For a more detailed discussion of the Group’s borrowings and interest expenses see “— Liquidity and Capital Resources — Capital Resources” and “— Borrowings” below and “Item 11. Quantitative and Qualitative Disclosures about Market Risk”.

Taxation

The total tax charge in 2017 of £13m represents 3.1% of pre-tax profit and compares to a benefit of £222m or 8.7% of pre-tax losses in 2016. The tax benefit in 2016 was mainly due to the release of deferred tax liabilities relating to tax deductible goodwill that was impaired. The low tax rate in 2017 is largely attributable to uncertain tax position releases due to the expiry of the relevant statutes of limitation. As a result of US tax reform, the reported tax charge includes a benefit from revaluation of deferred tax balances to the reduced federal rate of £5m and a repatriation tax charge of £6m. The Group continues to analyze the detail of the new legislation and this may result in revisions to these impacts. In addition to the impact on the reported tax charge, the Group’s share of profit from associates was adversely impacted by £8m.

Discontinued operations

There were no discontinued operations in either 2016 or 2017.

Profit/(loss) for the year

The profit for the financial year in 2017 was £408m compared to a loss in 2016 of £2,335m. The loss in 2016 includes the impairment charge of £2,548m and higher restructuring charges, as noted above.

Earnings/(loss) per ordinary share

The basic earnings per ordinary share, which is defined as the profit for the financial year divided by the weighted average number of shares in issue, was 49.9p in 2017 compared to a loss per share of 286.8p in 2016 based on a weighted average number of shares in issue of 813.4m in 2017 and 814.8m in 2016. The increase in earnings per share was due to the increase in profit for 2017 described above and was not significantly affected by the movement in the weighted average number of shares.

The diluted earnings per ordinary share was also 49.9p in 2017, with the dilutive effect of options being minimal. The diluted earnings per ordinary share in 2016 was the same as the basic earnings per ordinary share due to the loss for the year.

Exchange rate fluctuations

Currency movements increased sales by £126m and increased the operating profit by £13m. See “Item 11. Quantitative and Qualitative Disclosures about Market Risk” for a discussion regarding the Group’s management of exchange rate risks.

Sales and operating profit by segment

The following tables summarize the Group’s sales and adjusted operating profit for each of the Group’s business segments. Adjusted operating profit is included as it is the key financial measure used by management to evaluate performance and allocate resources to business segments. The measure also enables investors to more easily, and consistently, track the underlying operational performance of the Group and its business segments by separating out those items of income or expenditure relating to acquisition and disposal transactions.

In the Group’s adjusted operating profit it has excluded other net gains and losses, acquisition costs, amortization and impairment of acquired intangibles, the cost of major restructuring programs and the impact of

US tax reform. The intangible charges relate only to intangible assets acquired through business combinations and acquisition costs are the direct costs of acquiring those businesses. The Group does not believe these charges are relevant to an understanding of the underlying performance. Charges relating to acquired intangible assets are non-cash charges that reflect the historical expenditure of the acquired business. These acquired intangible assets continue to be supported by ongoing expenditure that is reported within adjusted operating profit. Other net gains and losses that represent profits and losses on the sale of subsidiaries, joint ventures, associates and other financial assets are also excluded from adjusted operating profit as it is important to highlight their impact on operating profit, as reported, in the period in which the disposal transaction takes place in order to understand the underlying trend in the performance of the Group. US tax reform in 2017 resulted in the revaluation of deferred tax balances. These revaluations have been excluded from adjusted earnings in 2017 due to their one-off nature.

A reconciliation of operating profit to adjusted operating profit for continuing operations is included in the tables below:

	Year Ended December 31, 2017						
£m	North America	Core	Growth	PRH	Continuing	Discontinued	Total
Sales	2,929	815	769	—	4,513	—	4,513
	65%	*18%*	*17%*	—	*100%*		
Total operating profit	242	27	28	154	451	—	451
Add back:							
Other net gains and losses	3	—	(35)	(96)	(128)	—	(128)
Acquisition costs	—	—	—	—	—	—	—
Costs of major restructuring	60	11	8	—	79	—	79
Intangible charges	89	12	37	28	166	—	166
Impact of US tax reform	—	—	—	8	8	—	8
Adjusted operating profit: continuing operations	394	50	38	94	576	—	576
Adjusted operating profit: discontinued operations	—	—	—	—	—	—	—
Total adjusted operating profit	394	50	38	94	576	—	576
	68%	*9%*	*7%*	*16%*	*100%*	*—%*	*100%*

	Year Ended December 31, 2016						
£m	North America	Core	Growth	PRH	Continuing	Discontinued	Total
Sales	2,981	803	768	—	4,552	—	4,552
	65%	*18%*	*17%*	—	*100%*		
Total operating profit	(2,448)	(33)	(100)	84	(2,497)	—	(2,497)
Add back:							
Other net gains and losses	12	12	1	—	25	—	25
Acquisition costs	—	—	—	—	—	—	—
Costs of major restructuring	172	62	95	9	338	—	338
Intangible charges	2,684	16	33	36	2,769	—	2,769
Adjusted operating profit: continuing operations	420	57	29	129	635	—	635
Adjusted operating profit: discontinued operations	—	—	—	—	—	—	—
Total adjusted operating profit	420	57	29	129	635	—	635
	66%	*9%*	*5%*	*20%*	*100%*	*—%*	*100%*

North America

Sales in North America decreased by £52m or 2% from £2,981m in 2016 to £2,929m in 2017 and adjusted operating profit decreased by £26m, or 6%, from £420m in 2016 to £394m in 2017. The Group estimates that after excluding the impact of exchange and the contribution from businesses disposed in 2017 and 2016, North America sales declined by 4% in 2017 compared to 2016 primarily due to anticipated declines in higher education and school courseware, school assessment, and Learning Studio, a learning management system was retired.

There were no impairment charges in 2017. In 2016, the Group recognized an impairment to its US goodwill. At the end of 2016, following trading in the final quarter of the year, the Group determined that the underlying issues in the North American higher education courseware market were more severe than anticipated. These issues related to declining student enrolments, changes in buying patterns of students and correction of inventory levels by distributors and bookshops. As a result, in January 2017, the Group revised its strategic plans and estimates for future cash flows and, as a consequence, recognized an impairment to North America goodwill of £2,548m. The 2017 North America results also include £60m in respect of the further major restructuring program announced during the year. 2016 results included £172m in respect of the previous major restructuring program and other losses on disposal mainly relating to the sale of the Pearson English Business Solutions business. Overall adjusted operating margins in the North America business declined in 2017 to 13.5% compared to 14.1% in 2016 due primarily to the impact of lower sales and other operating factors, partially offset by restructuring savings.

North America — courseware

In school courseware, revenue declined 6% primarily due to sharp declines across Open Territory states in the second half of the year. This was partially offset by growth in adoption state revenues where strong performance in Texas Grades K-12 Spanish, Indiana Grades K-12 Science and South Carolina Grades 6-8 Science outweighed a lower adoption participation rate resulting from the decision not to compete for the California Grades K-8 English Language Arts (ELA) adoption with a core basal program. The new adoption participation rate fell to 61% in 2017 from 64% in 2016. The Group won an estimated 38% share of adoptions competed for (30% in 2016) and 29% of total new adoption expenditure of $365m (19% of $470m in 2016).

In higher education, total US college enrolments, as reported by the National Student Clearinghouse, fell 1.1%, with combined two-year public and four-year for-profit enrolments declining 2.5%. Enrolment weakness was particularly focused on part-time students where enrolment declined 3.3%, a bigger decline than in any of the last five years. Full-time enrolment grew 0.3%, the first expansion since late 2010. Net revenues at constant exchange rates in the higher education courseware business declined 3% during the year. It is estimated that around 2% of this decline was driven by lower enrolment; just over 1% from the adoption of Open Educational Resources (OER); around 5% from the secondary market, new initiatives and other factors, primarily the growth in print rental; offset by an around 3% benefit from institutional selling and the shift to digital and a 2% benefit in 2017 from lower returns by the channel.

In 2017, the Group's US higher education courseware market share, as reported by MPI, was in the upper half of the 40-41.5% range seen over the last five years. During 2017, the Group performed strongly in Statistics and Business Statistics, Biology and Accounting. Statistics benefited from the popularity of "best in class" learning application StatCrunch, Biology from the success of Campbell Biology 11e and MasteringBiology, and Accounting from the success of Miller-Nobles Horngren Accounting 11e and MyAccountingLab. This was offset by weakness in Information Technology, particularly in the for-profit sector, and continued softness in Developmental Mathematics.

Digital revenues grew 9% benefiting from continued growth in direct sales, favourable mix and selected price increases. Global digital registrations of MyLab and related products fell 1%. In North America, digital registrations fell 3% with good growth in Science, Business & Economics and Revel offset by lower overall enrolment and continued softness in Developmental Mathematics. Revel registrations grew more than 50%. Including stand-alone e-book registrations, total North American digital registrations were flat.

The actions announced in early 2017 to promote access over ownership were successfully implemented. The rental price of 2,000 eBook titles was reduced and resulted in eBook revenues increasing by more than 20% in response. The print rental program has had a successful start, with the addition of more than 90 further titles. In institutional courseware solutions, 210 institutions were signed up to the Group’s Inclusive Access (Direct Digital Access, DDA) solutions, taking the total to over 500. During the year, over 1m course enrolments were delivered with inclusive access rising to around 5% of higher education revenue as more colleges and faculties see the benefit of this model.

North America — assessment

In school assessment (State and National assessments), revenues at constant exchange rates declined by 9% due to previously announced contract losses. Colorado announced in June 2017 they will be leaving the Partnership for Assessment of Readiness for College and Careers (“PARCC”) consortium after the 2017/2018 school year. The Group won the subsequent bid to deliver ELA, Math, Science, and Social Studies for at least the next six years and also secured contract extensions in Virginia, Indiana, Arizona, Minnesota, Puerto Rico, Kentucky, New York City and North Carolina and for the National Assessment of Educational Progress.

The Group delivered 25.3m standardized online tests to K-12 students, up 7% from 2016. TestNav 8, the Group’s next-generation online test platform, supported a peak load of 752,000 tests in a single day and provided 99.99% up time. AI scoring systems scored 35m responses to open-ended test items, around 30% of the total. Paper based standardized test volumes fell 7% to 20.4m.

In professional certification, revenues grew 2%. VUE global test volume rose 1% to over 15m. Revenues in North America were flat, with continued growth in certification for professional bodies, offset by modest declines in US teacher certification and the GED (General Educational Development, the high school equivalency test that is part of a joint venture with the American Council on Education), after strong performance last year, and by weakness in higher level IT certifications in the second half.

The Group signed over 50 new contracts in 2017 including a ten-year contract with the Association of American Medical Colleges (AAMC) to administer the MCAT, and contracts with ExxonMobil for five years and the Project Management Institute for four years. Its renewal rate on existing contracts continues to be over 95%. During the year, the Group renewed over 50 contracts including the American Board of Internal Medicine (ABIM) for nine years, Florida Teacher Licensure Assessments for five years, Pharmacy Technician Certification Board (PTCB) for five years, and The Institute of Internal Auditors for four years.

Clinical assessment sales increased 2% largely due to the effect of exchange and, at constant exchange rates, declined slightly on an absence of new major product introductions. Q-Interactive, the Group’s digital solution for Clinical Assessment administration, saw continued strong growth in license sales with sub-test administrations up more than 33% over the same period last year.

North America — services

Connections Education the virtual school business, served nearly 78,000 Full Time Equivalent students through full-time virtual and blended school programs, up 6% on last year. Two new full-time online, state-wide, partner schools opened for the 2017-2018 school year. Enrolment growth from new and existing schools was partially offset by the termination of a school partnership at the end of the 2016-2017 school year. Revenues grew modestly as enrolment growth was partially offset by increased in-sourcing, as some partners took non-core services in-house. Enrolment and revenue is expected to grow in 2018 as growth in existing school partnerships and the opening of new partner schools for the 2018-2019 school year offsets the termination of two further contracts and the in-sourcing of services by some customers. The 2017 Connections Academy Parent Satisfaction Survey showed strong results with 92% of families with students enrolled in full-time online partner schools stating they would recommend the schools to others and 95% agreeing that the curriculum is of high quality.

In Pearson Online Services, revenues declined primarily due to a decline in Learning Studio revenues as the product is being retired and the restructuring of smaller non-OPM contracts. Learning Studio declined by just over 50% to a revenue contribution of £11m in 2017. In OPM, revenues grew modestly as course enrolments increased strongly, up 8% to more than 341,000, boosted by good growth and program extensions at key partners including Arizona State University Online, Maryville University, Rutgers University and University of Alabama at Birmingham and from new partners, partially offset by contract exits.

The Group signed 45 multi-year programs in 2017 renewed 19 programs and launched 14 new programs at partners including Maryville University, Duquesne University and Ohio University. During the year it also agreed the termination of nine programs that were not mutually viable and did not renew a further six programs.

Brinker International, Inc. (NYSE: EAT), one of the world’s leading casual dining restaurant companies and owner of Chili’s® Grill & Bar and Maggiano’s Little Italy®, with over 1,600 owned, operated and franchised restaurant locations, partnered with the Group to launch a comprehensive employer-education program Best You EDU that provides free educational opportunities to Brinker employees including foundational, GED and Associate Degree programs.

Core

Sales in Core markets increased by £12m, or 1%, from £803m in 2016 to £815m in 2017 while adjusted operating profit decreased by £7m, or 12%, from £57m in 2016 to £50m in 2017. At constant exchange and after excluding the contribution from disposals, Core sales were flat year on year and profits declined by 14%. Growth in OPM sales in the UK and Australia and growth in Pearson Test of English were offset by declines in school, higher education, English courseware and student assessment and qualifications.

The decline in adjusted operating profit was due to revenue mix, investment in new products and services and product line exits, partially offset by restructuring savings. The Group’s statutory results in 2017 included restructuring costs of £11m. The statutory results in 2016 included restructuring costs of £62m and a loss on closure of Wall Street English Germany of £12m.

Core — courseware

Courseware revenues declined 2%. In school, revenues declined in Australia, due to market contraction in the primary sector partly offset by slight growth in secondary, and declines in smaller markets in Europe and Africa. In higher education, revenues were down slightly due to declines in smaller markets, whilst in Australia and the UK an increase in direct to institution sales and a further shift to digital offset declines in traditional textbook sales. In English, there were declines in smaller markets.

Core — assessments

In higher education and School assessment, revenues fell 4% primarily due to lower AS level, iGCSE and Apprenticeship volumes as a result of policy changes. BTEC revenues also declined modestly as revenues recognized in 2017 lagged the greater stability seen in registrations and billed revenue in the year. The Group successfully delivered the National Curriculum Test for 2017, marking 3.5m scripts, up slightly from 2016.

Clinical assessment grew 15% with revenues benefiting from strong growth in the new editions of the Wechsler Intelligence Scale for Children (WISC-V) and the Clinical Evaluation of Language Fundamentals (CELF-5).

Pearson Test of English (PTE) saw continued strong growth in test volumes, which rose 84% from 2016, driven primarily by its use to support visa applications to the Australian Department of Immigration and Border Protection and good growth in New Zealand.

In Professional certification, revenues were flat as the impact of last year's renegotiated terms of the UK Driving Theory test for the DVSA was offset by growth from new and existing contracts.

Core — services

In higher education services, revenues grew 17% and OPM revenues grew by 33%. In Australia, there was good growth due to the successful partnership with Monash University, and the continued success of the Graduate Diploma in Psychology. There are a total of around 9,300 course registrations across the seven programs in Australia (up from around 6,900 registrations in 2016). In the UK, five new programs were launched in addition to the two launched in 2016. UK course registrations grew to about 1,400, compared to about 370 in 2016.

English services grew, with strong growth in WSE Italy, due to the opening of new centers in 2015 and 2016, partially offset by declines in Japan.

Growth

Growth sales increased by £1m, to £769m in 2017 from £768m in 2016. Adjusted operating profit increased by £9m or 31% to £38m in 2017 from £29m in 2016. The Group estimates that, after excluding the impact of exchange rates and the incremental contribution from businesses disposed in 2017 and 2016, sales were flat year on year. Growth in China, school courseware in South Africa and Pearson Test of English was offset by declines in higher education services, primarily due to lower enrolment at CTI, business rationalization in India and declines in Brazil.

The adjusted operating profit increase reflected the benefits of prior year restructuring and the higher revenues in China, South Africa school courseware and PTE in India, partially offset by lower revenues in Brazil. The Group's statutory results included restructuring costs of £8m in 2017 and £95m in 2016.

On November 27, 2017, The Group announced that it had agreed the sale of Wall Street English to a consortium of funds affiliated with Baring Private Equity Asia and CITIC Capital. The sale was completed on March 15, 2018.

Growth — courseware

Courseware revenues grew 7%, due to strong growth in school textbook sales in South Africa and English language courseware in China, partially offset by weakness in Brazil.

Growth — assessments

Professional Certification grew strongly. Pearson Test of English saw over 30% growth in the volume of tests taken in India.

Growth — services

In English services, growth in Wall Street English in China, due to new center openings, was more than offset by declines in Brazil due to macroeconomic pressures.

In school services, revenue fell, with student enrolment in the sistemas business in Brazil falling 14% primarily due to NAME, the public sistema, where the Group took the strategic decision to exit two thirds of its contracts with municipalities due to unattractive economic prospects, together with a reduction in student enrolments in the Dom Bosco private sistema due to challenging economic conditions. In India, Pearson MyPedia, an inside service ‘sistema’ solution for schools, expanded to over 500 schools with approximately 157,000 learners.

In higher education services, revenues declined sharply due to a 14% fall in total student enrolment at CTI, the university business in South Africa, driven by the cumulative impact of economic factors in recent years, partially offset by improved new student enrolments in 2017, together with business exits in India.

Penguin Random House

The Group owns 25% of Penguin Random House, the first truly global consumer book publishing company. The Group owned 47% until October 5, 2017, when it completed the sale of 22% to Bertelsmann. The Group’s share of Penguin Random House adjusted operating profits were £94m in 2017 compared to £129m in 2016, primarily due to the sale of part of the Group’s share.

Penguin Random House performed in line with expectations with revenues up slightly year on year on rising audio sales, broadly stable print sales, and modest ongoing declines in demand for e-books, whilst the business benefitted from bestsellers by Dan Brown, R.J. Palacio, John Grisham, Jamie Oliver, and Dr. Seuss.

The Penguin Random House Venture Combined Financial Statements are included in this report on pages F-81 to F-151.

Results of operations

Year ended December 31, 2016 compared to year ended December 31, 2015

Consolidated results of operations

Sales

The Group’s total sales from continuing operations increased from £4,468m in 2015 to £4,552m in 2016, an increase of £84m or 2%. This year on year increase was the result of currency movements, primarily the strength of the US dollar relative to sterling during the year but also due to the strength of many of the other currencies that the Group is exposed to. In 2016, currency movements increased sales by £486m when compared to the equivalent figures at constant 2015 rates. When measured at 2015 constant exchange rates, the Group’s sales declined by 9%. Part of the decrease was due to the absence of sales from businesses sold during the year and the Group estimates that after excluding the impact of disposals, sales declined by 8% at constant exchange rates.

North America sales increased by £41m or 1% from £2,940m to £2,981m, mainly due to the strengthening of the US dollar against sterling. The Group estimates that after excluding the impact of exchange and the contribution from businesses disposed in 2015 and 2016, North America sales declined by 10% in 2016 compared to 2015 due to a significant decline in US higher education courseware, together with anticipated declines in school assessment (due to previously announced contract losses) and in school courseware (due to a smaller adoption market and a lower participation rate). The declines were partially offset by growth in professional certification, virtual and blended schools and Online Program Management. North America continued to be the most significant source of the Group’s sales and, as a proportion of sales contributed 65% in 2016 and 66% in 2015.

Core sales declined by £12m or 1% from £815m in 2015 to £803m in 2016. The Group estimates that after excluding the impact of exchange movements and the closure of Wall Street English Germany, the disposal of other sub-scale businesses and the transfer of some smaller businesses to the Growth segment, Core sales declined by 4%. The decline was primarily due to expected declines in vocational course registrations in UK schools and courseware. This was partially offset by strong growth in English assessments in Australia and OPM services in the UK and Australia.

Growth sales increased by £55m or 8% from £713m in 2015 to £768 in 2016, almost all of the increase can be attributed to exchange movements, particularly the strength of key emerging market currencies compared to sterling. The Group estimates that after excluding the impact of exchange rates and the incremental contribution from businesses disposed in 2015 and 2016 and the transfer of smaller businesses from the Core segment, sales declined by 1%. In China, growth in adult English language learning and English courseware was partly offset by declines in English test preparation. In Brazil, revenues declined due to enrolment declines in the English language learning business, related to macroeconomic pressures. In South Africa, revenues grew strongly with growth in school textbooks, offset by enrolment declines at CTI. In the Middle East, revenues fell significantly due to the previously announced withdrawal from an agreement to run three Saudi Colleges of Excellence, with the colleges transitioning to new providers from 30 June 2015.

Cost of goods sold and operating expenses

The following table summarizes the Group's cost of sales, net operating expenses and impairment of intangible assets:

	Year Ended December 31	
	2016	2015
	£m	£m
Cost of goods sold	2,093	1,981
Operating expenses		
Distribution costs	88	80
Selling, marketing and product development costs	908	895
Administrative and other expenses	1,240	1,195
Restructuring costs	329	35
Other income	(85)	(98)
Total net operating expenses	2,480	2,107
Other net gains and losses	25	(13)
Impairment of intangible assets	2,548	849
Total expenses	7,146	4,924

Cost of goods sold. Cost of sales consists of costs for raw materials, primarily paper, printing and binding costs, amortization of pre-publication costs, royalty charges, the cost of service provision in the assessment and testing business and the cost of teaching and facilities in direct delivery businesses. The Group's cost of sales increased by £112m, or 6%, from £1,981m in 2015, to £2,093m in 2016. The increase reflects the increase in sales but also the mix of sales, as sales declines in higher margin products were offset by sales increases in lower margin products and services. Cost of sales was 46.0% of sales in 2016 compared to 44.3% in 2015.

Distribution costs. Distribution costs consist primarily of shipping costs, postage and packing. Distribution costs increased due to the effect of exchange movements. After taking out the impact of exchange movements, distribution costs decreased due to the continuing shift to digital and services products.

Selling, marketing and product development costs. The Group's selling, marketing and product development costs increased by £13m or 1% from £895m in 2015 to £908m in 2016. As a percentage of sales these costs were relatively consistent at 19.9% in 2016 and 20.0% in 2015, the slight decline reflecting benefits from restructuring.

Administrative and other expenses. The Group's administrative and other expenses increased by £45m or 4% from £1,195m in 2015 to £1,240m in 2016. The increase is largely due to exchange and increased investment in technology, which offset significant savings from restructuring in 2016.

Restructuring costs. In January 2016, the Group announced that it was embarking on a major restructuring program to simplify the business, reduce costs and position the company for growth in its major markets. The scope and costs of the 2016 program are significantly more than normal levels of restructuring. Total restructuring in 2016 for the Group's subsidiary companies amounted to £329m compared to £35m in 2015 and includes costs associated with headcount reductions, property rationalization and closure or exit from certain systems, platforms, products and supplier and customer relationships.

Other income. Other operating income mainly consists of freight recharges, sub-rights and licensing income, distribution commissions, investment income and gains on minor asset disposals together with the service fee income from Penguin Random House. Other operating income decreased to £85m in 2016 compared to £98m in 2015 mainly due to a reduction in Penguin Random House service fee income. This income decreased as Penguin Random House reduced its reliance on Pearson systems and processes and the fee of £16m in 2015 compares to a fee of £4m in 2016.

Other net gains and losses. Included in other gains and losses in 2016 of £25m are the losses associated with the closure of the Group's English language schools in Germany and the sale of the Pearson English Business Solutions business. Included in other net gains and losses in 2015 is the profit on sale of PowerSchool of £30m, net of £70m of write downs on related software assets and small losses on investments and costs relating to prior year disposals totaling £17m.

Impairment of intangible assets. At the end of 2016, following trading in the final quarter of the year, it became clear that the underlying issues in the North American higher education courseware market were more severe than anticipated. These issues related to declining student enrolments, changes in buying patterns of students and correction of inventory levels by distributors and bookshops. As a result, in January 2017, the Group revised its strategic plans and estimates of future cash flows and, as a consequence, made an impairment to North American goodwill of £2,548m. In 2015, following economic and market deterioration in its operations in emerging markets and ongoing cyclical and policy related pressures in its mature market operations, the Group impaired intangible assets in North America by £282m, in Core markets by £37m and in Growth markets by £530m.

Share of results of joint ventures and associates

The contribution from the Group's joint ventures and associates increased by £45m to £97m in 2016 from £52m in 2015. The increase was mainly due to Penguin Random House where there was an improved operating performance coupled with a reduced amortization charge. The intangibles amortization charge arises on intangibles recognized on the creation of Penguin Random House in 2013. The amortization profile recognizes more of the amortization in the early years with progressively less amortization in later years.

Operating loss

In 2016, there was an operating loss on a continuing basis of £2,497m compared to an operating loss on a continuing basis of £404m in 2015. The increase in loss is due to the impairment of intangible assets and the additional restructuring charges taken in 2016, as outlined above.

Net finance costs

Net interest payable in 2016 was £59m, compared to £46m in 2015. The majority of the movement in net interest payable was due to a one-off release of accrued interest in 2015 following agreement of historical tax positions. The most significant element of the net interest payable figure is interest on bond debt, with the impact of interest on tax provisions and interest receivable off setting each other. Interest on bond debt was in line with the prior year, with the savings from bond repayments offset by the impact of rising US dollar interest rates.

Other net finance costs comprise finance income and costs on retirement benefits, foreign exchange and other gains and losses. The increase in finance income in respect of employee benefit plans from £4m in 2015 to £11m in 2016 is a reflection of the more favorable funding position at the end of 2015. Both the exchange loss in 2016 of £12m and the exchange gain in 2015 of £13m mainly relate to foreign exchange differences on unhedged cash and cash equivalents and other financial instruments.

For a more detailed discussion of the Group’s borrowings and interest expenses see “— Liquidity and Capital Resources — Capital Resources” and “— Borrowings” below and “Item 11. Quantitative and Qualitative Disclosures about Market Risk”.

Taxation

The total tax benefit in 2016 of £222m represents 8.7% of pre-tax losses and compares to a benefit of £81m or 18.7% of pre-tax losses in 2015. The increased benefit in 2016 is mainly due to the release of deferred tax liabilities relating to tax deductible goodwill that was impaired. The Group’s overseas profits, which arise mainly in the US, are largely subject to tax at higher rates than that in the UK (which had an effective statutory rate of 20% in 2016 and 20.25% in 2015).Although tax relief on the impairment of goodwill was significant in both 2015 and 2016, this tax relief only related to a portion of goodwill impaired and this has driven the overall tax rate below the effective statutory rates.

Discontinued operations

Profit from discontinued operations in 2015 of £1,175m includes the results to date of sale and the gain on sale of the Financial Times and the Economist. There were no discontinued operations in 2016.

Profit/(loss) for the year

The loss for the financial year in 2016 was £2,335m compared to a profit in 2015 of £823m. The loss in 2016 includes the impairment charge of £2,548m as noted above. The 2015 profit includes the gains on the sale of the Financial Times and Economist partly offset by significant impairment charges in the year.

Earnings/(loss) per ordinary share

The basic earnings per ordinary share, which is defined as the profit for the financial year divided by the weighted average number of shares in issue, was a loss of 286.8p in 2016 compared to earnings of 101.2p in 2015 based on a weighted average number of shares in issue of 814.8m in 2016 and 813.3m in 2015. The decrease in earnings per share was due to the decrease in profit for 2016 described above and was not significantly affected by the movement in the weighted average number of shares.

A diluted earnings per ordinary share was not calculated in either 2015 or 2016 as a result of the losses from continuing operations.

Exchange rate fluctuations

Currency movements increased sales by £486m and increased the operating loss by £454m. See “Item 11. Quantitative and Qualitative Disclosures about Market Risk” for a discussion regarding the Group’s management of exchange rate risks.

Sales and operating profit by segment

The following tables summarizes the Group’s sales and adjusted operating profit for each of its business segments. Adjusted operating profit is included as it is the key financial measure used by management to evaluate performance and allocate resources to business segments. The measure also enables investors to more easily, and consistently, track the underlying operational performance of the Group and its business segments by separating out those items of income or expenditure relating to acquisition and disposal transactions.

In its adjusted operating profit the Group has excluded other net gains and losses, acquisition costs, amortization and impairment of acquired intangibles and the cost of major restructuring. The intangible charges relate only to intangible assets acquired through business combinations and acquisition costs are the direct costs of acquiring those businesses. The Group does not believe these charges are relevant to an understanding of the underlying performance of the Group. Charges relating to acquired intangible assets are non-cash charges that reflect the historical expenditure of the acquired business. These acquired intangible assets continue to be supported by ongoing expenditure that is reported within adjusted operating profit. Other net gains and losses that represent profits and losses on the sale of subsidiaries, joint ventures, associates and other financial assets are also excluded from adjusted operating profit as it is important to highlight their impact on operating profit, as reported, in the period in which the disposal transaction takes place in order to understand the underlying trend in the performance of the Group. In 2016, the definition of adjusted operating profit was amended to exclude the cost of major restructuring activity. In January 2016, the Group announced that it was embarking on a restructuring program to simplify the business, reduce costs and position itself for growth in its major markets. The costs of the program in 2016 are significant enough to exclude from adjusted operating profit so as to better highlight the underlying performance.

A reconciliation of operating profit to adjusted operating profit for continuing operations is included in the tables below:

	Year Ended December 31, 2016						
£m	**North America**	**Core**	**Growth**	**PRH**	**Continuing**	**Discontinued**	**Total**
Sales	2,981	803	768	—	4,552	—	4,552
	65%	*18%*	*17%*	—	*100%*		
Total operating profit	(2,448)	(33)	(100)	84	(2,497)	—	(2,497)
Add back:							
Other net gains and losses	12	12	1	—	25	—	25
Acquisition costs	—	—	—	—	—	—	—
Costs of major restructuring	172	62	95	9	338	—	338
Intangible charges	2,684	16	33	36	2,769	—	2,769
Adjusted operating profit: continuing operations	420	57	29	129	635	—	635
Adjusted operating profit: discontinued operations	—	—	—	—	—	—	—
Total adjusted operating profit	420	57	29	129	635	—	635
	66%	*9%*	*5%*	*20%*	*100%*	*—%*	*100%*

£m	Year Ended December 31, 2015 North America	Core	Growth	PRH	Continuing	Discontinued	Total
Sales	2,940	815	713	—	4,468	312	4,780
	66%	*18%*	*16%*	—	*100%*		
Total operating profit	113	21	(586)	48	(404)	1,232	828
Add back:							
Other net gains and losses	(19)	5	—	1	(13)	(1,184)	(1,197)
Costs of major restructuring	—	—	—	—	—	—	—
Acquisition costs	—	—	—	—	—	—	—
Intangible charges	386	79	583	41	1,089	3	1,092
Adjusted operating profit: continuing operations	480	105	(3)	90	672	—	672
Adjusted operating profit: discontinued operations	—	—	—	—	—	51	51
Total adjusted operating profit	480	105	(3)	90	672	51	723
	66%	*15%*	*(0)%*	*12%*	*93%*	*7%*	*100%*

North America

North America sales increased by £41m or 1% from £2,940m to £2,981m and adjusted operating profit decreased by £60m, or 13%, from £480m in 2015 to £420m in 2016. The Group estimates that, after excluding the impact of exchange movements and the contribution from businesses disposed in 2015 and 2016, North America sales declined by 10% in 2016 compared to 2015. This decline was due to a significant decline in US higher education courseware, together with anticipated declines in school assessment (due to previously announced contract losses) and in school courseware (due to a smaller adoption market and a lower participation rate). These declines were partially offset by growth in professional certification, virtual and blended schools and Online Program Management.

In 2016, the Group recognized an impairment to its US goodwill. At the end of 2016, following trading in the final quarter of the year, the Group determined that the underlying issues in the North American higher education courseware market were more severe than anticipated. These issues related to declining student enrolments, changes in buying patterns of students and correction of inventory levels by distributors and bookshops. As a result, in January 2017, the Group revised its strategic plans and estimates of future cash flows and, as a consequence, recognized an impairment to North America goodwill of £2,548m. In 2015, the Group recognized an impairment of £282m following ongoing cyclical and policy related pressures in its main US markets. Also in the results was the cost of the major restructuring program of £172m and other losses on disposal mainly relating to the sale of the Pearson English Business Solutions business. In 2015 the Group realized a gain on sale of PowerSchool of £30m, net of the write down of related software assets. In addition to the gain on PowerSchool there were also small losses on the sale and write down of smaller investments of £11m.

Overall adjusted operating margins in the North America business declined in 2016 to 14.1% compared to 16.3% in 2015 as cost savings from restructuring were more than offset by the margin impact of lower sales, particularly in higher education courseware.

North America — courseware

In school courseware, revenue declined 10% with a smaller new adoption market and a lower participation rate, partially offset by good growth and market share gains in Open Territories resulting from new product launches. The Group’s new adoption participation rate fell from over 90% in 2015 to 64% in 2016 due to its decision not to compete for the California Grades K-8 English Language Arts (ELA) adoption with a core basal program. It won an estimated 30% share of adoptions competed for (31% in 2015) and 19% of total new adoption expenditure of $470m (29% of $730m in 2015), driven by strong performance in Indiana Math and Social Studies and South Carolina Science and Social Studies. Sales in open territories grew strongly benefiting from the new MyPerspectives program in Grades 6 – 12 ELA, ReadyGen, Investigations 3.0, the extension of enVisionMATH to cover Grades 6 – 8 and growth in the digital reading intervention program, iLit.

In higher education courseware, total US college enrolments fell 1.4%, with combined two-year public and four-year for-profit enrolments declining 5.0%, affected by rising employment rates and regulatory change impacting the for-profit and developmental learning sectors, partially offset by modest growth in combined enrolments at four-year public and private not-for-profit institutions. Net revenues in the Group’s US higher education courseware business declined an unprecedented 18% during the year. The Group estimates that 2% of this decline was driven by lower enrolment, particularly in Community College and among older students; 3 – 4% by an accelerated impact from rental in the secondary market; and approximately 12% due to an inventory correction in the channel reflecting the cumulative impact of these factors in prior years. Underlying market share trends remained stable and the Group’s market share in the 12 months to January 2017 was 40.4%.

During 2016, the Group performed strongly in Science and Business & Economics with key titles including: *Applying, Biochemistry: Concepts & Connections 1e*; Amerman, *Human Anatomy & Physiology 1e*; Marieb, *Human Anatomy & Physiology 10e*; Young, Freedman, *University Physics 14e* and Parkin, *Economics 12e*. Global digital registrations of MyLab and related products grew 2%. In North America, digital registrations grew 2% with good growth in Science, Business & Economics and Revel, partly offset by continued softness in Developmental Mathematics. Skill Builder Adaptive Practice, the in-house adaptive homework solution launched in over 60 titles in 2016. Faculty-generated studies indicate that the use of MyLab, Mastering and Revel programs, as part of a broader course redesign, can support improvements in student test scores and lower institutional cost. Findings from an efficacy study suggest that students in Developmental Mathematics courses who increased their number of homework and quiz attempts in MyMathLab-Developmental increased their odds of passing; and that users of MyLab Writing who complete seven topics or more increase their final exam scores by 14%. In another study at a mid-sized university in the Midwest, during the 2015 – 2016 academic year, students using My IT Lab were able to raise their exam scores by half a letter grade for every seven additional activities attempted. In institutional courseware solutions, the Group signed 148 large-scale, enterprise adoptions of direct digital access (DDA), where content is purchased via an upfront course fee and integrated with university IT systems. New signings in the year included University of Tennessee — Knoxville and Kentucky State University.

North America — assessment

In school assessment (State and National Assessments), revenues declined 22% due to previously announced contract losses. The states of Arkansas, Mississippi and Ohio discontinued the PARCC assessments and the Group ceased to administer the majority of the current State of Texas Assessments of Academic Readiness (“STAAR”) contract, as announced in 2015. The Group replaced the loss from Massachusetts leaving PARCC by winning a five-year sub-contract to deliver Massachusetts’ new custom assessment. The Group was awarded a one-year emergency contract in Tennessee to score and report 2016 state assessments. Kentucky renewed a contract with the Group for two years to provide its state assessments in Math, English Language Arts, and Science. Arizona extended the Group’s contract to provide the English language learner assessments for the 2016 – 2017 school year, while Colorado extended a contract with the Group to provide PARCC, science and social studies assessments. The Group won new contracts in Delaware for social studies assessment and a sub-contract to develop high school math and English language arts assessments in Louisiana. The Group delivered 23.6 million standardized online tests to K-12 students, a reduction of 11% from 2015 due to overall reduction in test counts across contracts. Paper-based standardized test volumes fell 33% to 21.9 million. Digital tests on the Group’s TestNav platform now account for over 52% of testing volumes. The Group launched *aimswebPlusTM*, an update to its leading formative assessment platform, first launched in 2000.

In professional certification, revenues grew 7% with VUE global test volumes up 3% to almost 15 million, boosted by continued growth in IT, professional, US teacher certification programs and strong growth in GED. The Group renewed its contracts with the Computing Technology Industry Association (CompTIA) for three years, the Florida Department of Business & Professional Regulation for five years, the American Register of Radiologic Technologists (ARRT) for seven years and a contract to administer insurance back office licensing services in North Carolina for five years.

Clinical assessment sales declined 1% following the strong performance over the previous two years driven by the introduction of the fifth edition of the Wechsler Intelligence Scale for Children (WISC-V). Behavior Assessment for Children 3e (BASC) continues to see strong growth; and Q-Interactive, the Group’s digital solution for clinical assessment administration, saw continued strong growth in licence sales with sub-test administrations up more than 80% over the same period last year.

North America — services

Connections Education, the Group’s virtual school business, served nearly 73,000 full-time equivalent students through full-time virtual and blended school programs, up 6% on last year. Connections revenues grew 8%. Five new full-time online, statewide, partner schools opened for the 2016 – 2017 school year in Arkansas, Washington, Colorado, Pennsylvania and New Mexico. The 2016 Connections Education Parent Satisfaction Survey showed strong results with 92% of families with students enrolled in full-time online partner schools stating that they would recommend the schools to others.

In Pearson Online Services, the higher education OPM business, course enrolments grew strongly, up over 19% to more than 314,000, boosted by strong growth in Arizona State University Online, new partners and program extensions. The Group signed 11 new programs in 2016 including two new partners: Eastern Gateway Community College in collaboration with American Federation of State, County and Municipal Employees, and took over an existing suite of online Nursing programs with Duquesne University. Strong growth in OPM was partially offset by a decline in Learning Studio, which is currently being retired. Overall revenues grew 5%.

Core

Sales in Core markets decreased by £12m, or 1%, from £815m in 2015 to £803m in 2016 while adjusted operating profit decreased by £48m, or 46%, from £105m in 2015 to £57m in 2016. At constant exchange and after excluding the closure of Wall Street English Germany, the disposal of other sub-scale businesses and the transfer of some smaller businesses to the Growth segment, Core sales declined by 4% and profits by 51%. This decline was primarily due to expected declines in vocational course registrations in UK schools and courseware. This was partially offset by strong growth in English assessments in Australia and OPM services in the UK and Australia.

In its statutory results in 2016, the Group recognized restructuring costs of £62m and a loss on closure of Wall Street English Germany of £12m. In 2015, it recognized an impairment to its goodwill of £37m mainly related to the English language teaching businesses in Europe.

Core — courseware

Courseware revenues declined 7%. School revenues declined in smaller markets in Europe and Africa, in Australia as the Group exited a number of sub-scale market segments and in the UK primary due to a smaller adoption cycle, partially offset by growth in secondary in the UK due to new product launches aligned with the Group’s qualifications and the successful delivery of The Crunch food project in partnership with the Wellcome Trust. In higher education courseware, revenues declined in smaller markets, in Australia due to phasing and in the UK as the Group exited sub-scale market segments. In the UK, 2.1 million pupils are now using a Pearson digital service on ActiveLearn Primary, including Bug Club, up from 1.8 million a year ago. In a randomized control trial, where its impact was periodically assessed, Bug Club was shown to have made a highly statistically significant impact on pupils’ reading, vocabulary and spelling performance, with a greater positive impact in schools with a higher proportion of children receiving free school meals.

Core — assessments

In higher education and School assessment, revenues fell 10%. UK qualifications have been impacted by government policy, where changes to accountability measures have led to lower vocational registrations. As expected, BTEC Firsts registrations in UK schools have begun to stabilize, though overall BTEC and apprenticeship registrations continued to fall in 2016, albeit at a slower rate. GCSE and GCE entries for summer 2016 declined modestly compared with 2015, primarily due to lower AS level entries as a result of a policy-driven shift to more linear courses. The Group successfully delivered the National Curriculum Test for 2016, marking 3.4 million scripts and successfully implemented the transition from levels to scaled scores.

Clinical assessment grew 9% with Australian revenues benefiting from strong growth in the new edition of the WISC-V. At VUE, revenues declined 1% due to the initial impact of contract renewals. The Group was awarded contracts: to continue to administer the UK driving theory test for the UK DVSA for four years from September 2016; to continue to provide testing services to the Construction Industry Training Board for four years from April 2017; and to administer the UK Clinical Aptitude Test for five years from January 2017. In France, VUE was awarded a new licence by the Délégation à la Sécurité et à la Circulation Routières (DSCR) du Ministere de l’Intérieur to be one of the providers administering the country’s computer-based driving theory exam throughout France.

The Pearson Test of English (PTE) Academic saw continued strong growth in global test volumes with the Australian Department of Immigration and Border Protection and New Zealand immigration accepting the test for proof of English ability for a range of student visas. The number of professional associations using PTE Academic to credential English language standards of their members continued to grow and now includes the Australian Nursing & Midwifery Accreditation Council. All Australian and NZ universities now accept PTE Academic for admissions purposes, as do most of the UK and Canadian universities, and a growing number of US institutions including Harvard Business School, Yale and Wharton Business School.

Core — services

In higher education services, revenues grew 12%. OPM revenues grew 74%. Australia saw strong growth due to the successful partnership with Monash University, led by the Graduate Diploma in Psychology, now one of Monash’s largest postgraduate courses. The partnership with Griffith University remains strong, with performance driven mainly by the MBA course. In the UK, the ongoing OPM partnership with King’s College London saw the Group commence teaching in early 2016 of several post graduate Psychology and Law programs. The Group has signed an additional partnership with Manchester Metropolitan University to launch three online postgraduate degrees in Business Studies in 2017, and has also partnered with another Russell Group University to launch a wide range of online postgraduate programs over the next four years.

Wall Street English revenues grew strongly in Italy as the Group opened new centers and rolled out the New Student Experience (NSE) in all centers in the country. The NSE delivers a next generation Wall Street English service with adaptive, personalized learning incorporating Pearson’s Global Scale of English. The Group announced the closure of its unprofitable Wall Street English schools in Germany.

Growth

Growth sales increased by £55m, or 8%, to £768m in 2016 from £713m in 2015. Adjusted operating profit increased by £32m to a profit of £29m in 2016 from a loss of £3m in 2015. The Group estimates that after excluding the impact of exchange rate movements, the incremental contribution from businesses disposed in 2015 and 2016 and the transfer of smaller businesses from the Core segment, sales declined by 1%. In China, growth in adult English language learning and English courseware was partly offset by declines in English test preparation. In Brazil, revenues declined due to enrolment declines in the English language learning business, related to macroeconomic pressures. In South Africa, revenues grew strongly with growth in school textbooks, offset by enrolment declines at CTI. In the Middle East, revenues fell significantly due to the previously announced withdrawal from an agreement to run three Saudi Colleges of Excellence, with the colleges transitioning to new providers from June 30, 2015.

Adjusted operating profit increased reflecting the benefits of restructuring and the absence of a contract termination charge in the Middle East which impacted the first half of 2015.

In its statutory results, the Group included restructuring costs of £95m in 2016. In 2015, reflecting the significant economic and market deterioration in the Group’s operations in emerging markets, the Group wrote down the balance sheet value of its goodwill and intangibles for businesses in Growth markets by £530m. This represented impairments of £269m for Brazil, £181m for China, £58m for South Africa and £22m for other Growth markets.

In February 2017, the Group announced the intention to explore potential partnership for its English language learning business Wall Street English (WSE) and possible sale of its English test preparation business Global Education (GEDU).

Growth — courseware

Courseware revenues grew 8%, due to strong growth in school textbook sales in South Africa and English language courseware in China, Argentina and Mexico partially offset by weakness in Brazil. The Group saw strong growth in registrations for MyEnglishLab boosted by new editions of key titles such as Speakout and Top Notch. Middle East school courseware declined as a result of macroeconomic pressure and lower purchases from key international school clients.

Growth — services

In China, growth in Wall Street English (WSE) was offset by declines at Global Education. Enrolments grew 8% at WSE, to 72,500. The Group launched the New Student Experience across all 68 WSE China centers, opened two new retail centers in Beijing and Shenzhen and a new corporate training center in Shenzhen. In Global Education, two cities were transferred to franchisees. Underlying revenue declined, with lower enrolments partially offset by an ongoing shift to more premium courses with smaller class sizes.

In Brazil, student enrolment in the Group’s sistemas business fell 9% due to attrition in NAME and Dom Bosco partially offset by new students at COC. Revenues grew slightly due to improved mix. Revenues in English language learning fell due to challenging economic conditions, partially offset by an increased footprint for the Group’s leading brand in language learning, Wizard, where new school openings expanded the number of franchise schools by 7% to 2,392. At the Group’s public sistema (NAME), an efficacy study suggested that, after controlling for all of the identified student and school level factors, grade 5 NAME students significantly outperformed comparison students by 28 points in mathematics equating to one level higher attainment in the state Prova Brasil assessment. In another study at the Group’s largest private sistema (COC), students scored significantly higher than students in similar non-COC schools in Writing, natural sciences, humanities, language, and mathematics.

In South Africa, student enrolment at CTI Education Group and Pearson Institute of Higher Education fell by 25% to 8,500 driven primarily by tightening consumer credit affecting enrolment rates.

In India, Pearson MyPedia, an inside service 'sistema' solution for schools comprising print and digital content, assessments and academic support services, expanded to over 200 schools with approximately 56,000 learners in its first full year since launch. PTE Academic saw nearly 50% growth in the volume of tests taken.

Penguin Random House

During both 2016 and 2015, the Group owned 47% of Penguin Random House the first truly global consumer book publishing company. The Group's share of Penguin Random House adjusted operating profits were £129m compared to £90m for 2015.

Penguin Random House delivered a strong profit performance in 2016 with continued net benefits from the merger integration. Revenues declined after a very strong performance in 2015, which was boosted by the success of multi-million sellers *Grey* and *The Girl on the Train*, due to the anticipated industry-wide decrease in ebook purchases following 2015's industry-wide digital-terms changes.

Revenues in 2016 benefited from strong sales of *The Girl on the Train* by Paula Hawkins, in its second year of publication, and Jojo Moyes's *Me Before You* and *After You*, together with broad resilience of print books, including growing print sales online and increased demand for audio books. The US business published 585 New York Times print and ebook bestsellers in 2016 (2015: 584). The division benefited from multi-million copy successes of *The Girl on the Train* and two novels from Jojo Moyes. Additional number one adult titles were *The Whistler* by John Grisham; *Night School* by Lee Child; *Fool Me Once* by Harlan Coben; *When Breath Becomes Air* by Paul Kalanithi; and Ina Garten's *Cooking For Jeffrey*. Children's authors who extended their outstanding sales in 2016 included Dr. Seuss and Roald Dahl, whose *The BFG* benefited from a movie tie-in; Rick Yancey; James Dashner; Drew Daywalt; Oliver Jeffers; and R. J. Palacio.

The UK business published 202 titles on the Sunday Times bestseller lists (2015: 201). The division's top-selling hardback was *Night School* by Lee Child. *The Girl On The Train* sold over three million copies in multi-formats, and *Me Before You* and *After You* cumulatively sold more than 2.5 million. Top-performing children's franchises were Roald Dahl and the tenth volume in Jeff Kinney's *Diary Of A Wimpy Kid* series.

Penguin Random House completed the sale of its travel-content division, Fodors, to Internet Brands, an online media and technology company, on June 30, 2016, and transferred the ownership of Random House Studio, its film and television development and production division, to a division of Bertelsmann.

The integration of Penguin and Random House continued to provide benefits in 2016 including net benefits from the first full year of systems and warehouse combinations in North America and in Spain and Latin America.

With the integration of Penguin Random House complete, and with greater industry-wide stability on digital terms, on February 24, 2017 the Group announced that it had issued an exit notice regarding its 47% stake in Penguin Random House to its JV partner Bertelsmann, with a view to selling its stake or recapitalizing the business and extracting a dividend. On October 5, 2017 the Group completed the sale of a 22% share in Penguin Random House to Bertelsmann, retaining a 25% share. The Group used the proceeds from this action to maintain a strong balance sheet; invest in its business; and return excess capital to shareholders whilst retaining an investment grade credit rating.

The Penguin Random House Venture Combined Financial Statements are included in this report on pages F-81 to F-151.

Liquidity and capital resources

Cash flows and financing

Net cash generated from operations decreased by £60m (or 11%) to £462m in 2017 from £522m in 2016, primarily due to higher special pension contributions (£227m in 2017 compared to £90m in 2016) and exchange movements due to the strengthening of sterling against the US dollar, with some offset from lower spend on restructuring (£71m in 2017 v £167m in 2016). Net cash generated from operations increased by £4m (or 1%) to £522m in 2016 from £518m in 2015 reflecting lower cash incentive payments and tight working capital partially offset by restructuring spend and higher pension deficit payments.

Net interest paid increased by £18m (or 35%) to £69m in 2017 from £51m in 2016 reflecting higher US interest rates and premiums incurred on the early redemption of bonds and associated swaps, as the Group sought to increase the efficiency of its balance sheet. Net interest paid in 2016 was the same as 2015 at £51m and reflects the similar interest charge for the year after taking out the one-off release of accrued interest in 2015 following agreement of historical tax positions.

Capital expenditure on property, plant and equipment and software intangibles was £232m in 2017, £245m in 2016 and £247m in 2015. The expenditure in all years on both tangible and intangible capital is largely due to the continuing investment in enabling function technology, designed to lower administrative costs.

The acquisition of subsidiaries, joint ventures and associates accounted for a cash outflow of £11m in 2017, £15m in 2016 and £20m in 2015. There were no major acquisitions in either 2017, 2016 or 2015.

The sale of subsidiaries and associates produced a net cash inflow of £430m in 2017 compared to an outflow of £50m in 2016 and an inflow of £1,409m in 2015. The cash inflow in 2017 relates to the Group’s sale of a 22% stake in Penguin Random House to Bertelsmann for £413m and the sale of its test preparation business in China for £54m, less the associated costs and cash disposed. There were no significant disposals of subsidiaries and associates in 2016, with the cash outflow relating primarily to the disposal of the FT Group in 2015. The cash inflow in 2015 relates to the proceeds on the sale of the *Financial Times* of £858m, the proceeds on the sale of The Economist Group of £377m and proceeds on the sale of PowerSchool £222m.

The cash outflow from financing of £1,759m in 2017 reflects the early redemption of various bonds (and their associated swaps) and the partial completion of a share buyback program, offset in part by a lower dividend. In March and November 2017 respectively, the Group redeemed $500m 6.25% Global dollar bonds and $300 4.625% US dollar notes, both originally due in 2018. In addition, in August 2017, the Group redeemed $383m out of the $500m 3.75% US dollar notes due in 2022 and $406m out of the 3.25% US dollar notes due in 2023. In July 2017, the Group announced its intention to buy back £300m worth of its own shares. As at the end of 2017, the Group had spent £149m under this share buy-back program. The cash outflow from financing of £697m in 2016 reflects a broadly flat dividend payment compared to 2015 and the repayment of a $350m US Dollar note. The cash outflow from financing of £364m in 2015 reflects a further 7% increase in the dividend, the repayment of a £300m Sterling bond, offset in part by the proceeds from the issue of a €500m Euro note.

Capital resources

The Group’s borrowings fluctuate by season due to the effect of the school year on the working capital requirements in the educational materials business. Assuming no acquisitions or disposals, the Group’s maximum level of net debt normally occurs in July, and its minimum level of net debt normally occurs in December. Based on a review of historical trends in working capital requirements and of forecast monthly balance sheets for the next 12 months, the Group believes that it has sufficient funds available for the Group’s present requirements, with an appropriate level of headroom given its portfolio of businesses and current plans. The Group’s ability to expand and grow its business in accordance with current plans and to meet long-term capital requirements beyond this 12-month period will depend on many factors, including the rate, if any, at which its cash flow changes and the availability of public and private debt and equity financing, including its ability to secure bank lines of credit. The Group cannot be certain that additional financing, if required, will be available on favorable terms, if at all.

At December 31, 2017, the Group’s net debt was £432m compared to £1,092m at December 31, 2016 reflecting proceeds from disposals, offset in part by special pension contributions. Net debt is defined as all short-term, medium-term and long-term borrowing (including finance leases), less all cash, cash equivalents and liquid resources. Cash equivalents comprise short-term deposits with a maturity of up to 90 days, while liquid resources comprise short-term deposits with maturities of more than 90 days and other marketable instruments which are readily realizable and held on a short-term basis. Total Short-term, medium-term and long-term borrowing amounted to £1,085m at December 31, 2017, compared to £2,468m at December 31, 2016 reflecting the bonds repaid during the year.. At December 31, 2017, total cash and liquid resources were £645m, compared to £1,459m at December 31, 2016. This decrease reflects the utilization of cash to pay down long-term debt and create a more efficient balance sheet.

To ensure efficient use of the cash balances, in January 2018, the Group executed market tenders to repurchase €250m out of its €500m euro 1.875% notes due May 2021 and €200m out of its €500m euro 1.375% notes due May 2025.

Contractual obligations

The following table summarizes the maturity of the Group’s borrowings, its obligations under non-cancelable leases, and pension funding obligations, exclusive of anticipated interest payments. Due to the variability of future interest payments, these have been excluded from the table below.

	At December 31, 2017				
	Total	Less than one year	One to two years	Two to five years	After five years
	£m	£m	£m	£m	£m
Gross borrowings:					
Bank loans, overdrafts and commercial paper	15	15	—	—	—
Bonds	1,062	—	—	548	514
Finance lease obligations	8	4	3	1	—
Operating lease obligations	1,201	156	139	307	599
UK Pension funding obligations	25	25	—	—	—
Total	2,311	200	142	856	1,113

The UK pension funding obligation of £25m is subject to change upon completion of the latest actuarial valuation of the UK Group plan.

At December 31, 2017 the Group had capital commitments for fixed assets, including finance leases already under contract, of £nil (2016: £9m). There are contingent liabilities in respect of indemnities, warranties and guarantees in relation to former subsidiaries and in respect of guarantees in relation to subsidiaries and associates. In addition there are contingent liabilities in respect of legal and royalty claims. None of these claims or guarantees is expected to result in a material gain or loss.

In 2014, the Group negotiated a new $1,750m committed revolving credit facility with an initial maturity date of August 2019, extended to August 2020 in 2015. During 2016, the Group extended the maturity date of this facility to August 2021. The facility requires the Group to pay an annual commitment fee of 0.1575%, payable quarterly, on the unused amount of the facility.

Off-Balance sheet arrangements

The Group does not have any off-balance sheet arrangements, as defined by the SEC for the purposes of Form 20-F, that have or are reasonably likely to have a material current or future effect on the Group’s financial position or results of operations.

Borrowings

The Group finances its operations by a mixture of cash flows from operations, short-term borrowings from banks and commercial paper markets, and longer term loans from banks and capital markets.

The Group has in place a committed revolving credit facility of $1.75bn, which matures in August 2021. At December 31, 2017, the full $1.75bn was available under this facility. This credit facility contains two key covenants measured for each 12 month period ending June 30 and December 31:

The Group must maintain the ratio of its profit before interest, tax and amortization to its net interest payable at no less than 3:1; and

The Group must maintain the ratio of its rolling 12 month average net debt to its EBITDA, explained below, at no more than 4:1.

“EBITDA” refers to earnings before interest, taxes, depreciation and amortization. The Group is currently in compliance with these covenants.

See note 18 of “Item 18. Financial Statements” for information on the Group’s longer term loans from banks and capital markets.

Treasury policy

The Group’s treasury policy is described in note 19 of “Item 18. Financial Statements”. For a more detailed discussion of the Group’s borrowing and use of derivatives, see “Item 11. Quantitative and Qualitative Disclosures about Market Risk”.

Related parties

There were no significant or unusual related party transactions in 2017, 2016 or 2015. Refer to note 36 in “Item 18. Financial Statements”.

Accounting policies

For a description of the Group’s principal accounting policies used refer to note 1 in “Item 18. Financial Statements”.