 users of Mirena™ alleging idiopathic intracranial hypertension had been served upon Bayer in the United States. Another MDL proceeding concerning perforation cases has been dismissed. The Second Circuit Court of Appeals affirmed the perforation MDL district court's summary judgment order of 2016 dismissing approximately 1,230 cases pending before that court. In April 2018, a master settlement agreement regarding the global settlement of the perforation cases for a total amount of US$12.2 million was executed. Plaintiffs did not reach the 98% participation threshold as required under the settlement agreement, and therefore a US$200,000 reduction in the total settlement amount was negotiated. Upon completion of the settlement, the vast majority of filed cases nationwide have been (or will be) dismissed with 15 claimants affirmatively opting out of the settlement. Almost all the other non-participating claimants (approximately 200) have not filed cases and are presently unreachable by plaintiffs' attorneys. As of January 28, 2019, a total of approximately 3,800 cases would be included in the settlement.

As of January 28, 2019, five Canadian lawsuits relating to Mirena™ seeking class action certification had been served upon Bayer. Bayer believes it has meritorious defenses and intends to defend itself vigorously.

Xarelto™: As of January 28, 2019, U.S. lawsuits from approximately 24,900 recipients of Xarelto™, an oral anticoagulant for the treatment and prevention of blood clots, had been served upon Bayer. Plaintiffs allege personal injuries from the use of Xarelto™, including cerebral, gastrointestinal or other bleeding and death, and seek compensatory and punitive damages. They claim, among other things, that Xarelto™ is defective and that Bayer knew or should have known of these risks associated with the use of Xarelto™ and failed to adequately warn its users. Additional lawsuits are anticipated. Cases pending in U.S. federal courts have been consolidated in an MDL for common pre-trial management. In 2017, the first three MDL trials resulted in complete defense verdicts. In January 2018, after the first trial to proceed in Pennsylvania state court had initially resulted in a judgment in favor of the plaintiff, the trial judge vacated the jury's verdict and granted judgment in favor of Bayer. In April and August 2018, the second and third Pennsylvania state court trials also resulted in complete defense verdicts. Appeals are pending in all of the six cases. Additional Pennsylvania state court trials are currently scheduled for May and September 2019 and into the second quarter of 2020. Bayer anticipates that additional trials will be scheduled.

As of January 28, 2019, ten Canadian lawsuits relating to Xarelto™ seeking class action certification had been served upon Bayer. One of the proposed class actions has been certified. Bayer has filed a motion for leave to appeal. Bayer believes it has meritorious defenses and intends to defend itself vigorously.

Essure™: As of January 28, 2019, U.S. lawsuits from approximately 29,400 users of Essure™, a medical device offering permanent birth control with a nonsurgical procedure, had been served upon Bayer. The significant increase in filings was triggered by the statutes of limitations in some states. Plaintiffs allege personal injuries from the use of Essure™, including hysterectomy, perforation, pain, bleeding, weight gain, nickel sensitivity, depression and unwanted pregnancy, and seek compensatory and punitive damages. Additional lawsuits are anticipated.

As of January 28, 2019, two Canadian lawsuits relating to Essure™ seeking class action certification had been served upon Bayer. Bayer believes it has meritorious defenses and intends to defend itself vigorously.

Class actions over neonicotinoids in Canada: Proposed class actions against Bayer were filed in Quebec and Ontario (Canada) concerning crop protection products containing the active substances imidacloprid and clothianidin (neonicotinoids). Plaintiffs are honey producers, who have filed a proposed nationwide class action in Ontario and a Quebec-only class action in Quebec. Plaintiffs claim for damages and punitive damages and allege Bayer and another crop protection company were negligent in the design, development, marketing and sale of neonicotinoid pesticides. The proposed Ontario class action is in a very early procedural phase. In Quebec, a court certified a class proposed by plaintiffs in February 2018. Bayer believes it has meritorious defenses and intends to defend itself vigorously.

Roundup™ (Glyphosate): As of January 28, 2019, lawsuits from approximately 11,200 plaintiffs claiming to have been exposed to glyphosate-based products manufactured by Bayer's subsidiary Monsanto had been served upon Monsanto in the United States. Glyphosate is the active ingredient contained in a number of Monsanto's herbicides, including Roundup™-branded products. Plaintiffs allege personal injuries resulting from exposure to those products, including non-Hodgkin lymphoma (NHL) and multiple myeloma, and seek compensatory and punitive damages. Plaintiffs claim, inter alia, that the glyphosate-based herbicide products are defective and that Monsanto knew, or should have known, of the risks allegedly associated with such products and failed to adequately warn its users. Additional lawsuits are anticipated. The majority of plaintiffs have brought actions in state courts in Missouri and California. Cases pending in U.S. federal courts have been consolidated in an MDL in the Northern District of California for common pre-trial management.

In August 2018, a state court jury in San Francisco, California, awarded roughly US$39 million in compensatory and US$250 million in punitive damages to a plaintiff who claimed that a Monsanto product caused his NHL. While the punitive damages were subsequently reduced by the trial court to roughly US$39 million, we still disagree with the verdict and have filed an appeal with the California Court of Appeal. More than 800 scientific studies and regulatory authorities all over the world confirm that glyphosate is safe for use when used according to label instructions. This includes an independent study which followed more than 50,000 licensed pesticide applicators for more than 20 years which found no association between glyphosate-based herbicides and cancer, and the U.S. Environmental Protection Agency's 2017 risk assessment which examined more than 100 studies and concluded that glyphosate is "not likely to be carcinogenic to humans." We continue to believe, therefore, that we have meritorious defenses and we intend to defend ourselves vigorously in all of these lawsuits. The next two trials are currently scheduled for February and March 2019 before a federal court in San Francisco and a state court in California, respectively. Another five trials are currently scheduled in California and Missouri for the remainder of 2019. However, trial dates in all venues remain subject to change depending on court schedules and rulings.

As of January 28, 2019, one Canadian lawsuit relating to Roundup™ seeking class action certification had been served upon Bayer. Bayer believes it has meritorious defenses and intends to defend itself vigorously.

In connection with the above-mentioned product-related litigation, Bayer is insured against statutory product liability claims against Bayer to the extent customary in the respective industries and has, based on the information currently available, taken appropriate accounting measures for anticipated defense costs. However, the accounting measures relating to Essure™ claims exceed the available insurance coverage.

Patent disputes

Adempas™: In January 2018, Bayer filed patent infringement lawsuits in a U.S. federal court against Alembic Pharmaceuticals Limited, Alembic Global Holding SA, Alembic Pharmaceuticals, Inc. and INC Research, LLC (together "Alembic"), against MSN Laboratories Private Limited and MSN Pharmaceuticals Inc. (together "MSN") and against Teva Pharmaceuticals USA, Inc. and Teva Pharmaceutical Industries Ltd. (together "Teva"). In 2017, Bayer had received notices of an Abbreviated New Drug Application with a paragraph IV certification ("ANDA IV") pursuant to which Alembic, MSN and Teva each seek approval of a generic version of Bayer's pulmonary hypertension drug Adempas™ in the United States. In October 2018, the court decided, upon a joint request by Bayer and Teva, that Bayer's patent is valid and infringed by Teva. This terminated the patent dispute with Teva.

Betaferon™/Betaseron™: In 2010, Bayer filed a complaint against Biogen Idec MA Inc. in a U.S. federal court seeking a declaration by the court that a patent issued to Biogen in 2009 is invalid and not infringed by Bayer's production and distribution of Betaseron™, Bayer's drug product for the treatment of multiple sclerosis. Biogen is alleging patent infringement by Bayer through Bayer's production and distribution of Betaseron™ and Extavia™ and has sued Bayer accordingly. Bayer manufactures Betaseron™ and distributes the product in the United States. Extavia™ is also a drug product for the treatment of multiple sclerosis; it is manufactured by Bayer, but distributed in the United States by Novartis Pharmaceuticals Corporation, another defendant in the lawsuit. In 2016, the U.S. federal court decided a disputed issue regarding the scope of the patent in Biogen's favor. Bayer disagrees with the decision, which may be appealed at the conclusion of the proceedings in the U.S. federal court. In February 2018, a jury decided that Biogen's patent is invalid at the end of a trial regarding Biogen's claims against EMD Serono, Inc. ("Serono") and Pfizer Inc. ("Pfizer") for infringement of the same patent. In September 2018, the court overturned the jury decision and granted judgment in favor of Biogen. Serono and Pfizer appealed. The trial of Biogen's claim against Bayer has not yet been scheduled.

Jivi™ (BAY94-9027): In August 2018, Nektar Therapeutics ("Nektar"), Baxalta Incorporated and Baxalta U.S., Inc. (together "Baxalta") filed another complaint in a U.S. federal court against Bayer alleging that BAY94-9027, approved as Jivi™ in the United States for the treatment of hemophilia, infringes five patents by Nektar. The five patents are part of a patent family registered in the name of Nektar and further comprising a European patent application with the title "Branched polymers and their conjugates." This patent family is different from the one at issue in the earlier patent disputes still pending in the United States and Germany. In October 2018, Bayer filed a lawsuit in the administrative court of Munich, Germany, claiming rights to the European patent application based on a past collaboration between Bayer and Nektar in the field of hemophilia. In 2017, Baxalta and Nektar had already filed a complaint in the same U.S. federal court against Bayer alleging that BAY94-9027 infringes seven other patents by Nektar. The seven patents are part of a patent family registered in the name of Nektar and further comprising European patent applications with the title "Polymer-factor VIII moiety conjugates" which are at issue in a lawsuit Bayer had filed against Nektar in 2013 in the district court of Munich, Germany. In this proceeding, Bayer claims rights to the European patent applications based on a past collaboration between Bayer and Nektar in the field of hemophilia. However, Bayer believes that the patent families do not include any valid patent claim relevant for Jivi™.

Stivarga™: In 2016, Bayer filed a patent infringement lawsuit in a U.S. federal court against Apotex, Inc. and Apotex Corp. (together "Apotex"). Bayer had received a notice of an ANDA IV application pursuant to which Apotex seeks approval of a generic version of Bayer's cancer drug Stivarga™ in the United States.

Bayer believes it has meritorious defenses in the above ongoing patent disputes and intends to defend itself vigorously.

Further Legal Proceedings

Trasylol™/Avelox™: A qui tam complaint relating to marketing practices for Trasylol™ (aprotinin) and Avelox™ (moxifloxacin) filed by a former Bayer employee is pending in the United States District Court in New Jersey. Bayer's motion for summary judgment related to the relator's Trasylol claims is pending. The U.S. government has declined to intervene at the present time.

Baycol™: A qui tam complaint (filed by the same relator as in Trasylol™/Avelox™) asserting Bayer fraudulently induced a contract with the Department of Defense is pending in the United States District Court in Minnesota. In October 2018, the District Court judge issued a brief decision denying Bayer's renewed motion to dismiss. The case will now proceed with discovery.

Newark Bay Environmental Matters: In the United States, Bayer is one of numerous parties involved in a series of claims brought by federal and state environmental protection agencies. The claims arise from operations by entities which historically were conducted near Newark Bay or surrounding bodies of water, or which allegedly discharged hazardous waste into these waterways or onto nearby land. Bayer and the other potentially responsible parties are being asked to remediate and contribute to the payment of past and future remediation or restoration costs and damages. In 2016, Bayer learned that two major potentially responsible parties had filed for protection under Chapter 11 of the U.S. Bankruptcy Code. While Bayer remains unable to determine the extent of its liability for these matters, this development is likely to adversely affect the share of costs potentially allocated to Bayer.

In the Lower Passaic River matter, a group of more than sixty companies including Bayer is investigating contaminated sediments in the riverbed under the supervision of the United States Environmental Protection Agency (EPA) and other governmental authorities. Future remediation will involve some form of dredging, the nature and scope of which are not yet defined, and potentially other tasks. The cost of the investigation and the remediation work may be substantial if the final remedy involves extensive dredging and disposal of impacted sediments. In July 2018, Occidental Chemical Company, one of the parties potentially liable for cleanup costs in the Lower Passaic River, filed a lawsuit in New Jersey federal court seeking contribution and cost recovery from dozens of other potentially responsible parties, including a Bayer subsidiary, for past and future cleanup costs. Bayer is currently unable to determine the extent of its liability in this matter. In the Newark Bay matter, an unaffiliated party is currently conducting an investigation of sediments in Newark Bay under EPA supervision. The investigation is in a preliminary stage. Bayer has contributed to certain investigation costs in the past and may incur costs for future investigation and remediation activities in Newark Bay.

Bayer has also been notified by governmental authorities acting as natural resource trustees that it may have liability for natural resource damages arising from the contamination of the Lower Passaic River, Newark Bay and surrounding water bodies. Bayer is currently unable to determine the extent of its liability.

Asbestos: In many cases, plaintiffs allege that Bayer and co-defendants employed third parties on their sites in past decades without providing them with sufficient warnings or protection against the known dangers of asbestos. Additionally, a Bayer affiliate in the United States is the legal successor to companies that sold asbestos products until 1976. Union Carbide has agreed to indemnify Bayer for this liability. Similarly, Bayer's subsidiary Monsanto faces numerous claims based on exposure to asbestos at Monsanto premises without adequate warnings or protections and based on manufacture and sale of asbestos-containing products. Bayer believes it has meritorious defenses and intends to defend itself vigorously.

One A Day™ vitamins: Bayer has been named in a class action lawsuit in the United States alleging Bayer's claims on its One A Day™ vitamins regarding the support of heart health, immunity and physical energy are false and misleading. The class is defined as California, Florida and New York residents who purchased One A Day™ products with the claims at issue. In September 2018, plaintiffs asserted through the filing of an expert report their alleged potential damages. Bayer's challenge of the class certification is currently pending in the Court of Appeals for the Ninth Circuit. Bayer believes it has meritorious defenses and intends to defend itself vigorously.

PCB: Bayer's subsidiary Monsanto has been named in lawsuits brought by various governmental entities in the United States claiming that Monsanto, Pharmacia and Solutia, collectively as a manufacturer of PCBs, should be responsible for a variety of damages due to PCBs in bodies of water, regardless of how PCBs came to be located there. Monsanto also faces numerous lawsuits claiming personal injury and/or property damage due to use of and exposure to PCB products. PCBs are man-made chemicals that were widely used for various purposes until the manufacture of PCBs was prohibited by the Environmental Protection Agency (EPA) in the United States in 1979. We believe that we have meritorious defenses and intend to defend ourselves vigorously.

Tax Proceedings

Stamp taxes in Greece: In 2014, 2016 and 2017, a Greek administrative court of first instance dismissed Bayer's lawsuits against the assessment of stamp taxes and contingent penalties in a total amount of approximately €130 million on certain intra-Group loans to a Greek subsidiary. Bayer is convinced that the decisions are wrong and either has appealed the relevant decisions or plans to do so in due course. Bayer believes it has meritorious arguments to support its legal position and intends to defend itself vigorously.

Notes to the Statements of Cash Flows

The statement of cash flows shows how cash inflows and outflows during the fiscal year affected the cash and cash equivalents of the Bayer Group.

Of the cash and cash equivalents, an amount of €14 million (2017: €17 million) had limited availability due to foreign exchange restrictions. Past experience has shown such restrictions to be of short duration.

The cash flows reported by consolidated companies outside the eurozone are translated at average monthly exchange rates, with the exception of cash and cash equivalents, which are translated at closing rates. The “Change in cash and cash equivalents due to exchange rate movements” is reported in a separate line item.

30. Net cash provided by (used in) operating, investing and financing activities

The operating cash flow (total) declined by 2.7% in 2018, to €7,917 million. Covestro was still included in the prior-year period. The operating cash flow from continuing operations was up 19.8% from the previous year.

The net cash outflow for investing activities in 2018 amounted to €34,152 million (2017: €432 million). There was an outflow of €45,290 million for the acquisition of Monsanto, net of €2,657 million in cash acquired from Monsanto. There was a net inflow of €7,291 million from the divestments to BASF. Additions to property, plant and equipment and intangible assets in 2018 resulted in a cash outflow of €2,593 million (2017: €2,366 million). Cash inflows from sales of property, plant and equipment and intangible assets amounted to €230 million (2017: €241 million). The net cash inflow from noncurrent and current financial assets amounted to €5,717 million (2017: €1,230 million), and included net inflows of €2,909 million from the sale and repurchase of Covestro shares.

There was a net cash inflow of €23,432 million (2017: net cash outflow of €1,881 million) for financing activities. Net borrowings amounted to €17,819 million (2017: net loan repayments of €2,479 million). Cash outflows for dividend payments amounted to €2,407 million (2017: €2,364 million). Net interest payments – including payments for and receipts from interest-rate swaps – increased to €919 million (2017: €732 million). Capital increases resulted in an inflow of €8,986 million.

The change in financial liabilities is presented in the following table:

B 30/1

Financial Liabilities

		Cash flows	Noncash changes				
€ million	Dec. 31, 2017		Acquisition	Currency effects	New contracts	Fair value changes[1]	Dec. 31, 2018
Bonds and notes/promissory notes	12,436	16,803	5,596	648	–	(81)	35,402
Liabilities to banks	534	3,352	1,072	(93)	–	–	4,865
Liabilities under finance leases	238	(43)	133	9	62	–	399
Liabilities from derivatives	240	(1)	1	(1)	–	(67)	172
Other financial liabilities	970	(2,292)	1,855	14	–	9	556
Total	**14,418**	**17,819**	**8,657**	**577**	**62**	**(139)**	**41,394**

[1] Including discount effects

Other Information

31. Audit fees

Deloitte has been Bayer's auditor since 2017. The Independent Auditor's Report on the consolidated financial statements for fiscal 2018 was signed by Heiner Kompenhans and Prof. Frank Beine. Both signed the Independent Auditor's Report for the first time for the year ended December 31, 2017, and are the responsible audit partners.

The following fees for the services of the worldwide network of Deloitte or Deloitte GmbH Wirtschaftsprüfungsgesellschaft (Deloitte GmbH WPG) were recognized as expenses:

B 31/1

Audit Fees

	Deloitte		of which Deloitte GmbH WPG	
€ million	**2017**	**2018**	**2017**	**2018**
Financial statements auditing	9	15	3	6
Audit-related services and other audit work	2	3	2	3
Tax consultancy	1	3	–	–
Other services	5	4	4	2
Total	**17**	**25**	**9**	**11**

The fees for the auditing of financial statements mainly comprised those for the audits of the consolidated financial statements of the Bayer Group and the financial statements of Bayer AG and its subsidiaries. The non-audit-related services primarily related to due diligence services concerning business entities considered for divestment (Other services), the assessment of financial and nonfinancial information outside of financial statement auditing (Audit-related services and other audit work), and compliance-related tax consultancy services that had neither a material or direct impact on the annual financial statements or consolidated financial statements.

32. Related parties

Related parties as defined in IAS 24 are those legal entities and natural persons that are able to exert influence on Bayer AG and its subsidiaries or over which Bayer AG or its subsidiaries exercise control or joint control or have a significant influence. They include, in particular, nonconsolidated subsidiaries, joint ventures and associates included in the consolidated financial statements at fair value or using the equity method, and post-employment benefit plans. Related parties also include the corporate officers of Bayer AG whose compensation is reported in Note [33] and in the Compensation Report, which forms part of the Combined Management Report.

B 32/1

Related Parties

€ million	Sales of goods and services 2017	Sales of goods and services 2018	Purchase of goods and services 2017	Purchase of goods and services 2018	Receivables 2017	Receivables 2018	Liabilities 2017	Liabilities 2018
Nonconsolidated subsidiaries	5	8	6	5	6	8	16	26
Joint ventures	25	1	–	–	3	4	164	178
Associates	84	219	84	36	119	2	87	3
Post-employment benefit plans	–	–	–	–	974	837	70	215

Intercompany profits and losses for companies accounted for in the consolidated financial statements using the equity method were immaterial in 2018 and 2017.

Covestro ceased to be recognized as an associate in May 2018. Receivables and liabilities from associates therefore declined.

In May 2018, Bayer AG acquired 6.8% of Covestro shares from Bayer Pension Trust e. V. at market value for a total amount of €1.1 billion to service the exchangeable bond that matures in 2020. As a result of the stock buyback program implemented by Covestro AG, we held 7.5% of shares in that company as of December 31, 2018.

Bayer AG has undertaken to provide jouissance right capital (Genussrechtskapital) in the form of an interest-bearing loan with a nominal volume of €150 million (2017: €150 million) for Bayer-Pensionskasse VVaG. The entire amount remained drawn as of December 31, 2018. The carrying amount was €152 million (2017: €152 million). Loan capital was first provided to Bayer-Pensionskasse VVaG in 2008 for its effective initial fund. This capital had a nominal volume of €635 million as of December 31, 2018 (2017: €595 million). The carrying amount was €643 million (2017: €605 million). The outstanding receivables, comprised of different tranches, are each subject to a five-year interest-rate adjustment mechanism. Interest income of €16 million (2017: €15 million) and expenses of €8 million due to fair value changes were recognized for 2018.

As in the prior year, we did not recognize any material impairment losses on receivables from associates in 2018.

33. Total compensation of the Board of Management and the Supervisory Board, advances and loans

In 2018, the compensation of the Supervisory Board amounted to €3,897 thousand (2017: €3,703 thousand), and the compensation of the Board of Management totaled €20,552 thousand (2017: €26,168 thousand). The total compensation of the Board of Management included a short-term component of €15,149 thousand (2017: €11,304 thousand) and a long-term component of €5,403 thousand (2017: €12,886 thousand), with stock-based compensation accounting for €1,914 thousand (2017: €8,979 thousand) of this figure.

Pension payments to former members of the Board of Management and their surviving dependents in 2018 amounted to €17,138 thousand (2017: €12,758 thousand). The defined benefit obligation for former members of the Board of Management and their surviving dependents amounted to €185,736 thousand (2017: €184,479 thousand). In addition, severance payments of €0 thousand (2017: €1,978 thousand) were made in connection with the termination of a service contract. There were no advances or loans to members of the Board of Management or the Supervisory Board outstanding as of December 31, 2018, nor at any time during 2018 or 2017.

Further details of the compensation of the Board of Management and Supervisory Board are given in the Compensation Report within the Management Report.

34. Events after the end of the reporting period

Repayment of financial liabilities

The syndicated credit facility drawn in June 2018 to finance the acquisition of Monsanto was reduced by a further US$1.1 billion to US$3.8 billion in February 2019.

PEGylated factor VIII:

In February 2019, a federal court jury awarded US$155 million in damages to Bayer at the end of a trial regarding Bayer's claims against Baxalta Incorporated and Baxalta US Inc. (Baxalta) for infringement of a Bayer patent. In 2016, Bayer had filed a complaint in a U.S. federal court against Baxalta, a subsidiary of Takeda Pharmaceutical Company Limited, for infringement of the patent by Adynovate™ (PEGylated recombinant factor VIII), approved in the United States for the treatment of hemophilia. Baxalta may appeal.

Leverkusen, February 19, 2019

Bayer Aktiengesellschaft

The Board of Management

Responsibility Statement

To the best of our knowledge, and in accordance with the applicable reporting principles for financial reporting, the consolidated financial statements give a true and fair view of the assets, liabilities, financial position and profit or loss of the Bayer Group, and the combined management report includes a fair review of the development and performance of the business and the position of the Bayer Group and Bayer AG, together with a description of the principal opportunities and risks associated with the expected development of the Bayer Group and Bayer AG.

Leverkusen, February 19, 2019
Bayer Aktiengesellschaft

The Board of Management

Werner Baumann
Chairman

Liam Condon

Dr. Hartmut Klusik

Kemal Malik

Wolfgang Nickl

Stefan Oelrich

Heiko Schipper

Independent Auditor's Report

To: Bayer Aktiengesellschaft, Leverkusen

REPORT ON THE AUDIT OF THE CONSOLIDATED FINANCIAL STATEMENTS AND THE COMBINED MANAGEMENT REPORT

Audit opinions

We audited the consolidated financial statements of Bayer Aktiengesellschaft, Leverkusen, and its subsidiaries (the Group) – consisting of the consolidated balance sheet as of December 31, 2018, the consolidated income statement and consolidated statement of comprehensive income, the consolidated statement of cash flows and the consolidated statement of changes in equity for the fiscal year from January 1 through December 31, 2018 and also the Notes to the consolidated financial statements, together with a summary of significant accounting methods. Furthermore, we audited the management report of Bayer Aktiengesellschaft, Leverkusen, combined with the management report of the parent company, for the fiscal year from January 1 through December 31, 2018. In accordance with German statutory provisions, we did not audit the contents of the components of the combined management report named in the Appendix to our auditors' report.

In our opinion, based on the findings of our audit,

- the accompanying consolidated financial statements comply in all material respects with the IFRS as adopted by the EU and the additional requirements of German law pursuant to § 315e (1) HGB and give a true and fair view of the net assets and financial position of the Group as of December 31, 2018 and of its results of operations for the fiscal year from January 1, 2018 through December 31, 2018; and
- the accompanying combined management report provides a suitable overall view of the Group's situation. In all material respects, this combined management report is consistent with the consolidated financial statements, complies with German legal requirements, and suitably presents the opportunities and risks of future development. Our audit opinion on the combined management report does not extend to the content of the components of the combined management report mentioned in the Appendix to the auditors' report.

In accordance with Section 322 (3.1) HGB, we state that our audit has not led to any objections to the correctness of the consolidated financial statements and the combined management report.

Basis for the audit opinions

We conducted our audit of the consolidated financial statements and the combined management report in accordance with Section 317 HGB and the EU Auditors' Regulation (No. 537/2014; hereafter referred to as "EU Audit Regulation") in compliance with the generally accepted German standards for the audit of financial statements promulgated by the Institut der Wirtschaftsprüfer (IDW). We conducted our audit of the consolidated financial statements with additional regard for the International Standards on Auditing (ISA). Our responsibility pursuant to these regulations, principles, and standards is described in more detail in the section "Auditor's responsibility for the audit of the consolidated financial statements and the combined management report" of our Audit Report. We are independent of the Group companies in accordance with European and German commercial and professional regulations and have fulfilled our other German professional obligations in accordance with these requirements. Furthermore we state, in accordance with Article 10 (2f) EU Audit Regulation, that we have rendered no inadmissible non-audit services within the meaning of Article 5 (1) EU Audit Regulation. We believe that the audit evidence we obtained is sufficient and appropriate to provide a basis for our audit opinions on the consolidated financial statements and combined management report.

Particularly important audit issues in the audit of the consolidated financial statements

Particularly important audit issues are those issues that we considered – at our due discretion – to be the most significant in our audit of the consolidated financial statements for the fiscal year from January 1 through December 31, 2018. These issues have been taken into account in connection with our audit of the consolidated financial statements as a whole and in forming our opinion thereon; we do not express a separate opinion on these issues.

We present below what we consider to be the particularly important audit issues:

1. Acquisition of Monsanto Company
2. Intrinsic value (recoverability) of goodwill and brand rights
3. Depiction of risks from product-related legal disputes
4. Depiction of research and development costs
5. Financial instruments – hedge accounting
6. Adjustments to EBITDA and EBIT for special items

We have structured our presentation of these particularly important audit issues as follows:

a) Description of issue (including reference to associated disclosures in the consolidated financial statements)
b) Audit approach

1. Acquisition of Monsanto Company

a) On June 7, 2018, the Bayer Group acquired 100% of the outstanding shares of Monsanto Company, based in St. Louis, Missouri, United States, (Monsanto), for a purchase price of EUR 48bn. Bayer accounts for the business combination in accordance with IFRS 3.

The assets, liabilities, and contingent liabilities recognized at fair value in connection with the acquisition of the Monsanto business are based on values from the purchase price allocation performed by Bayer on the basis of a preliminary valuation opinion prepared on February 8, 2019, by KPMG Aktiengesellschaft, Munich, as a neutral expert. Previously unrecognized intangible assets were recognized primarily for seed and trait technologies, herbicides and digital platforms (EUR 17,152m), research and development projects (EUR 4,637m), and product brand rights (EUR 3,941m). The fair values underlying the purchase price allocation are derived from expert valuations based on asset-specific, maturity-dependent discount rates (6,3% to 11.8%) and were determined on the basis of Bayer's planning as of the acquisition date, with the technologies in particular taking appropriate account of separability and economic value added. Taking into account the other net assets measured at fair value, goodwill amounts to EUR 24,455m (51% of the consideration transferred). The write-downs to assets recognized at fair value, in particular technologies and brands, resulted in expenses of EUR 1,045m in the year under review. The goodwill recognized in the balance sheet is subject to an annual impairment test (cf. topic 2.).

Within the framework of our audit, the matter was of particular significance due to the complexity of the transaction and the associated risk of material misrepresentations of the net assets, financial position, and results of operations as well as the assumptions and discretionary estimates made by Management in carrying out the purchase price allocation.

The Company's disclosures on the acquisition of the Monsanto Group are contained in Section 5.2 of the Notes to the consolidated financial statements.

b) Within the framework of our audit we verified, among other things on the basis of the inter-company agreements and the stipulations of the antitrust authorities as well as the criteria defined in IFRS 10, Management's assessment that Bayer took control of Monsanto on June 7, 2018, and is required to consolidate it in the consolidated financial statements.

Within the framework of the audit of the preliminary purchase price allocation, we evaluated the consideration transferred by Bayer and the methodical approach of the external appraiser engaged by Management with regard to the identification of the acquired assets and the conceptual assessment of the valuation models, taking into account the requirements of IFRS 3. In consultation with our internal valuation specialists, we reconstructed the valuation methods applied, taking into account the requirements of IFRS 13. We analyzed assumptions and discretionary estimates such as growth rates, capital costs, license rates or remaining useful lives to determine the fair values of the acquired and identifiable assets and liabilities and contingent liabilities assumed at the acquisition date to determine whether these correspond to general and industry-specific market expectations. We reconstructed the models on which the valuations are based and plausibilized the expected future cash flows adduced and compared the fair values with the assumptions and expectations of expert external market participants at the time of acquisition. One emphasis of our audit was on determining the fair values of technologies and research projects.

We also examined whether the accounting methods complying with Bayer accounting principles were applied uniformly at the Monsanto companies and whether the tax effects of the business combination were recognized in the balance sheet. We retraced the presentation of the initial consolidation, including the non-controlling interests, in the consolidation system. We also audited the disclosures in the notes to the consolidated financial statements relating to the acquisition of the Monsanto Group according to the relevant requirements of IFRS 3.

2. Intrinsic value (recoverability) of goodwill and brand rights

a) In the consolidated financial statements, an amount of EUR 38,146m (30% of total Group assets) is reported under the balance sheet item “Goodwill”. In addition, brand rights of EUR 9,104m (7% of the Group's total assets) are reported under “Other intangible assets”. The Company allocates goodwill to the strategic business units or groups of strategic business units within the Bayer Group. Regular impairment tests of goodwill and case-related impairment tests of brand rights compare the respective carrying amounts with their recoverable amounts. Fundamentally, the recoverable amount is determined on the basis of the fair value less costs to sell. The present value of future cash flows is used as a basis, since as a rule no market values are available for the individual strategic business units. The present value is determined using discounted cash flow models based on the Bayer Group's four-year operating planning drawn up by Management and approved by the Supervisory Board and perpetuated with assumptions about long-term growth rates. Discounting is based on the weighted average cost of capital of the reporting segments concerned. The result of this valuation depends to a large extent on the estimates by the Management of the future cash flows of the strategic business unit concerned and the discount rate used and is therefore fraught with considerable uncertainty. In the light of this, and owing to the underlying complexity of the valuation models, this issue was of particular importance within the framework of our audit.

The Company's disclosures on goodwill and brand rights are contained in Sections 3 and 14 of the Notes to the consolidated financial statements.

b) In our audit, among other things we reconstructed the methodology used to perform the impairment tests and assessed the calculation of the weighted cost of capital. We convinced ourselves of the appropriateness of the future cash inflows used in the valuation, among other things by recording and critically assessing the underlying planning process. We also compared this information with the current budget from the four-year plan drawn up by Management and approved by the Supervisory Board, and reconciled it with general and industry-specific market expectations. For this, we also convinced ourselves that the costs of the Group functions included in the Corporate Functions and Consolidation segment of segment reporting were appropriately taken into account in the impairment test of the strategic business unit concerned. We studied intensively the parameters used to determine the discount rate applied and assessed the completeness and correctness of the calculation scheme. Owing to the material significance of goodwill, we further performed additional sensitivity analyses of our own for the strategic business units (carrying amount in comparison to the recoverable amount).

3. Depiction of risks arising from product-related legal disputes

a) Bayer Group companies are involved in legal and out-of-court proceedings with public authorities, competitors, and other parties. These give rise to legal risks, in particular in the areas of product liability, competition and anti-trust law, patent law, tax law, and environmental protection.

In addition, by January 28, 2019, Monsanto, a subsidiary of Bayer AG, had been served in the United States with actions for compensation and punitive damages by approximately 11,200 plaintiffs alleging that their contact with products containing glyphosate manufactured by Monsanto had resulted in damage to their health. In addition, by January 28, 2019, the Bayer Group had been served in the United States with claims for compensation and punitive damages from about 24,900 users of the product Xarelto™. By January 28, 2019, the Bayer Group had been served with lawsuits in the USA by about 29,400 users of Essure™, in each of which compensation and punitive damages were likewise claimed. Against the background of pending and expected product liability lawsuits relating to the product Mirena™, by January 28, 2019 the Bayer Group had been served in the United States with lawsuits from approximately 2,360 users of Mirena™.

Whether a pending legal dispute makes the recognition of a provision to cover the risk necessary and, if so, to what extent, is determined to a large extent by estimates and assumptions by Management. Against this background, and in view of the amount of the claims asserted, the above-mentioned product-related disputes of the Bayer Group were of particular significance from our point of view.

The disclosures about and explanations of the legal disputes mentioned are contained in Section 29 of the Notes to the consolidated financial statements.

b) Within the framework of our audit, we assessed, among other things, the process established by the Company to ensure the recognition, the estimate of the outcome of the proceedings, and the accounting presentation of a legal dispute. Furthermore, we held regular discussions with the Company's internal legal department in order to be informed about current developments and the reasons that led to the corresponding estimates. The development of material legal disputes, including the estimates by Management with regard to the possible outcome of proceedings, was made available to us in writing by Bayer AG's internal legal department. As of the closing date, we furthermore obtained external attorney's certificates, which we compared with the risk assessment made by Management about the product-related disputes named in the "Description of the facts" section. Taking these estimates into account, we also critically assessed the assumptions underlying the provisions for expected defense costs and checked the amount of the provisions for plausibility on the basis of experience from similar proceedings in the past and on other evidence.

4. Depiction of restructuring issues

a) At the end of 2018, the Management of Bayer Aktiengesellschaft announced a comprehensive restructuring program for the entire Bayer Group. The program essentially involves the cutback of up to 12,000 jobs in the next three fiscal years. A provision of EUR 611m was recognized for the severance payment obligations specified up to the end of the fiscal year. A not inconsiderable part of the job cuts is attributable to Germany, where redundancies for operational reasons are excluded until 2025 owing to works agreements. In order to implement the restructuring program, appropriate discussions with employee bodies were already held in 2018, as a basis for job cuts and for the recognition of restructuring provisions. In our opinion, this matter was of particular importance for our audit, as the recognition and measurement of the provision are to a large extent based on estimates and assumptions made by Management.

The Group's disclosures on the restructuring provision are contained in Section 23 of the Notes to the consolidated financial statements.

b) We investigated whether a restructuring provision that is in accordance with the definition in IAS 37.10 has been recognized. To this end, we verified compliance with the general recognition and measurement requirements for provisions, including the criteria of IAS 37.70 et seq. that further specify these requirements and – insofar as provisions for employee benefits in connection with the termination of employment are involved – with the relevant provisions of IAS 19. For this purpose, we received and verified the corresponding evidence and calculation documents from Management. We critically assessed and verified the plausibility of the estimates and assumptions of Management on which the evidence and calculation principles are based as to the extent to which the recognition and amount of the provisions are appropriate. In particular, we evaluated information documents (resolutions, minutes, presentations) supplied to employee representatives in Germany as to whether the employees were sufficiently informed thereby in concrete terms about the restructuring programs and individual components of the planned restructuring measures in the 2018 fiscal year. We furthermore investigated whether and to what extent Management had informed the employees in the various departments and/or at the various locations about the planned job cuts. Based on this, we examined whether the criteria for the recognition of the provision had been met as of the balance sheet date. In order to check the plausibility of the amount of the provisions, we analyzed, among other things, the job reduction programs developed in the personnel departments with regard to the premises set for the amount of severance offers to employees and the expected acceptance rates. We discussed the restructuring programs in detail with those responsible in the personnel departments and critically questioned the premises that had been set. We also examined the disclosures in the Notes to the consolidated financial statements relating to the restructuring measures in the light of the relevant requirements of IAS 37.

5. Financial instruments - hedge accounting

a) Bayer Group companies conclude a large number of different derivative financial instruments to hedge against currency, commodity price, and interest rate risks from ordinary business operations. The basis for this is the hedging policy prescribed by Management, which is documented in appropriate internal guidelines. The currency risk essentially results from sales and procurement transactions, and also financing transactions in foreign currencies. Raw material price risks are primarily associated with procurement transactions, in particular the procurement of propagated seed. The aim of interest rate hedging is to achieve a reasonable relationship between variable and fixed interest rates. Derivative financial instruments are recognized at their fair value as of balance sheet date. The positive fair values of all derivative financial instruments used as hedges amount to EUR 204m as of the closing date (i.e., 0.2% of total Group assets), the negative fair values amounted to EUR 482m (i.e., 0.4% of total Group assets). To the extent that the financial instruments used by the Bayer Group are effective hedges of future cash flows under hedge accounting in accordance with IFRS 9, changes in fair value are recognized in equity until the due date of the hedged cash flow (effective portion) over the term of the hedge relationship. As of the balance sheet date, a cumulative amount of EUR 115m had been recognized as expenses and income not affecting pre-tax profit or loss. From our point of view, these issues were of particular significance due to the high complexity and large number of transactions as well as the extensive accounting and reporting requirements imposed by IFRS 9, which is to be applied for the first time in 2018.

The disclosures on hedge accounting are contained in Sections 3 and 27 of the Notes to the consolidated financial statements.

b) Within the framework of our audit, and with the support of our internal specialists from the Financial Risk unit, we assessed the contractual and financial fundamentals of the financial instruments, among other things, and reconstructed the accounting, including the effects on equity and earnings of the various hedging transactions. Jointly with our specialists, we also assessed the Company's internal control system in the area of derivative financial instruments, including the internal monitoring of compliance with the hedging policy, and reviewed the controls with regard to design, implementation, and effectiveness. Furthermore, while auditing the fair value measurement of the financial instruments, we also checked, on the basis of market data and within the framework of our risk assessment, the calculation methods of representatively selected samples and reconstructed the correct implementation of the methods in the system. We also based our assessment of the completeness of the transactions recognized on a portfolio comparison with the counterparties. In order to audit the effectiveness of the hedging transactions, we analyzed the various methods (prospectively critical term match method; retrospectively dollar offset method) and, within the framework of our risk assessment, traced their correct implementation in the system. With regard to the expected cash flows, we essentially assessed the past hedging ratios in retrospect.

6. Adjustments to EBITDA and EBIT for special items

a) For management and analysis purposes, the Bayer Group adduces EBITDA (Earnings Before Interest, Taxes, Depreciation, and Amortization, and also impairment losses and reinstatements), adjusted for special items (by their nature or amount special effects). Bayer AG's segment reporting in the consolidated financial statements discloses adjustments of EUR 2,566m to EBIT and EUR +719m to EBITDA. EBIT adjusted for special items are used for the calculation of adjusted net income from continuing operations, which is needed to calculate adjusted earnings per share from continuing operations (core EPS). EBITDA adjusted for special items and core EPS are used by Bayer as key financial performance indicators in its capital market communications. These two key indicators are furthermore adduced as the degree of target achievement for the annual performance-based compensation of Bayer Group employees. The adjustments to EBIT and EBITDA were of particular significance within the framework of our audit, as they are made on the basis of the Bayer Group's internal accounting guideline and there is a risk that Management might exercise their discretionary powers one-sidedly.

The Company's disclosures on the adjustments to EBIT and EBITDA and the derivation thereof are presented in Section 4 of the Notes to the consolidated financial statements.

b) We reconstructed the calculation of EBIT and EBITDA adjusted for special items and critically examined the identification of the Group companies' special items taken into account by Management. We analyzed the composition of the adjustments to determine the extent to which the individual components comply with the relevant internal guidelines for special items and have been appropriately eliminated from EBIT and EBITDA. At the same time we made use of the findings of our audit and the information provided to us by Management to examine whether the adjustments were made in accordance with the definitions and procedure set out in the notes to the combined management report and segment reporting.

Other information

Management is responsible for the other information. This other information includes:

- // the components of the combined management report named in the Appendix to the Auditors' Report that were not audited as to their contents,
- // the declaration by Management regarding the consolidated financial statements and the combined management report pursuant to § 297 (2.4) HGB and § 315 (1.5) HGB, and
- // the remaining components of the annual report, with the exception of the audited consolidated financial statements and the combined management report and our Auditors' Report.

Our audit opinions on the consolidated financial statements and on the combined management report do not extend to this other information and, accordingly, we express neither an opinion nor any other form of audit conclusion on them.

In connection with our audit of the consolidated financial statements, it is our responsibility to read the other information and to assess whether the other information

- // displays significant discrepancies with the consolidated financial statements, the combined management report or with our knowledge gained during the audit,
- // otherwise appears to be substantially incorrectly presented.

Should we, on the basis of our work, conclude that there is a material misrepresentation in this other information, we are required to report on this fact. We have nothing to report in this connection.

Responsibility of the Management and the Supervisory Board for the consolidated financial statements and the combined management report

Management is responsible for the preparation of consolidated financial statements which comply in all material respects with the IFRSs as adopted by the EU, and with the additional requirements of German law pursuant to Section 315e (1) HGB, and for ensuring that the consolidated financial statements give a true and fair view of the net assets, financial position, and results of operations of the Group while observing these requirements. Management is furthermore responsible for the internal controls which they have determined are necessary to enable the preparation of consolidated financial statements that are free from material misstatements, whether intentional or unintentional.

In preparing the consolidated financial statements, Management is responsible for assessing the Group's ability to continue its business activities. Furthermore, they are responsible for disclosing matters relating to the continuation of business activities, if relevant. They are moreover responsible for accounting on the basis of the accounting policy of continuing operations, unless there is an intention to liquidate the Group or discontinue operations, or there is no realistic alternative.

Management is also responsible for preparing the combined management report, which as a whole provides a suitable view of the Group's situation and is consistent in all material respects with the consolidated financial statements, complies with German legal requirements and suitably presents the opportunities and risks of future development. Management is further responsible for the arrangements and measures (systems) that they deem necessary to enable the preparation of a combined management report in accordance with the applicable German legal provisions and to provide sufficient suitable evidence for the assertions in the combined management report.

The Supervisory Board is responsible for monitoring the Group's accounting process for preparing the consolidated financial statements and the combined management report.

Auditors' responsibility for the audit of the consolidated financial statements and the combined management report

Our objective is to obtain reasonable assurance as to whether the consolidated financial statements as a whole are free from material – intentional or unintentional – misstatements, and whether the combined management report as a whole provides a suitable view of the Group's situation and is in all material respects consistent with the financial statements and with the findings of the audit, complies with German legal requirements, and suitably presents the opportunities and risks of future development, and to issue an auditors' report containing our audit opinions on the consolidated financial statements and the combined management report.

Reasonable assurance is a high degree of certainty, but there is no guarantee that an audit conducted in accordance with Section 317 HGB and the EU Audit Regulation, observing generally accepted auditing principles for the audit of financial statements promulgated by the Institute of Public Auditors in Germany (IDW), and in supplementary observance of the ISAs will always reveal a material misrepresentation. Misstatements may result from violations or inaccuracies and are considered material if it is reasonable to expect that they will affect, individually or collectively, the economic decisions of addressees made on the basis of these consolidated financial statements and the combined management report.

During the audit, we exercise due discretion and maintain a critical attitude. In addition to this

- we identify and assess the risks of material misstatements – whether intentional or unintentional – in the consolidated financial statements and the combined management report, plan and perform audit procedures in response to these risks, and obtain audit evidence that is sufficient and adequate to serve as a basis for our audit opinions. The risk that material misrepresentations are not detected is higher for violations than for inaccuracies, as violations may involve fraudulent collaboration, forgeries, intentional incompleteness, misleading representations, or the overriding of internal controls.
- we gain an understanding of the internal control system relevant to the audit of the consolidated financial statements and the arrangements and measures relevant to the audit of the combined management report to plan audit procedures that are appropriate in the circumstances, but not with the objective of expressing an audit opinion on the effectiveness of these of the Company's systems.
- we assess the appropriateness of the financial reporting methods applied by Management and the tenability of the estimates and related disclosures made by Management.
- we draw conclusions on the appropriateness of the application of the going-concern accounting principle applied by Management and, on the basis of the audit evidence obtained, whether there is essential uncertainty in connection with events or circumstances that might give rise to significant doubts about the Group's ability to continue operations. If we come to the conclusion that there is essential uncertainty, we are obliged to draw attention to the related disclosures in the consolidated financial statements and the combined management report or, if these disclosures are inappropriate, to modify our relevant audit opinion. We draw our conclusions based on the audit evidence obtained up to the date of our audit opinion. However, future events or circumstances may result in the Group no longer being able to continue its business activities.
- we assess the overall presentation, the structure and content of the consolidated financial statements, including the disclosures, and whether the consolidated financial statements present the underlying transactions and events in such a way that the consolidated financial statements give a true and fair view of the net assets, financial position, and results of operations of the Group in accordance with IFRSs as adopted by the EU and the additional requirements of German law pursuant to Section 315e (1) HGB.
- we obtain sufficient suitable audit evidence for the accounting information of the companies or business activities within the Group in order to give our opinion on the consolidated financial statements and the combined management report. We are responsible for the guidance, supervision, and conduct of the audit of the consolidated financial statements. We bear sole responsibility for our audit opinions.
- we assess the conformity of the combined management report with the consolidated financial statements, its legal compliance, and the view it provides of the Group's situation.

- we perform audit procedures on the forward-looking statements presented by Management in the combined management report. On the basis of adequate and suitable audit evidence, we trace in particular the significant assumptions on which Management's forward-looking statements are based and assess the proper derivation of the forward-looking statements from these assumptions. We do not express a separate audit opinion on the forward-looking statements or on the underlying assumptions. There is a significant, unavoidable risk that future events will differ materially from the forward-looking statements.

We discuss, with those responsible for monitoring, among other things the planned scope and timing of the audit and also significant audit findings, including any deficiencies in the internal control system that we identify during our audit.

We address a declaration that we have complied with the relevant independence requirements to those responsible for monitoring and discuss with them all relationships and other issues reasonably likely to affect our independence, and the safeguards we have put in place.

On the basis of the issues which we discussed with those responsible for monitoring, we determine the issues that were most significant for the audit of the consolidated financial statements in the current reporting period and are therefore the particularly important audit issues. We describe these issues in the auditor's report, unless laws or other legal provisions exclude the disclosure of such issues.

OTHER STATUTORY AND LEGAL REQUIREMENTS

Other disclosures pursuant to Article 10 EU Audit Regulation

We were elected as auditors by the Annual General Meeting on May 25, 2018. We were engaged by the Supervisory Board on July 10, 2018. We have been working uninterruptedly as statutory auditors of the consolidated financial statements of Bayer Aktiengesellschaft, Leverkusen, since the 2017 fiscal year.

We declare that the audit opinions contained in this Auditor's Report are consistent with the additional report to the Audit Committee pursuant to Article 11 EU Audit Regulation (Audit Report).

RESPONSIBLE AUDITOR

The public auditor responsible for the audit is Prof. Dr. Frank Beine.

Munich, February 20, 2019

Deloitte GmbH
Wirtschaftsprüfungsgesellschaft

Heiner Kompenhans German Public Auditor	Prof. Dr. Frank Beine German Public Auditor

Appendix to the Auditors' Report: components of the combined management report that were not audited as to their contents

We did not audit the following components of the combined management report as to their contents:

- the parts marked "audited with limited assurance" and the following sections of the non-financial statement integrated in the combined management report pursuant to Sections 289b to 289e, 315b and 315c HGB:

Section	Chapter
Diverse stakeholders in focus	1.2.3 Sustainability Management
Collaboration formats aimed at specific target groups	1.2.3 Sustainability Management
Binding and transparent compensation structures	1.4.1 Employees
Quality management of segments	1.6.1 Product Stewardship
Biodiversity in the segments	1.6.1 Product Stewardship
Commitment to reducing animal studies	1.6.1 Product Stewardship
Global pharmaceutical monitoring system	1.6.1 Product Stewardship
Processes in plant biotechnology	1.6.1 Product Stewardship
Training of farmers and Bayer employees	1.6.1 Product Stewardship
Occupational illnesses	1.6.2 Occupational, Plant and Transportation Safety
Other Direct Air Emissions	1.6.3 Environmental Protection
Water Use in the Bayer Group 2018	1.6.3 Environmental Protection
Waste by Means of Disposal	1.6.3 Environmental Protection
Liaison offices – Contact with poltical stakeholders	4.2 Compliance

- the corporate governance statement pursuant to Section 289f and Section 315d HGB contained in Chapter 4.1 of the combined management report.

Furthermore, we did not audit the content of the following disclosures that are not normally part of the management report. Disclosures that are not normally part of the management report in the combined management report are disclosures that are neither required by Sections 289 to 289f, 315 to 315d of the German Commercial Code (HGB) nor by DRS 20.

- The information in section 2.2.2 of the combined management report on pro forma sales by strategic business unit of the Crop Science Division.

Independent Auditor's Report on a Limited Assurance Engagement on Sustainability Information

To Bayer Aktiengesellschaft, Leverkusen (Germany)

Our engagement

According to our engagement, we have performed a limited assurance engagement on the following information within the combined management report 2018 of Bayer Aktiengesellschaft, Leverkusen (Germany), for the period from January 1 to December 31, 2018: Diverse stakeholders in focus, Collaboration formats aimed at specific target groups, Binding and transparent compensation structures, Quality management of segments, Biodiversity in the segments, Commitment to reducing animal studies, Global pharmaceutical monitoring system, Processes in plant biotechnology, Training of farmers and Bayer employees, Occupational illnesses, Other Direct Air Emissions, Water Use in the Bayer Group 2018, Waste by Means of Disposal and Liaison offices – Contact with political stakeholders.

Our engagement does not include links to web pages.

Responsibility of the executive directors

The executive directors of Bayer Aktiengesellschaft are responsible for the preparation of infor-mation listed above in compliance with the Sustainability Reporting Standards of the Global Reporting Initiative provided in the "Core" option (hereafter: "GRI Standards") as well as for the selection of the disclosures to be assessed.

This responsibility of the company's executive directors includes the selection and application of appropriate methods for the sustainability reporting as well as making assumptions and estimates related to individual sustainability disclosures, which are reasonable in the circumstances. In addition, the executive directors are responsible for such internal controls they have determined necessary to enable the preparation of information listed above that is free from material misstatements, whether intentional or unintentional.

Practitioner's responsibility

Our responsibility is to express a limited assurance conclusion on the disclosures as listed above in the combined management report 2018, based on the assurance engagement we have performed.

We are independent of Bayer Aktiengesellschaft in accordance with the provisions under German commercial law and professional requirements, and we have fulfilled our other ethical responsibilities in accordance with these requirements.

Our audit company applies the German national legal requirements and the German profession's pronouncements for quality control, in particular the by-laws governing the rights and duties of public auditors and chartered accountants (Berufssatzung für Wirtschaftsprüfer und vereidigte Buchprüfer) as well as the IDW Standard on Quality Control 1: Requirements for Quality Control in Audit Firms [IDW Qualitätssicherungsstandard 1: Anforderungen an die Qualitätssicherung in der Wirtschaftsprüferpraxis (IDW QS 1)], which comply with the International Standard on Quality Control 1 (ISQC 1) issued by the International Auditing and Assurance Standards Board (IAASB).

We conducted our assurance engagement in compliance with the International Standard on Assurance Engagements (ISAE) 3000 (Revised): "Assurance Engagements other than Audits or Reviews of Historical Financial Information" issued by the IAASB. This standard requires that we plan and perform the assurance engagement in a form that enables us to conclude with limited assurance that nothing has come to our attention that causes us to believe that the information as listed above in the combined management report 2018 of Bayer Aktiengesellschaft for the period from January 1 to December 31, 2018 has not been prepared, in all material respects, in compliance with the GRI Standards. In a limited assurance engagement the assurance procedures are less in extent than for a reasonable assurance engagement and, therefore, a substantially lower level of assurance is obtained. The assurance procedures selected depend on the practitioner's professional judgment.

Within the scope of our limited assurance engagement, which was performed – with work stoppages – from September 2018 to February 2019, we conducted, amongst others, the following audit procedures and other activities:

// Obtaining an understanding of the structure of the sustainability organization and of the stakeholder engagement
// An on-site visit to Bergkamen, Dormagen, Frankfurt, Knapsack, Leverkusen, Uerdingen and Wuppertal (Germany); Muttenz (Switzerland); Vapi (India); as well as Belford Roxo (Brazil) and Kansas City, Luling, Muscatine, Illiopolis, St. Louis and Soda Springs (USA) as part of an investigation into the processes for collecting, analyzing and aggregating selected data
// Interview of the relevant employees that participated in the preparation of the information listed above about the preparation process, about the internal control system relating to the process as well as about the disclosures
// Identification of the possible risks of material misstatement concerning the information in the annual report as listed above
// Analytical assessment of disclosures in the combined management report as listed above
// Comparison of selected disclosures with corresponding data in the consolidated financial statements, the annual financial statements and combined management report
// Evaluation of the presentation of the disclosures

Practitioner's conclusion

Based on the assurance work performed and evidence obtained, nothing has come to our attention that causes us to believe that the information in the combined management report of Bayer Aktiengesellschaft as listed above, for the period from January 1 to December 31, 2018 has not been prepared, in all material respects, in compliance with the GRI Standards: Option "Core".

Our conclusion does not include links to internet pages.

Purpose of the assurance statement

We issue this report on the basis of the engagement agreed with Bayer Aktiengesellschaft. The limited assurance engagement has been performed for purposes of Bayer Aktiengesellschaft and the report is solely intended to inform Bayer Aktiengesellschaft on the results of the assurance engagement.

Liability

The report is not intended to provide third parties with support in making (financial) decisions. Our responsibility exclusively refers to Bayer Aktiengesellschaft and is also restricted under the engagement agreed with Bayer Aktiengesellschaft on July 18, 2018 as well as in accordance with the "General engagement terms for Wirtschaftsprüfer and Wirtschaftsprüfungsgesellschaften (German public auditors and German public audit firms)" from January 1, 2017 of the Institut der Wirtschaftsprüfer in Deutschland e.V. We do not assume any responsibility to third parties.

Munich (Germany), February 20, 2019

Deloitte GmbH
Wirtschaftsprüfungsgesellschaft

Heiner Kompenhans
German Public Auditor

Prof. Dr. Frank Beine
German Public Auditor

C Further Information

Governance Bodies

Supervisory Board

Members of the Supervisory Board held offices as members of the supervisory board or a comparable supervising body of the corporations listed (as at December 31, 2018, or the date on which they ceased to be members of the Supervisory Board of Bayer AG) and as shown attended the meetings of the Supervisory Board and committees to which he or she belonged.

Werner Wenning
Leverkusen, Germany
(born October 21, 1946)

Chairman of the Supervisory Board effective October 2012

Chairman of the Supervisory Board of Bayer AG

Memberships on other supervisory boards:

- Henkel Management AG
- Siemens AG (Vice Chairman)

Memberships in comparable supervising bodies of German or foreign corporations:

- Henkel AG & Co. KGaA (Shareholders' Committee)

Attendance at Supervisory Board and committee meetings: 17 of 17

Oliver Zühlke
Solingen, Germany
(born December 11, 1968)

Vice Chairman of the Supervisory Board effective July 2015

Member of the Supervisory Board effective April 2007

Chairman of the Bayer Central Works Council

Attendance at Supervisory Board and committee meetings: 13 of 14

Dr. Paul Achleitner
Munich, Germany
(born September 28, 1956)

Member of the Supervisory Board effective April 2002

Chairman of the Supervisory Board of Deutsche Bank AG

Memberships on other supervisory boards:

- Daimler AG
- Deutsche Bank AG (Chairman)

Memberships in comparable supervising bodies of German or foreign corporations:

- Henkel AG & Co. KGaA (Shareholders' Committee)

Attendance at Supervisory Board and committee meetings: 12 of 12

Dr. rer. nat. Simone Bagel-Trah
Düsseldorf, Germany
(born January 10, 1969)

Member of the Supervisory Board effective April 2014

Chairwoman of the Supervisory Board of Henkel AG & Co. KGaA and Henkel Management AG and of the Shareholders' Committee of Henkel AG & Co. KGaA

Memberships on other supervisory boards:

- Henkel AG & Co. KGaA (Chairwoman)
- Henkel Management AG (Chairwoman)
- Heraeus Holding GmbH

Memberships in comparable supervising bodies of German or foreign corporations:

- Henkel AG & Co. KGaA (Shareholders' Committee, Chairwoman)

Attendance at Supervisory Board meetings: 6 of 7

Dr. Norbert W. Bischofberger
Hillsborough, U.S.A.
(born January 10, 1956)

Member of the Supervisory Board effective April 2017

Executive Vice President Research & Development and Chief Scientific Officer of Gilead Sciences, Inc. (until April 2018)

President and Chief Executive Officer of Kronos Bio, Inc. (effective May 2018)

Memberships in comparable supervising bodies of German or foreign corporations:

- InCarda Therapeutics, Inc. (Board of Directors)
- Kronos Bio, Inc. (Board of Directors) (effective May 2018)

Attendance at Supervisory Board and committee meetings: 8 of 8

André van Broich
Dormagen, Germany
(born June 19, 1970)

Member of the Supervisory Board effective April 2012

Chairman of the Bayer Group Works Council

Chairman of the Works Council of the Dormagen site

Attendance at Supervisory Board and committee meetings: 11 of 11

Thomas Ebeling
Muri bei Bern, Switzerland
(born February 9, 1959)

Member of the Supervisory Board effective April 2012

Chief Executive Officer of ProSiebenSat.1 Media SE (until February 2018)

Independent consultant (effective March 2018)

Memberships on other supervisory boards:

- Apleona GmbH (effective June 2018) (Chairman effective August 2018)
- GfK SE
- ClearVat AG

Memberships in comparable supervising bodies of German or foreign corporations:

- Cullinan Oncology, LLC (Board of Directors)
- Heilpflanzenwohl AG (Board of Directors)
- Ocean Outdoor Ltd. (Board of Directors) (effective October 2018)

Attendance at Supervisory Board meetings: 6 of 7

Dr. Thomas Elsner
Düsseldorf, Germany
(born April 24, 1958)

Member of the Supervisory Board effective April 2017

Chairman of the Bayer Group Managerial Employees' Committee

Chairman of the Managerial Employees' Committee of Bayer AG Leverkusen

Attendance at Supervisory Board and committee meetings: 11 of 11

Johanna W. (Hanneke) Faber
Amstelveen, Netherlands
(born April 19, 1969)

Member of the Supervisory Board effective April 2016

President Europe at Unilever N.V./plc

Attendance at Supervisory Board meetings: 6 of 7

Colleen A. Goggins
Princeton, U.S.A.
(born September 9, 1954)

Member of the Supervisory Board effective April 2017

Independent consultant

Memberships in comparable supervising bodies of German or foreign corporations:

- The Toronto-Dominion Bank (Board of Directors)
- IQVIA Holdings Inc. (Board of Directors)
- SIG Combibloc Services AG (Board of Directors) (effective September 2018)

Attendance at Supervisory Board meetings: 7 of 7

Heike Hausfeld
Leverkusen, Germany
(born September 19, 1965)

Member of the Supervisory Board effective April 2017

Chairwoman of the Works Council of the Leverkusen site

Memberships on other supervisory boards:

- Bayer Business Services GmbH (Vice Chairwoman)

Attendance at Supervisory Board and committee meetings: 9 of 10

Reiner Hoffmann
Wuppertal, Germany
(born May 30, 1955)

Member of the Supervisory Board effective October 2006

Chairman of the German Trade Union Confederation

Attendance at Supervisory Board meetings: 7 of 7

Frank Löllgen
Cologne, Germany
(born June 14, 1961)

Member of the Supervisory Board effective November 2015

North Rhine District Secretary of the German Mining, Chemical and Energy Industrial Union

Memberships on other supervisory boards:

- Evonik Industries AG
- IRR-Innovationsregion Rheinisches Revier GmbH

Attendance at Supervisory Board and committee meetings: 11 of 11

Prof. Dr. Wolfgang Plischke
Aschau im Chiemgau, Germany
(born September 15, 1951)

Member of the Supervisory Board effective April 2016

Independent consultant

Memberships on other supervisory boards:

- Evotec AG (Chairman)

Attendance at Supervisory Board and committee meetings: 12 of 12

Petra Reinbold-Knape
Gladbeck, Germany
(born April 16, 1959)

Member of the Supervisory Board effective April 2012

Member of the Executive Committee of the German Mining, Chemical and Energy Industrial Union

Memberships on other supervisory boards:

- Lausitz Energie Bergbau AG (Vice Chairwoman)
- Lausitz Energie Kraftwerk AG (Vice Chairwoman)

Memberships in comparable supervising bodies of German or foreign corporations:

- DGB Rechtsschutz GmbH (effective February 2018)

Attendance at Supervisory Board and committee meetings: 9 of 9

Detlef Rennings
Krefeld, Germany
(born April 29, 1965)

Member of the Supervisory Board effective June 2017

Chairman of the Central Works Council of CURRENTA

Chairman of the Works Council of CURRENTA of the Uerdingen site

Memberships on other supervisory boards:

- Currenta Geschäftsführungs-GmbH

Attendance at Supervisory Board meetings: 7 of 7

Sabine Schaab
Wuppertal, Germany
(born June 25, 1966)

Member of the Supervisory Board effective October 2017

Vice Chairwoman of the Works Council of the Elberfeld site

Attendance at Supervisory Board and committee meetings: 8 of 8

Michael Schmidt-Kießling
Schwelm, Germany
(born March 24, 1959)

Member of the Supervisory Board effective April 2012

Chairman of the Works Council of the Elberfeld site

Attendance at Supervisory Board meetings: 7 of 7

Dr. Klaus Sturany*
Ascona, Switzerland
(born October 23, 1946)

Member of the Supervisory Board until May 2018

Member of various supervisory boards

Memberships on other supervisory boards:

- Hannover Rück SE (Vice Chairman)

Attendance at Supervisory Board and committee meetings: 5 of 5

Prof. Dr. Dr. h.c. Otmar D. Wiestler
Berlin, Germany
(born November 6, 1956)

Member of the Supervisory Board effective October 2014

President of the Helmholtz Association of German Research Centres

Attendance at Supervisory Board and committee meetings: 8 of 8

Prof. Dr. Norbert Winkeljohann*
Osnabrück, Germany
(born November 5, 1957)

Member of the Supervisory Board effective May 2018

Chairman of the Board of Management of PricewaterhouseCoopers GmbH Wirtschaftsprüfungsgesellschaft (until June 2018)

Chief Executive Officer of PwC Europe SE (until June 2018)

Independent management consultant (effective July 2018)

Memberships on other supervisory boards:

- Deutsche Bank AG (effective August 2018)
- heristo aktiengesellschaft (Chairman) (effective July 2018)

Attendance at Supervisory Board and committee meetings: 6 of 6

* Expert member pursuant to Section 100, Paragraph 5 of the German Stock Corporation Act (AktG)

Standing committees of the Supervisory Board of Bayer AG (as at December 31, 2018)

Presidial Committee / Mediation Committee
Wenning (Chairman), Achleitner, Reinbold-Knape, Zühlke

Audit Committee
Winkeljohann* (Chairman), Elsner, Löllgen, Plischke, Wenning, Zühlke

Human Resources Committee
Wenning (Chairman), Achleitner, Hausfeld, van Broich

Nominations Committee
Wenning (Chairman), Achleitner

Innovation Committee
Plischke (Chairman), Bischofberger, van Broich, Reinbold-Knape, Schaab, Wenning, Wiestler, Zühlke

Board of Management

Members of the Board of Management held offices as members of the supervisory board or a comparable supervising body of the corporations listed (as at December 31, 2018, or the date on which they ceased to be members of the Board of Management of Bayer AG):

Werner Baumann
(born October 6, 1962)

Chairman

Member of the Board of Management effective January 1, 2010, appointed until April 30, 2021

Liam Condon
(born February 27, 1968)

Member of the Board of Management effective January 1, 2016, appointed until December 31, 2023

Dr. Hartmut Klusik
(born July 30, 1956)

Member of the Board of Management effective January 1, 2016, appointed until December 31, 2019

Labor Director

- Currenta Geschäftsführungs-GmbH (Chairman)

Kemal Malik
(born September 29, 1962)

Member of the Board of Management effective February 1, 2014, appointed until January 31, 2022

Wolfgang Nickl
(born May 9, 1969)

Member of the Board of Management effective April 26, 2018, appointed until April 25, 2021

- Bayer Business Services GmbH (Chairman) (effective June 2018)

Stefan Oelrich
(born June 1, 1968)

Member of the Board of Management effective November 1, 2018, appointed until October 31, 2021

Heiko Schipper
(born August 21, 1969)

Member of the Board of Management effective March 1, 2018, appointed until February 28, 2021

Member of the Board of Management until May 31, 2018

Johannes Dietsch
(born January 2, 1962)

- Bayer Business Services GmbH (Chairman)
- Covestro AG
- Covestro Deutschland AG

Member of the Board of Management until March 31, 2018

Erica Mann
(born October 11, 1958)

Member of the Board of Management until October 31, 2018

Dieter Weinand
(born August 16, 1960)

- HealthPrize Technologies LLC (Board of Directors) (until March 2018)
- Replimune Inc. (Board of Directors) (effective June 2018)

Glossary

A

Access to Medicine (ATM) describes activities to promote general access to essential medicines and improve knowledge on health.

B

Biocides are substances and products that control pests such as insects, mice and rats, as well as algae, fungi and bacteria.

Breakthrough innovation is a term used to describe disruptive innovations in the form of pioneering advances in technology and business models with the power to change markets.

C

CDP is a nonprofit organization that works on behalf of institutional investors to compile annual rankings of detailed environmental data, especially in respect of greenhouse gas emissions (CDP-Climate) and water management (CDP-Water), from over 2,400 companies worldwide. According to CDP, more than 650 investors representing fund assets of around US$87 trillion currently draw on this information for their investment decisions.

Consumer-validated concepts are concepts that are assessed in terms of their potential for success through consumer surveys conducted as part of market research activities.

(Corporate) compliance comprises the observance of statutory and company regulations on lawful and responsible conduct.

Corruption Perceptions Index (CPI) Since 1995, NGO Transparency International has produced an annual index of countries by the perceived level of public-sector corruption. The CPI ranks countries according to the extent to which public servants and politicians are believed to engage in bribery and to grant or accept undue advantage.

E

Environmentally relevant sites are Bayer locations with annual net energy consumption of over 1.5 terajoules.

G

GHG Protocol The Greenhouse Gas Protocol is an internationally recognized tool for recording, quantifying and reporting greenhouse gas emissions. Its standards cover all emissions within a company's value chain. Bayer aligns itself to the Corporate Standard for direct (Scope 1) and indirect (Scope 2) greenhouse gas emissions and also to the Corporate Value Chain (Scope 3) Accounting and Reporting Standard, which covers further indirect emissions along the value chain. Dual reporting was introduced for Scope 2. Indirect emissions have to be reported using both the location-based and the market-based methods. The location-based method uses regional or national average emissions factors, while the market-based method applies provider- or product-specific emissions factors based on contractual instruments.

Global commercial paper program Commercial paper (CP) issued under Bayer's program is a short-term, unsecured debt instrument normally issued at a discount and redeemed at nominal value. It is a flexible way of obtaining short-term funding on the capital market. Bayer's commercial paper program allows the company to issue commercial paper on both the U.S. and European markets.

GxP is a collective term for all guidelines that govern "good working practice" and are particularly relevant for the fields of medicine, pharmacy and pharmaceutical chemistry. The "G" stands for "Good" and the "P" for "Practice," while the "x" in the middle is replaced by the respective abbreviation for the specific area of application – such as Good Manufacturing Practice (GMP), Good Laboratory Practice (GLP), Good Clinical Practice (GCP) or Good Agricultural Practice (GAP). These guidelines are established by institutions such as the European Medicines Agency or the U.S. Food and Drug Administration.

H

HSEQ stands for health, safety, environment and quality.

I

ILO core labor standards The eight core labor standards of the ILO (International Labour Organization) that define the minimum requirements for humane working conditions are internationally recognized "qualitative social standards." They represent universal human rights that are deemed valid in all countries regardless of their economic development status.

L

Local procurement at Bayer means that goods and services are ordered from suppliers that are based in the same country as the (Bayer) company that receives them.

N

Neonicotinoids are a chemical class of systemic insecticides.

O

OTC (over-the-counter) designates the business with nonprescription medicines.

P

Pharmacovigilance is defined as activities and the science they are based on that relate to the identification, assessment, comprehension and prevention of side effects or other problems associated with pharmaceutical products.

Phase I-IV studies are clinical phases in the development of a drug product. The active ingredient candidate is generally tested in healthy subjects in Phase I, and in patients in Phases II and III. The studies test the therapeutic tolerability and efficacy of active ingredients in a specific indication. Phase IV studies are conducted following the approval of a new drug product to monitor its safety and efficacy over an extended period of time. The studies are subject to strict legal requirements and documentation procedures.

R

3Rs principle (replace, reduce, refine) Replace: prior to each project, Bayer checks whether an approved method is available that does not rely on animal studies and then applies it. Reduce: in case no alternative method exists, only as many animals are used as are needed to achieve scientifically meaningful results based on statutory requirements. Refine: Bayer ensures that animal studies are performed in a way that minimizes any suffering.

S

Significant locations of operation A selection of countries that accounted for more than 80% of total Bayer Group sales in 2018 (Argentina, Australia, Brazil, Canada, China, France, Germany, India, Italy, Japan, Mexico, Poland, Russia, Spain, Switzerland, Turkey, the United Kingdom and the United States)

Social innovation To tackle the challenges of our time, we need to think and work in a way that goes beyond the boundaries of scientific disciplines and institutions – both in the science sector and social domain. The term defines the process by which new social practices emerge, prevail and become more widespread in various areas of society.

V

Vector control describes methods for the avoidance or targeted control of organisms that transmit pathogens triggering infectious diseases. Vectors include blood-sucking insects such as the Anopheles mosquito, which can transfer malaria parasites, for example.

Financial Calendar

Q1 2019 Interim Report[1]	April 25, 2019
Annual Stockholders' Meeting 2019	April 26, 2019
Planned dividend payment day	May 2, 2019
Half-Year Report 2019	July 30, 2019
Q3 2019 Interim Report[1]	October 30, 2019
Annual Report 2019	February 27, 2020
Q1 2020 Interim Report[1]	April 27, 2020
Annual Stockholders' Meeting 2020	April 28, 2020

Masthead

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Forward-Looking Statements
This release may contain forward-looking statements based on current assumptions and forecasts made by Bayer management. Various known and unknown risks, uncertainties and other factors could lead to material differences between the actual future results, financial situation, development or performance of the company and the estimates given here. These factors include those discussed in Bayer's public reports which are available on the Bayer website at www.bayer.com. The company assumes no liability whatsoever to update these forward-looking statements or to conform them to future events or developments.

[1] In 2019, Bayer will for the first time publish quarterly statements pursuant to Section 53 of the Exchange Rules for the Frankfurter Wertpapierbörse (FWB) for the first and third quarters.

www.bayer.com