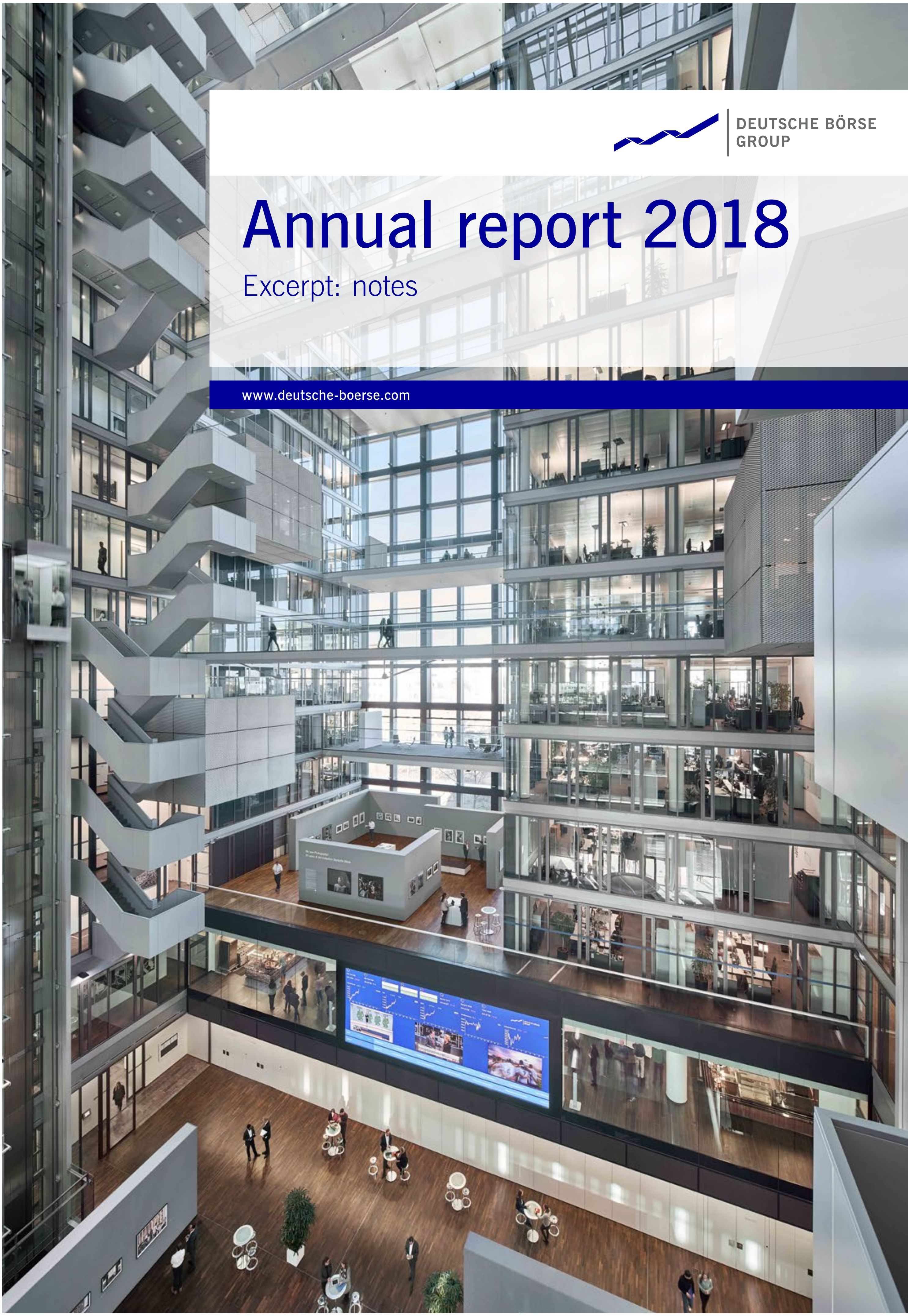
DEUTSCHE BÖRSE GROUP

Annual report 2018

Excerpt: notes

www.deutsche-boerse.com



Consolidated financial statements/notes

Notes to the consolidated financial statements Basis of preparation

1. General principles

Company information

Deutsche Börse AG (the "company") has its registered office in Frankfurt/Main, and is registered in the commercial register B of the Frankfurt/Main Local Court (Amtsgericht Frankfurt am Main) under HRB 32232. Deutsche Börse AG is the parent company of Deutsche Börse Group. Deutsche Börse AG and its subsidiaries operate cash and derivatives markets. Its business areas range from pre-IPO and growth financing services, the admission of securities to listing, through trading, clearing and settlement, down to custody of securities. Furthermore, IT services are provided and market data distributed. For details regarding internal organisation and reporting see note 24.

Basis of reporting

The 2018 consolidated financial statements have been prepared in compliance with the International Financial Reporting Standards (IFRS) issued by the International Accounting Standards Board (IASB) and the related interpretations issued by the International Financial Reporting Standards Interpretations Committee (IFRIC), as adopted by the European Union in accordance with Regulation No. 1606/2002 of the European Parliament and of the Council on the application of international accounting standards.

The disclosures required in accordance with Handelsgesetzbuch (HGB, German Commercial Code) section 315e (1) have been presented in the notes to the consolidated financial statements and the remuneration report of the combined management report. The consolidated financial statements are also based on the interpretations issued by the Rechnungslegungs Interpretations Committee (RIC, Accounting Interpretations Committee) of the Deutsches Rechnungslegungs Standards Committee e.V. (Accounting Standards Committee of Germany), to the extent that these do not contradict the standards and interpretations issued by the IFRIC or the IASB.

New accounting standards – implemented in the year under review

In the 2018 reporting period, the following standards and interpretations issued by the IASB and adopted by the European Commission were applied to Deutsche Börse Group. This adoption did not constitute an early adoption.

Amendments to IFRS 2 "Classification and Measurement of Share-Based Payments" (June 2016)
The amendments affect the accounting for cash-settled share-based payment transactions. The most important amendment to IFRS 2 is the clarification on how to determine the fair value of liabilities for share-based payments.

IFRS 9 “Financial Instruments” (July 2014)
IFRS 9 introduces new requirements for the recognition and measurement of financial instruments.

IFRS 15 “Revenue from Contracts with Customers” (May 2014 plus clarification dated April 2016)
IFRS 15 specifies the recognition of revenue from contracts with customers.

The changes in accounting policies resulting from first-time adoption of IFRS 9 and IFRS 15 are set out in note 3.

Amendments resulting from the “Annual Improvements Project 2014–2016” (December 2016)
The amendments relate to three standards; the first-time application of the amendments to IFRS 1 and IAS 28 was obligatory as of the year 2018. IAS 28 clarifies that the option to measure an investment in an associate venture or a joint venture held by a venture capital company or by another qualifying entity may be exercised differently for each investment.

IFRIC 22 “Foreign Currency Transactions and Advance Consideration” (December 2016)
IFRIC 22 addresses a question on the application of IAS 21 “The Effects of Changes in Foreign Exchange Rates”. It clarifies at which point in time the exchange rate is to be determined for the translation of transactions into foreign currencies containing advance payments received or made. The exchange rate for the underlying asset, income or expense is determined by reference to the point in time on which the asset or liability resulting from the prepayment is recognised for the first time.

The application of the above-mentioned standards and interpretations has no material effect on the presentation of the consolidated financial statements. Amendments to IAS 40 “Transfers of Investment Property” have no effect on the presentation of the consolidated financial statements.

New accounting standards – not yet implemented

The following standards and interpretations, which are relevant to Deutsche Börse Group but which have not been adopted early by the Group for 2018, have been published by the IASB prior to the publication of this financial report and partially adopted by the European Commission.

The following standards were already adopted by the European Commission:

IFRS 16 “Leases” (January 2016)
IFRS 16 establishes principles for the recognition, measurement, presentation and disclosure of leases. The objective of IFRS 16 is to ensure that lessees and lessors provide relevant information on the effects of lease contracts. The standard must be applied for financial years beginning on or after 1 January 2019; earlier application is permitted. Deutsche Börse Group will apply the standard as from 1 January 2019. The standard was adopted by the EU on 31 October 2017.

Deutsche Börse Group as lessee expects a material impact on its consolidated financial statements from the first-time application of the new leasing standard. IFRS 16 introduces a single lessee accounting model. According to this approach, the lessee is obliged to recognise all leases: first, the lessee recognises the right-of-use asset, i.e. the lessee's right to use the leased asset; second, the lessee recognises the lease liability, i.e. the lessee's obligation to make lease payments.

As a result of the recognition of right-of-use assets and the corresponding lease liabilities, Deutsche Börse Group's total assets are expected to increase, as at the date of conversion, by around €300 million. Of this amount, approximately €5 million refer to lease agreements for company cars; the remainder refers to long-term arrangements for office properties and data centres.

Furthermore, the type of expenses associated with such leases will change as well: going forward, Deutsche Börse Group will recognises a right-of-use asset less any accumulated depreciation and any accumulated impairment losses as well as interest expenses from lease liabilities instead of rental and lease expenses recognised in other operating expenses. These changes are expected to amount to around €55 million, and will ultimately lead to an improvement of earnings before interest, tax, depreciation and amortisation (EBITDA).

Deutsche Börse Group will make use of the general practical expedients provided by IFRS 16:

- All arrangements identified as leases in the past will continue to be classified as such.
- Short-term leases (lease term of less than twelve months) and leased assets of low value are not recorded as right-of-use asset or lease liability, respectively.

Value-added tax included in lease payments is included neither in the lease liabilities nor in the carrying amount of the right-of-use asset, regardless of whether Deutsche Börse Group is entitled to make deduct input taxes or not.

As at the date of first-time adoption of IFRS 16, Deutsche Börse Group will proceed as follows:

- The transition is based on the modified retrospective approach; prior-year figures are not restated.
- The present value of the lease liabilities is calculated on the basis of the future lease payments using the incremental borrowing rate. A uniform rate is selected for similar leases.
- The measurement of the right-of-use asset is calculated on the basis of the individual agreements, either retrospectively using the interest rate applied upon first-time adoption or on the basis of the restated lease liabilities. The cumulative effects from first-time adoption of the new standard are recorded as at the date of first-time adoption directly in equity. This results in an effect as at 1 January 2019 of around €10 million. The right-of-use asset is adjusted for provisions from the charges of lease agreements.

- In the case of agreements with a remaining term of less than twelve months at the date of first-time adoption, a decision is made on an individual agreement level.
- Initial direct costs are not taken into account in the right-of-use asset.

Amendments to IFRS 9 "Prepayment Features with Negative Compensation" (October 2017)
The amendments regarding prepayment features with negative compensation must be applied for financial years beginning on or after 1 January 2019; earlier application is permitted. The amendments were adopted by the EU on 22 March 2018.

IFRIC 23 "Uncertainty over Income Tax Treatments" (June 2017)
This interpretation is to be applied to the determination of current and deferred tax assets and liabilities, in case of uncertainty over income tax treatments. IFRIC 23 must be applied for financial years beginning on or after 1 January 2019; earlier application is permitted. This interpretation was adopted by the EU on 23 October 2018.

Amendments to IAS 28 "Long-term Interests in Associates and Joint Ventures" (October 2017)
These amendments clarify that an entity applies IFRS 9 to long-term interests in an associate or joint venture that form part of the net investment in the associate or joint venture but to which the equity method is not applied. The amendments must be applied for financial years beginning on or after 1 January 2019; earlier application is permitted. The amendments were adopted by the EU on 8 February 2019.

The following standards have not yet been adopted by the European Commission:

Amendments to IFRS 3 "Definition of a Business" (October 2018)
The amendments aim at resolving the difficulties that arise when an entity determines whether it has acquired a business or a group of assets. The amendments are effective for business combinations for which the acquisition date is on or after the beginning of the first annual reporting period beginning on or after 1 January 2020. The amendments have not yet been adopted by the EU.

Amendments to IAS 1 and IAS 8 "Definition of Material" (October 2018)
The definition of the term "material" – regarding materiality of information – was specified in more detail. Furthermore, the various definitions in the Framework and the Standards were harmonised. The amendments must be applied for financial years beginning on or after 1 January 2020; earlier application is permitted. The amendments have not yet been adopted by the EU.

Amendments to IFRS 10 and IAS 28 “Sales or Contributions of Assets Between an Investor and its Associate/Joint Venture” (September 2014)
The amendments clarify that the extent to which gains or losses are recognised for transactions with an associate or joint venture depends on whether the assets sold or contributed constitute a business operation. The application date has been postponed indefinitely.

IFRS 17 “Insurance Contracts” (May 2017)
IFRS 17 establishes the principles for the recognition, measurement, presentation and disclosure of insurance contracts. The objective of IFRS 17 is to ensure that an entity provides relevant information that faithfully represents insurance contracts. The standard must be applied for financial years beginning on or after 1 January 2021, and has not yet been adopted by the EU.

Amendments resulting from the “Annual Improvements Project 2015–2017” (December 2017)
Four standards are affected by these amendments:

The amendments to IFRS 3 clarify that when an entity obtains control of a business in which it has previously had a participating interest as part of a joint operation, such entity must apply the principles for successive business combinations. The interest previously held by the acquirer must be remeasured.

For IFRS 11, it is clarified that when a party obtains joint control of a business operation in which it has previously had an interest as part of a joint operation, such party does not have to remeasure the interest previously held.

IAS 12 will be amended so that all income tax consequences of dividend payments must be considered in the same way as the income on which the dividends are based.

Finally, IAS 23 states that if an entity has raised funds generally for the acquisition of qualifying assets, borrowing costs specifically incurred in connection with the acquisition of qualifying assets shall not be included in the determination of the financing cost rate until the completion of the borrowing.

The amendments must be applied for financial years beginning on or after 1 January 2019, but have not yet been adopted by the EU.

Amendments to IAS 19 “Plan Amendment, Curtailment or Settlement” (February 2018)
The amendments specify that if a plan amendment, curtailment or settlement occurs, it is now mandatory that the current service cost and net interest for the period after the remeasurement are determined using the assumptions used for the remeasurement. In addition, amendments have been included to clarify the effect of a plan amendment, curtailment or settlement on the requirements regarding the asset ceiling. The amendments must be applied for financial years beginning on or after 1 January 2019; earlier application is permitted. The amendments have not yet been adopted by the EU.

Revised “Conceptual Framework in IFRS Standards”
The revised “Conceptual Framework in IFRS Standards” is structured into an introductory explanation on the status and purpose of the Conceptual Framework, eight chapters and a glossary. Included are revised definitions of assets and liabilities as well as new guidance on measurement and derecognition, presentation and disclosure.

Together with the revised Conceptual Framework, references to the Conceptual Framework have been adapted in various standards.

Regarding the standards and interpretations listed above, Deutsche Börse Group expects no material impact on the presentation of the consolidated financial statements – except for the application of IFRS 16, the expected effects of which are described above.

2. Basis of consolidation

Deutsche Börse AG's equity interests in subsidiaries, associates and joint ventures as at 31 December 2018 included in the consolidated financial statements are presented in the following tables. Unless otherwise stated, the financial information in these tables is presented in accordance with the generally accepted accounting principles in the companies' countries of domicile.

Fully consolidated subsidiaries (part 1)

Company	Domicile	Equity interest as at 31 Dec 2018 direct/(indirect) %
Assam SellerCo, Inc. in Liquidation	New York, USA	100.00
Assam SellerCo Service, Inc. in Liquidation[3)]	New York, USA	(100.00)
Need to Know News, LLC in Liquidation	Chicago, USA	(100.00)
Börse Frankfurt Zertifikate AG	Frankfurt/Main, Germany	100.00
Clearstream Holding AG	Frankfurt/Main, Germany	100.00
Clearstream Beteiligungs AG	Frankfurt/Main, Germany	(100.00)
Clearstream International S.A.	Luxembourg, Luxembourg	(100.00)
Clearstream Banking S.A.	Luxembourg, Luxembourg	(100.00)
Clearstream Banking Japan, Ltd.	Tokyo, Japan	(100.00)
REGIS-TR S.A.	Luxembourg, Luxembourg	(50.00)
Clearstream Banking AG	Frankfurt/Main, Germany	(100.00)
Clearstream Global Securities Services Limited	Cork, Ireland	(100.00)
Clearstream Operations Prague s.r.o.	Prague, Czech Republic	(100.00)
Clearstream Services S.A.	Luxembourg, Luxembourg	(100.00)
Clearstream Funds Centre Ltd.	London, United Kingdom	(100.00)
DB1 Ventures GmbH	Frankfurt/Main, Germany	100.00
Deutsche Boerse Asia Holding Pte. Ltd.	Singapore, Singapore	100.00
Eurex Clearing Asia Pte. Ltd.	Singapore, Singapore	(100.00)
Eurex Exchange Asia Pte. Ltd.	Singapore, Singapore	(100.00)
Deutsche Boerse Market Data+Services Singapore Pte. Ltd.	Singapore, Singapore	100.00
Deutsche Boerse Systems Inc.	Chicago, USA	100.00
Deutsche Börse Photography Foundation gGmbH	Frankfurt/Main, Germany	100.00
Deutsche Börse Services s.r.o.	Prague, Czech Republic	100.00
Eurex Frankfurt AG	Frankfurt/Main, Germany	100.00
Eurex Clearing AG	Frankfurt/Main, Germany	(100.00)
Eurex Clearing Security Trustee GmbH	Frankfurt/Main, Germany	(100.00)
Eurex Repo GmbH	Frankfurt/Main, Germany	(100.00)

1) Disclosures are based on preliminary and unaudited figures which may be adjusted subsequently.
2) Includes capital reserves and retained earnings, accumulated gains or losses and net profit or loss for the year and, if necessary, further components according to the respective local GAAP
3) Assam SellerCo Service, Inc. in Liquidation is part of the Assam SellerCo, Inc. in Liquidation subgroup.
4) Before profit transfer or loss absorption
5) Consists of interest and commission results due to business operations
6) Thereof income from profit pooling of Eurex Clearing AG amounting to €8,141 thousand
7) Thereof income from participations amounting to €283,096 thousand (including €192,096 thousand from Clearing Banking S.A. and €91,000 thousand from Clearstream Banking AG)

Currency	Ordinary share capital[1] thousand	Equity[1] [2] thousand	Total assets[1] thousand	Sales revenue 2018[1] thousand	Net profit/loss 2018[1] thousand	Initially consolidated
US$	9,911	22,550	22,596	0	–108	2009
US$	n.a.	n.a.	n.a.	n.a.	n.a.	2009
US$	0	2,098	2,098	0	0	2009
€	140	16,594	22,454	19,734	3,023	2013
€	101,000	2,285,314	2,440,263	0	152,690[4]	2007
€	50	50	50	0	0	14 Dec 2018
€	25,000	1,345,824	1,391,071	43,985[5]	283,953[7]	2002
€	92,000	1,263,245	18,277,543	618,209[5]	204,280	2002
JPY	49,000	185,854	230,900	136,095	5,781	2009
€	3,600	13,310	16,910	16,209	4,765	2010
€	25,000	462,276	2,459,275	304,833[5]	92,707	2002
€	6,211	14,498	22,525	39,104	2,677	2014
CZK	160,200	193,485	546,144	696,772	9,577	2008
€	30,000	129,534	225,982	312,422[5]	12,419	2002
CHF	15,000	11,482	108,149	3,978	1,501	1 Oct 2018
€	25	50	58	0	–11	2016
€	0	14,063	14,312	0	–252	2013
€	10,000	9,833	10,470	0	545	2013
€	6,000	633	690	0	–206	2013
S$	606	1,076	1,332	0	58	2015
US$	400	44,397	52,910	19,840	–714	2000
€	25	175	216	0	–44	2015
CZK	200	391,760	661,102	1,416,597	71,092	2006
€	6,000	1,122,320	1,313,542	13,430	18,537[6]	1998
€	25,000	514,813	25,965,525	31,765[5]	8,141[4]	1998
€	25	79	86	4	0	2013
€	3,600	22,737	29,733	12,366	4,693	2001

Fully consolidated subsidiaries (part 2)

Company	Domicile	Equity interest as at 31 Dec 2018 direct/(indirect) %
Eurex Global Derivatives AG[3]	Zug, Switzerland	100.00
Eurex Services GmbH	Frankfurt/Main, Germany	100.00
European Energy Exchange AG	Leipzig, Germany	75.05[4]
Cleartrade Exchange Pte. Limited	Singapore, Singapore	(75.05)
EEX Link GmbH	Leipzig, Germany	(75.05)
European Commodity Clearing AG	Leipzig, Germany	(75.05)
European Commodity Clearing Luxembourg S.à r.l.	Luxembourg, Luxembourg	(75.05)
Nodal Exchange Holdings, LLC	Tysons Corner, USA	(75.05)
Nodal Exchange, LLC	Tysons Corner, USA	(75.05)
Nodal Clear, LLC	Tysons Corner, USA	(75.05)
Power Exchange Central Europe a.s.	Prague, Czech Republic	(50.03)
Powernext SAS	Paris, France	(75.05)
EPEX SPOT SE	Paris, France	(38.27)[7]
EPEX Netherlands B.V.	Amsterdam, Netherlands	(38.27)
EPEX SPOT Schweiz AG	Bern, Switzerland	(38.27)
JV Epex-Soops B.V.	Amsterdam, Netherlands	(22.96)
Gaspoint Nordic A/S	Brøndby, Denmark	(75.05)
PEGAS CEGH Gas Exchange Services GmbH	Vienna, Austria	(38.27)
STOXX Ltd.	Zug, Switzerland	100.00
STOXX Australia Pty Limited	Sydney, Australia	(100.00)
Tradegate Exchange GmbH	Berlin, Germany	80.00
360 Treasury Systems AG	Frankfurt/Main, Germany	100.00
360T Asia Pacific Pte. Ltd.	Singapore, Singapore	(100.00)
360TGTX Inc.	New York, USA	(100.00)
360 Trading Networks Inc.	New York, USA	(100.00)
360 Trading Networks LLC	Dubai, United Arab Emirates (UAE)	(100.00)
360 Trading Networks Sdn Bhd	Kuala Lumpur, Malaysia	(100.00)
Finbird GmbH	Frankfurt/Main, Germany	(100.00)
Finbird Limited	Jerusalem, Israel	(100.00)
ThreeSixty Trading Networks (India) Pte. Ltd.	Mumbai, India	(100.00)

1) Disclosures are based on preliminary and unaudited figures which may be adjusted subsequently.
2) Includes capital reserves and retained earnings, accumulated gains or losses and net profit or loss for the year and, if necessary, further components according to the respective local GAAP
3) Disclosures are based on the divergent financial year from 1 April 2018 to 31 December 2018.
4) 62.91 per cent of voting rights held
5) Thereof income from profit pooling of European Commodity Clearing AG amounting to €49,930 thousand
6) Before profit transfer or loss absorption
7) Thereof 8.02 per cent indirectly held via European Energy Exchange AG and 30.25 per cent indirectly held via Powernext SAS
8) Disclosures are based on financial statements as at 31 December 2017.

	Currency	Ordinary share capital[1] thousand	Equity[1) 2)] thousand	Total assets[1] thousand	Sales revenue 2018[1] thousand	Net profit/loss 2018[1] thousand	Initially consolidated
	€	83	673,011	698,106	107,083	95,769	2012
	€	25	98	98	0	0	2007
	€	60,075	340,295	408,293	74,562	45,459[5]	2014
	US$	21,559	2,080	2,700	1,000	–1,546	2014
	€	50	67	122	184	8	2016
	€	1,015	108,935	18,602,324	98,680	49,930[6]	2014
	€	13	109	522,160	39,721	27	2014
	US$	0	156,218	657,891	20,481	2,263	3 May 2017
	US$	0	43,689	495,362	20,481	6,657	3 May 2017
	US$	0	30,310	486,571	13,594	7,171	3 May 2017
	CZK	30,000	52,024	65,747	59,579	17,719	2016
	€	12,584	33,456	43,015	36,845	13,670	2015
	€	6,168	64,257	115,691	83,075	22,177	2015
	€	0	0	278	1,683	0	2016
	CHF	100	200	216	334	22	2015
	€	18	52	55	20	–125	2015
	DKK	2,000	2,439	2,933	3,499	99	2016
	€	35	6,986	7,302	1,921	231	2016
	CHF	1,000	171,430	221,662	173,041	96,811	2009
	AU$	0[8]	95[8]	228[8]	463[8]	8[8]	2015
	€	500	2,109	2,941	3,465	723	2010
	€	128	77,035	98,023	77,115	18,885	2015
	S$	550	4,767	7,039	11,198	301	2015
	US$	30,000	28,489	105,142	10,152	–3,511	29 Jun 2018
	US$	300	7,794	8,745	8,683	943	2015
	€	34	445	578	586	64	2015
	MYR	0	–82	84	0	–82	25 Aug 2017
	€	25	1,424	1,434	0	138	2015
	ILS	1	–4,021	3,989	0	–1,054	2015
	INR	300	75,970	86,553	44,991	7,143	2015

Changes to basis of consolidation

	Germany	Foreign	Total
As at 1 January 2018	20	41	61
Additions	1	2	3
Disposals	– 4	– 3	– 7
As at 31 December 2018	**17**	**40**	**57**

Eurex Repo GmbH, Frankfurt/Main, Germany, was merged into Eurex Bonds GmbH, Frankfurt/Main, Germany, (a wholly owned subsidiary of Eurex Frankfurt AG) effective 1 January 2018 and subsequently renamed Eurex Repo GmbH. Since Eurex Frankfurt AG, Frankfurt/Main, Germany, (a wholly owned subsidiary of Deutsche Börse AG) is the sole shareholder of Eurex Repo GmbH, a controlling influence within the meaning of IFRS 10 continues to be assumed, and the company continues to be fully consolidated.

Agricultural Commodity Exchange GmbH, EEX Power Derivatives GmbH and Global Environmental Exchange GmbH (all three in Leipzig, Germany) were merged into European Energy Exchange AG, Leipzig, Germany, with effect from 1 January 2018. As Deutsche Börse AG continues to hold a controlling interest in European Energy Exchange AG (EEX), the company continues to be fully consolidated.

On 29 June 2018, Deutsche Börse Group acquired the GTX Electronic Communication Network (ECN) business from GAIN Capital Holdings, Inc., Bedminster, USA. Within the scope of the transaction, 360 Treasury Systems AG, Frankfurt/Main, Germany, (a wholly-owned subsidiary of Deutsche Börse AG) established 360TGTX, Inc., New York City, USA, as a subsidiary, which acquired the GTX ECN business at a purchase price of US$100.1 million (€85.9 million), by way of an asset deal. Deutsche Börse Group consolidated the business activities of 360TGTX for the first time as at 29 June 2018.

The purchase price allocation – preliminary as at the reporting date – yielded the following effects:

Goodwill resulting from the business combination with the GTX ECN business

	Preliminary goodwill calculation 29 June 2018 €m
Consideration transferred	
Purchase price	85.9
Total consideration	**85.9**
Acquired assets and liabilities	
Customer relationships	23.3
Trade names	1.7
Software	4.5
Other non-current assets	0.4
Other current assets less liabilities	2.0
Total assets and liabilities acquired	**31.9**
Goodwill (tax deductible)	**54.0**

Goodwill resulting from the transaction largely reflects expected cost and revenue synergies from the business combination.

The full consolidation of the GTX ECN business resulted in an increase of net revenue amounting to €5.5 million as well as of income after tax amounting to €0.9 million. Due to the structure of the transaction (asset deal), no pro forma disclosures regarding the effects of a potential initial consolidation as at 1 January 2018 can be made.

With effect from 1 October 2018, Clearstream International S.A., Luxembourg, acquired 100 per cent of the shares in Swisscanto Funds Centre Ltd., London, United Kingdom. Since the completion of the transaction, the acquired entity has been fully consolidated. Effective 2 November 2018, the company name of the acquired entity was changed to Clearstream Funds Centre Ltd. With this transaction, Clearstream is extending its range of services in the investment funds area by adding distribution channels. The consideration paid for the acquisition of the shares was CHF 95.0 million (€83.3 million), leading to goodwill of €36.5 million.

The purchase price allocation – preliminary as at the reporting date – yielded the following effects:

Goodwill resulting from the business combination with Swisscanto Funds Centre Ltd.

	Preliminary goodwill calculation 1 October 2018 €m
Consideration transferred	
Purchase price in cash	92.7
Acquired bank balances	–9.4
Total consideration	**83.3**
Acquired assets and liabilities	
Customer relationships	40.8
Software	0.5
Other intangible assets	0.4
Non-current financial assets	14.7
Other non-current assets	0.6
Current financial assets (without cash)	16.3
Other current assets	1.7
Tax provisions	–0.4
Current financial liabilities (without cash deposits by customers)	–20.6
Deferred tax liabilities on temporary differences	–7.2
Total assets and liabilities acquired	**46.8**
Goodwill (not tax deductible)	**36.5**

The goodwill resulting from the transaction mainly reflects expected revenue synergies with existing customers. Due to the expansion of its product range, Clearstream expects to generate revenue from cross-selling synergies amounting to a low eight-digit sum in euros.

The full consolidation of Clearstream Funds Centre Ltd. (formerly Swisscanto Funds Centre Ltd.) resulted in an increase of net revenue amounting to €3.3 million as well as of income after tax amounting to €0.8 million. If the company had been fully consolidated as at 1 January 2018, this would have resulted in an increase of net revenue amounting to €12.5 million as well as of income after tax amounting to €2.0 million.

Eurex Zürich AG, Zurich, Switzerland, was merged into Eurex Global Derivatives AG, Zug, Switzerland, with effect from 1 October 2018. Since Deutsche Börse AG remains the sole shareholder of Eurex Global Derivatives AG, a controlling influence within the meaning of IFRS 10 continues to be assumed, and the company continues to be fully consolidated.

EPEX SPOT Belgium S.A., Brussels, Belgium, was merged into EPEX SPOT SE, Paris, France, with effect from 31 December 2018. Since European Energy Exchange AG (a 75 per cent subsidiary of Deutsche Börse AG) exerts a controlling influence within the meaning of IFRS 10 both indirectly via Powernext SAS (40.31 per cent) as well as directly (10.69 per cent), the company continues to be fully consolidated.

In the 2018 financial year, the following three companies were liquidated and deconsolidated: APX Shipping B.V.i.L. (as at 16 April 2018), APX Commodities Limited (as at 18 September 2018) and Impendium Systems Ltd. (as at 4 December 2018).

By purchase agreement dated 14 December 2018, Clearstream Holding AG, Frankfurt/Main, Germany, (a wholly owned subsidiary of Deutsche Börse AG) acquired all shares in Skylinehöhe 96 VV AG, Frankfurt/Main, Germany, at a purchase price of €57 thousand. The company was subsequently renamed Clearstream Beteiligungs AG. Since Deutsche Börse AG indirectly holds 100 per cent of the shares, a controlling influence within the meaning of IFRS 10 continues to be assumed, and the company is fully consolidated.

Associates

The following table summarises the main financial information of associates; data comprise the totals of each company according to the local GAAP and not proportional values from the view of Deutsche Börse Group.

Associates (part 1)

Company	Domicile	Segment	Equity interest as at 31 Dec 2018 direct/(indirect) %	Associate since
BrainTrade Gesellschaft für Börsensysteme mbH	Frankfurt/Main, Germany	Xetra (cash equities)	(28.58)[1]	2013
China Europe International Exchange AG	Frankfurt/Main, Germany	Eurex (financial derivatives)	40.00	2015
Deutsche Börse Commodities GmbH	Frankfurt/Main, Germany	Xetra (cash equities)	16.20	2007
Digital Vega FX Ltd	London, United Kingdom	Eurex (financial derivatives)	23.85	2011
enermarket GmbH	Frankfurt/Main, Germany	EEX (commodities)	(30.02)	2018
HQLAx S.à r.l.	Luxembourg, Luxembourg	GSF (collateral management)	28.76	2018
LuxCSD S.A.	Luxembourg, Luxembourg	Clearstream (post-trading)	(50.00)	2015
RegTek Solutions Inc.	New York, USA	Data	12.50	2015
R5FX Ltd	London, United Kingdom	Eurex (financial derivatives)	16.33	2014
SEEPEX a.d.	Belgrade, Serbia	EEX (commodities)	(9.57)	2015
Tradegate AG Wertpapierhandelsbank	Berlin, Germany	Xetra (cash equities)	19.99	2010
ZDB Cloud Exchange GmbH in Liquidation	Eschborn, Germany	Eurex (financial derivatives)	49.90	2013
Zimory GmbH in Liquidation	Berlin, Germany	Eurex (financial derivatives)	30.03	2013

1) Thereof 14.29 per cent held directly and 14.29 per cent indirectly via Börse Frankfurt Zertifikate AG

Associates (part 2)

Company	Currency	Ordinary share capital[1] thousand	Assets[1] thousand	Liabilities[1] thousand	Sales revenue 2018[1] thousand	Net profit/loss 2018[1] thousand
BrainTrade Gesellschaft für Börsensysteme mbH	€	1,400	3,723	2,027	3,780	101
China Europe International Exchange AG	€	27,000	13,284	76	255	–4,136
Deutsche Börse Commodities GmbH	€	1,000	6,518,505	6,511,137	13,974	4,601
Digital Vega FX Ltd	GBP	2,607[2]	2,387[2]	–458[2]	1,597[2]	563[2]
enermarket GmbH	€	25	351	357	8	–599
HQLAx S.à r.l.	€	17	3,141	1,331	0	–1,550
LuxCSD S.A.	€	6,000	6,547	1,265	2,679	427
RegTek Solutions Inc.	US$	4,857	4,688	2,709	2,917	–1,759
R5FX Ltd	GBP	2	477	930	38	–700
SEEPEX a.d.	RSD	240,000	151,468	155,706	94,300	5,344
Tradegate AG Wertpapierhandelsbank	€	24,403	160,700	113,330	68,958	17,191
ZDB Cloud Exchange GmbH in Liquidation	€	50	207	78	0	–16
Zimory GmbH in Liquidation	€	263	204	48	0	–18

1) Disclosures are based on preliminary and unaudited figures which may be adjusted subsequently.
2) The figures refer to the financial year from 1 December 2017 to 30 November 2018.

On 1 February 2018, European Energy Exchange AG acquired 40.0 per cent of the voting rights in enermarket GmbH, Frankfurt/Main, Germany. This resulted in an indirect equity investment of Deutsche Börse AG amounting to 30.02 per cent.

With effect from 4 July 2018, Deutsche Börse AG sold parts of its interest in PHINEO gAG, Berlin, Germany, to Phineo Pool GbR, Berlin, Germany. This resulted in a decrease in voting rights to 4 per cent. Hence, PHINEO gAG is no longer classified as an associate and is accounted for using the equity method.

On 7 August 2018, Deutsche Börse AG acquired 10.0 per cent of the voting rights in HQLAx S.à r.l., Luxembourg. On 5 December 2018, a second tranche was acquired, resulting in an equity investment of Deutsche Börse AG amounting to 28.76 per cent.

Effective 19 September 2018, Deutsche Börse AG sold its interest in Switex GmbH, Hamburg, Germany.

With effect from 31 December 2018, the purchase agreement to sell Deutsche Börse AG's shares in Digital Vega FX Ltd., London, United Kingdom, was signed. However, the Financial Conduct Authority (FCA), London, United Kingdom, must express its consent before such agreement can take effect.

Where Deutsche Börse Group's share of the voting rights in a company amounts to less than 20 per cent, Deutsche Börse Group's significant influence is exercised in accordance with IAS 28.6 (a) through the Group's representation on the supervisory board or the board of directors of the following companies as well as through corresponding monitoring systems:

- Deutsche Börse Commodities GmbH, Frankfurt/Main, Germany
- RegTek Solutions Inc., New York, USA
- R5FX Ltd, London, United Kingdom
- SEEPEX a.d., Belgrade, Serbia
- Tradegate AG Wertpapierhandelsbank, Berlin, Germany

3. Summary of key accounting policies

Deutsche Börse AG's consolidated financial statements have been prepared in euros, the functional currency of Deutsche Börse AG. Unless stated otherwise, all amounts are shown in millions of euros (€m). Due to rounding, the amounts may differ from unrounded figures.

The annual financial statements of subsidiaries included in the consolidated financial statements have been prepared on the basis of the Group-wide accounting policies based on IFRS that are described in the following. They were applied consistently to the periods shown.

Adjustments to the presentation of the consolidated income statement

Since 1 January 2018, personnel-related costs for continuing professional development, food and drink have been reported under "staff costs" in order to improve transparency. Before then, such costs were contained in other operating expenses. Prior-year figures were restated accordingly. For further details, see note 5 and note 6.

As part of a comprehensive analysis of customer contracts due to the first-time adoption of IFRS 15 as at 1 January 2018, reporting of connectivity and maintenance fees within Deutsche Börse Group has been harmonised. In this context, €5.1 million from other operating income were reclassified as sales revenue for the 2017 financial year. For further details, see note 4.

Effects from the first-time adoption of IFRS 9 "Financial instruments"

Deutsche Börse AG has implemented IFRS 9 as at 1 January 2018. The implementation has resulted in changes to the accounting principles and the restatement of amounts reported in the consolidated financial statements. Moreover, Deutsche Börse AG has adjusted the presentation of the consolidated balance sheet in order to enhance transparency as regards the financial instruments used. Under the new structure, the measurement categories in accordance with IFRS 9 are directly reflected in the consolidated balance sheet.

Reclassification of financial assets

31 Dec 2017 (IAS 39) (restated)			Changes arising from transition to IFRS 9
Consolidated balance sheet item	Category	Carrying amount €m	€m
Non-current assets			
Other equity investments	AFS[1]	99.4	2.2
Receivables and securities from banking business	AFS	1,563.0	–8.3
Other financial instruments	AFS	14.5	0
	AFS	15.1	–0.4
	FVPL[2] (FV option)	1.2	0
Other loans	LaR[3]	0.4	0
Non-current financial instruments held by central counterparties	Derivatives	4,837.2	0
Other non-current assets	–	4.1	0
	LaR	4.5	0
	Derivatives	0.1	0
Total non-current assets		**6,539.5**	**– 6.5**
Current assets			
Current financial instruments held by central counterparties	LaR	272.0	0
	Derivatives	79,238.7	0
Receivables and securities from banking business	LaR	12,776.8	0
	AFS	254.5	–0.5
	Derivatives	5.2	0
Trade receivables	LaR	329.4	1.5
Receivables from related parties	LaR	2.5	0
Other current assets	–	451.7	0
	LaR	141.8	0
	LaR	3.0	–1.5
	LaR	1.2	–1.5
Restricted bank balances	LaR	29,392.0	0
Other cash and bank balances	LaR	1,297.6	0
Total current assets		**124,166.4**	**– 2.0**
Total		**130,705.9**	**– 8.5**

1) AFS = available for sale
2) FVPL = fair value through profit or loss
3) LaR = loans and receivables
4) FVOCI = fair value through other comprehensive income
5) aAC = at amortised cost

1 Jan 2018 (IFRS 9)

	Carrying amount €m	Consolidated balance sheet item	Category
	101.6	Equity investments measured at FVOCI[4)]	FVOCI
	1,554.7	Financial assets measured at amortised cost	aAC[5)]
	14.5	Financial assets measured at amortised cost	aAC
	14.7	Financial assets at fair value through profit or loss	FVPL
	1.2	Financial assets at fair value through profit or loss	FVPL
	0.4	Financial assets measured at amortised cost	aAC
	4,837.2	Derivatives	FVPL
	4.1	Other non-current assets	–
	4.5	Financial assets measured at amortised cost	aAC
	0.1	Derivatives	FVPL
	6,533.0		
	272.0	Financial assets measured at amortised cost	aAC
	79,238.7	Derivatives	FVPL
	12,776.8	Financial assets measured at amortised cost	aAC
	254.0	Financial assets measured at amortised cost	aAC
	5.2	Derivatives	FVPL
	330.9	Trade receivables	aAC
	2.5	Trade receivables	aAC
	451.7	Other current assets	–
	141.8	Financial assets measured at amortised cost	aAC
	1.5	Financial assets at fair value through profit or loss	FVPL
	–0.3	Financial liabilities at fair value through profit or loss	FVPL
	29,392.0	Restricted bank balances	aAC
	1,297.6	Other cash and bank balances	aAC
	124,164.4		
	130,697.4		

The reclassification and the measurement of financial instruments as well as the first-time adoption of IFRS 15 "Revenue from Contracts with Customers" had the following effects on the revaluation surplus and accumulated profit of Deutsche Börse Group as at 1 January 2018:

Total impact on shareholders' equity

	Revaluation surplus €m	Accumulated profit €m
Closing balance as at 31 Dec 2017 – IAS 39/IAS 18	**19.6**	**3,631.0**
Reclassification of equity investments from "available for sale" to "fair value through other comprehensive income"	3.2	–1.0
Reclassification of debt investments from "available for sale" to "at amortised cost"	–8.5	0
Reclassification of financial assets from "available for sale" to "fair value through profit or loss"	–2.0	1.6
Change in valuation allowance for trade receivables	0	1.5
Change in valuation allowance for debt investments carried at amortised cost	0	–0.3
Recognition of deferred tax assets	1.0	–0.7
Recognition of deferred tax liabilities	1.1	–0.1
Adjustment due to first-time adoption of IFRS 9 as at 1 Jan 2018	**–5.2**	**1.0**
Recognition of contract liabilities	0	–10.7
Recognition of deferred tax assets	0	2.9
Adjustment due to first-time adoption of IFRS 15 as at 1 Jan 2018	**0**	**–7.8**
Opening balance as at 1 Jan 2018 – IFRS 9/IFRS 15	**14.4**	**3,624.2**

Reclassification of equity instruments from "available for sale" to "fair value through other comprehensive income (FVOCI)"

Equity instruments categorised as available for sale (€99.4 million) were presented in other equity investments until 31 December 2017. Since 1 January 2018, they have been shown within the "equity investments measured at fair value through other comprehensive income (FVOCI)" line item.

All equity instruments recognised as at 1 January 2018 are designated as at FVOCI by Deutsche Börse Group.

Under IAS 39, equity instruments for which no active market existed and for which no alternative valuation methods could be applied, were measured at cost. Deutsche Börse Group developed valuation models to calculate the fair values for these financial assets leading to an increase of €2.2 million in the amounts shown under "equity investments measured at fair value through other comprehensive income (FVOCI)". Foreign-exchange effects amounting to €1.0 million were reclassified from accumulated profit into revaluation surplus in connection with the allocation of equity investments to "equity investments measured at fair value through other comprehensive income (FVOCI)".

Reclassification of debt instruments from "available for sale" to "at amortised cost"
The management of Deutsche Börse Group assessed the business model for the financial assets classified as available for sale under IAS 39 as at 1 January 2018.

Following the analysis, debt instruments complying with the criteria to solely represent payments of principal and interest and following the business model "to hold" have been classified to the category "at amortised cost" and are shown in the "financial assets measured at amortised cost" line item. In 2017, these instruments had been shown as non-current and current receivables and securities from banking business (€1,563.0 million and €254.5 million, respectively) and as other non-current financial instruments (€14.5 million). Related fair value gains amounting to €8.5 million were de-recognised from other comprehensive income and from the related financial assets as at 1 January 2018.

As at 31 December 2018, the fair value of the debt instruments originally recognised in the available-for-sale category stood at €1,617.9 million. If these instruments had been recognised as available for sale on 31 December 2018, Deutsche Börse Group would have been obliged to recognise an unrealised gain of €2.4 million in other comprehensive income.

Reclassification of debt instruments from "available for sale" to "financial assets at fair value through profit or loss (FVPL)"
Debt instruments that do not meet the criteria to be classified as "at amortised cost" in accordance with IFRS 9 because their cash flows do not represent solely payments of principal and interest were reclassified to financial assets at fair value through profit or loss (€15.1 million). As Deutsche Börse Group applied the "at cost" exemption under IAS 39 for instruments without an active market, the revaluation at fair value led to a reduction of €0.4 million in accumulated profit. Furthermore, the measurement of financial instruments at FVPL led to a reduction of €2.0 million of the revaluation surplus and an increase of accumulated profit in the same amount. These financial instruments were already measured at fair value before adoption of IFRS 9.

As at 31 December 2018, the fair value of the debt instruments originally recognised in the available-for-sale category stood at €14.6 million. If these instruments had been recognised as available for sale on 31 December 2018, Deutsche Börse Group would have been obliged to recognise an unrealised loss of €1.6 million in other comprehensive income.

Change in provision for trade receivables
For trade receivables, Deutsche Börse Group applies the simplified approach to calculate the expected credit losses, which requires the use of the lifetime expected loss provision for all trade receivables. The transfer from the incurred loss model of IAS 39 to the expected loss model of IFRS 9 reduced the impairment charges for trade receivables by €1.5 million and increased accumulated profit by the same amount. As at 31 December 2017, impairments recognised for trade receivables amounted to €5.2 million.

Change in provision for debt instruments at amortised cost
Debt investments at amortised cost are considered to be generally low risk, and thus the impairment provision recognised is equal to the twelve-month expected credit loss. The corresponding provision calculated as at 1 January 2018 amounted to €0.3 million and retained earnings were reduced by the same amount.

Adjustment regarding the presentation of hybrid financial instruments
Since the new standard no longer provides for a separation of hybrid financial instruments, Deutsche Börse Group reclassified a total amount of €2.9 million from other liabilities to the items “financial instruments measured at fair value through profit or loss” and “financial liabilities measured at fair value through profit or loss”. This reclassification did not affect the Group’s equity.

Change in deferred tax assets
The impact on the deferred taxes is mainly driven by the reclassifications of financial instruments measured at available for sale under IAS 39 to “amortised cost” under IFRS 9.

Changes resulting from the first-time adoption of IFRS 15

Deutsche Börse Group applied IFRS 15 “Revenue from Contracts with Customers” as issued in May 2014 and the corresponding clarifications as issued in April 2016. IFRS 15 replaces the following standards and interpretations on revenue recognition:

- IAS 11 “Construction Contracts”
- IAS 18 “Revenue”
- IFRIC 13 “Customer Loyalty Programmes”
- IFRIC 15 “Agreements for the Construction of Real Estate”
- IFRIC 18 “Transfers of Assets from Customers”
- SIC-31 “Revenue – Barter Transactions Involving Advertising Services”

In accordance with the transition provisions set out in IFRS 15, Deutsche Börse Group has adopted the new accounting policies according to the modified retrospective approach.

Adjustments to the recognition of revenue from the admission, listing or inclusion of securities
Until 31 December 2017, the admission, listing and inclusion services for securities were each accounted for as a separate performance obligation, and revenue was recognised when (or as) the promised service was transferred to the customer and the customer obtained control of such service. More specifically, this was the point in time when Deutsche Börse’s management resolved the admission of the respective securities, or when the initial listing took place.

In its updates dated September 2018 and January 2019, the IFRS IC explains that specific fees related to security admission (as well as listing or inclusion) services do not represent distinct performance obligations to customers and may therefore not be accounted for separately from the subsequent listing of the respective securities. The question of how to recognise fees charged before the listing of securities was – and still is – subject to controversial debate among exchange operators, auditors and other stakeholders around the world.

In accordance with the published decisions taken by the IFRS IC, Deutsche Börse Group will allocate (a) the recognition of fees charged for the listing of securities to the regulated unofficial market (Freiverkehr) as well as (b) fees charged for the admission and inclusion of securities with definite maturities to/in the regulated market to the projected listing periods of the underlying securities; these amendments will be applied with retrospective effect as from 1 January 2018. Effective 1 January 2018, the adjustment effects resulting from the accounting method change amounted to €9.3 million and were netted against Deutsche Börse Group's equity. Regarding the 2018 financial year, the change in the accounting method led to an increase in sales revenue of €0.1 million.

Adjustment to the recognition of revenue from a pricing scale agreement
A pricing scale agreement exists for the continual provision of service in the cash market. An average price is calculated as a basis for the recognition of revenue. Due to the fact that, relatively speaking, a higher consideration is due on the part of the customer at the beginning of the contract compared to the services the customer receives during this period, a contract liability must be recognised and dissolved over the contract period until the end of the contract. The adjustment effect resulting from the change in the accounting method as at 1 January 2018 amounts to €1.4 million and is offset against equity. With regard to the 2018 financial year, the change in the accounting method results in an increase of sales revenue of €0.7 million.

Recognition of revenue and expenses

Revenue from contracts with customers
The accounting treatment of the most important performance obligations of Deutsche Börse Group's segments is described below.

Eurex (financial derivatives)
Deutsche Börse Group operates one of the leading global derivatives exchanges as well as one of the leading clearing houses. Revenue in the derivatives business is generated primarily from fees that are charged for transactions with regard to the matching/registration, administration and regulation of order book and off-book transactions on Eurex Deutschland. Additionally, there are connectivity fees. Fees, as well as any reductions due to discounts and rebates, are specified in price lists and circulars. Rebates depend mainly on monthly volumes or the monthly fulfilment of liquidity provisioning obligations in certain products or product groups.

Revenue for transactions in listed derivatives is recognised as soon as contracts are matched/registered and there is no unfulfilled obligation towards the customer. A receivable is recognised when the promised service is transferred at a specific point in time, and the entitlement to consideration depends solely on the passage of time. Transaction fees are invoiced on a monthly basis and are payable when invoiced. As rebates are granted mainly on a monthly basis, there is no need to recognise a contract liability. Payments are generally debited directly from the clearing member immediately after invoicing, which means that there are no financing components.

Fees are also collected for clearing and settlement services provided for off-exchange (over-the-counter, OTC) transactions and are generated primarily from posting and administration fees. Fees for these transactions and the related discounts and rebates are also specified in price lists and circulars of Eurex Clearing AG.

In the case of OTC transactions, posting fees are recognised at novation on a monthly basis. These fees are recognised at a specific point in time; namely, when the promised service is transferred at a specific point in time, and the entitlement to consideration depends solely on the passage of time. OTC administrative fees are recognised based on a time period as the service is provided until the transaction has been closed, terminated or has matured. A receivable is recognised monthly based on the usage within the respective month, provided that the respective position is still open at month end. In general, the payments are directly debited from the clearing member, which means that there are no financing components.

Deutsche Börse Group offers a whole range of connectivity options to the trading and clearing platforms. The customer has use of the company's service and uses the service as it is performed over the life of the contract. As the smallest reporting period is the same as the contract term, the performance progress equals 100 per cent. The connectivity revenue generated from this is usually realised monthly with invoicing.

EEX (commodities)

The EEX segment operates the central marketplace for energy and other commodity products in Europe. Its product portfolio comprises contracts on power, natural gas and emission allowances, as well as freight rates and agricultural products. Revenue is generated primarily from fees that are charged for exchange trading and clearing of commodity products. Transaction fees are specified in the price list. Rebates are granted primarily in the form of monthly rebates for the provision of a certain volume or level of liquidity. These types of rebates are dependent upon the total monthly volume or the monthly fulfilment of certain liquidity provision obligations.

Revenue is recognised as soon as contracts are matched/registered and there is no unfulfilled obligation towards the customer as the service has already been performed by this point in time. EEX recognises receivables when the promised service is provided at a certain time and the entitlement to consideration depends solely on the passage of time. Most of the invoiced amounts are debited directly from the clearing members, which means that there are no financing components.

360T (foreign exchange)

Via 360T group, the segment operates one of the biggest independent global multibank and multi-product trading platforms. 360T is a provider of optimised services covering the entire trading process of foreign-exchange products. It generates commission income from transaction and access fees payable for the use of its trading platform. In addition, 360T generates installation fees from the onboarding of customers on its trading platform, as well as user set-up fees and fees for the programming and maintenance of necessary interfaces.

Revenue is recognised when the contractually agreed service is provided to the customer. Revenue from the use of the platform and maintenance fees are recognised on a pro-rata basis.

Access fees, transaction fees, as well as trading platform fees, contain different discount schedules on a monthly basis. Such discounts are considered accordingly in the month in which the services are rendered and reduce the sales revenue of such period. They are invoiced on a monthly basis. Maintenance fees are invoiced on an annual basis.

Xetra (cash equities)

As a general rule, securities intended for trading on the regulated market of Frankfurter Wertpapierbörse (FWB, the Frankfurt Stock Exchange) are subject to the admission, listing or inclusion, resolved by FWB's Exchange Management. Deutsche Börse AG, as the operator of the public-sector exchange, charges fees for the admission, listing, inclusion and quotation of securities on the regulated market. Fees charged for the admission and inclusion of securities with definite maturities on the regulated market are realised using the projected useful lives of the underlying securities. Accordingly, the fees charged for the listing of securities on the regulated unofficial market are realised using the projected useful lives of the underlying securities. The method for measuring performance progress based on the projected useful life correctly reflects the performance progress until the complete fulfilment of the performance obligation. Customer invoicing is carried out on a quarterly basis, and receivables are payable upon invoicing.

Listing fees are levied for the activity of all bodies of FWB, which supervise the trading and the settlement of trades as well as ensure the proper functioning of all trading activities (permanent possibility to make use of exchange facilities). Listing fees are recurring fees, which are charged for a service that is delivered over time. Accordingly, revenue is realised on a pro-rata basis. Revenue from fees for listings on the regulated unofficial market is realised in a similar manner.

For trading cash market products, the same accounting treatment as described within the "Eurex (financial derivatives) segment" section applies for the Xetra (cash equities) segment.

Clearstream (post-trading)

Clearstream provides post-trading infrastructure and services; it offers transaction settlement services as well as administration and custody of securities. The fees are calculated in accordance with the prices set in the price list as well as with any relevant discounts granted. In accordance with the general terms and conditions, the customer authorises direct debiting and consequently no financing component has been identified.

Customers in the custody business receive the benefit from the service provided and consume it at the same time as the performance is fulfilled during the contract period. The revenue generated from this is generally realised on a monthly basis upon invoicing.

Fees collected for the administration of securities and for settlement services are recognised when the agreed service is provided to the customer. This occurs when instructions are received, and the transactions are processed. The service has been fulfilled at this point in time. Receivables are recognised if the agreed service is rendered at a specific point in time and the claim to the consideration solely depends on the course of time. Since discounts are generally granted on a monthly basis, the recognition of a contractual liability is not necessary. Customers are invoiced on a monthly basis and consideration is payable when invoiced.

IFS (investment fund services)

The segment provides services to standardise fund processing and to increase efficiency and safety in the investment fund sector. The services offered comprise order routing, settlement and asset administration, as well as custody services.

Revenue is recognised when the promised service is transferred to the customer. This occurs when instructions are received and the transactions are processed. The service has been fulfilled at this point in time.

Revenue is recognised based on the price specified in the price list and reduced by the corresponding rebates. Customers are invoiced on a monthly basis and consideration is payable when invoiced. In accordance with the general terms and conditions, the customer authorises direct debiting and consequently no financing component has been identified.

GSF (collateral management)
Via Clearstream, Deutsche Börse Group provides a comprehensive range of global securities financing (GSF) services with the two most prominent being collateral management and securities lending services. Customers of collateral management services simultaneously receive and consume the benefits with the company's performance of the service.

Revenue is recognised over a certain period of time concurrent with the provision of collateral management services. Services in the securities lending business, on the other hand, are provided at a specific point in time.

STOXX (index business)
STOXX is Deutsche Börse Group's global index provider that calculates and distributes a comprehensive index family. Its offering ranges from blue-chip to benchmark to strategy to sustainability to smart-beta indices. The Group generates revenue from calculating and marketing indices, which financial market participants use as underlyings for financial instruments or as a benchmark for the performance of investment funds. Customers simultaneously receive and consume the benefits provided by the entity's performance of the service during the contract term. The recognition of revenue for index licences is based on fixed payments, variable payments (usage-based volumes; mostly assets under management), or a combination of the two.

For variable payments, customers report their usage, and fees are invoiced in the quarter after usage; monthly estimates are recognised. This is determined either based on the customer's average usage over the previous twelve months, adjusted to take into account current developments in the markets, or based on the real data in the markets on a customer level. Revenue estimates are revised when warranted by the circumstances. Increases and decreases in estimated revenue are reflected in the consolidated income statement in the period in which the circumstances that give rise to the revision become known by the management.

For two fee components (minimum fee and usage-based fee), a contract liability is recognised and reduced each month based on the usage that has been recognised each month. Customers are invoiced on a quarterly basis, and consideration is payable when invoiced.

Data
Market participants subscribe to real-time trading and market signals or licence these services for their own use, processing, or dissemination. The customer simultaneously receives and consumes the benefits provided by the entity's performance during the contract term. Customers report their usage, and fees are charged in the month after usage. Deutsche Börse Group puts together monthly estimates that are based on the trend of the preceding months. Revenue estimates are revised when warranted by the circumstances. Increases and decreases in estimated revenue are reflected in the consolidated income statement in the period in which the circumstances that give rise to the revision become known by the management.

Revenue is recognised based on the price specified in the price list. Customers are invoiced on a monthly basis, and consideration is payable when invoiced.

Volume-related costs
The “volume-related costs” item comprises expenses that depend, in particular, on the number of certain trade or settlement transactions, the custody volume, the Global Securities Financing volume, or the volume of market data acquired or that result from revenue-sharing agreements or maker-taker pricing models. Volume-related costs are not incurred if the corresponding revenue is no longer generated.

Interest income and expense
Interest income and expense are recognised using the effective interest method over the respective financial instrument’s term to maturity. Interest income is recognised when it is probable that the economic benefits associated with the transaction will flow to the entity and the income can be measured reliably. Interest expense is recognised in the period in which it is incurred. Interest income and expense from banking business are set off in the consolidated income statement and disclosed separately in note 4.

Dividends
Dividends are recognised in net income from strategic investments if the right to receive payment is based on legally assertable claims.

The consolidated income statement is structured using the nature of expense method.

Research and development costs

Research costs are expensed in the period in which they are incurred. Development costs for an internally developed intangible asset are only capitalised when the definition and recognition criteria of an intangible asset and the recognition criteria of an intangible asset generated from development are met. An intangible asset has to be recognised when it is probable that the expected future economic benefit will flow to Deutsche Börse Group, and the cost of the asset can be measured reliably. An intangible asset generated from development has to be recorded when Deutsche Börse Group can provide evidence of the following:

- the technical feasibility of completing the intangible asset so that it will be available for use or sale
- the intention to complete development of the intangible asset and use (or sell) it
- the ability to use or sell the intangible asset
- how the intangible asset will generate probable future economic benefits
- the availability of adequate technical, financial and other resources to complete the intangible asset
- the ability to reliably measure the costs attributable to the intangible asset during its development

Development costs that have to be capitalised include direct labour costs, costs of purchased services and workplace costs, including proportionate overheads that can be directly attributed to the preparation of the respective asset for use, such as costs for the software development environment. Development costs that do not meet the requirements for capitalisation are recognised through profit or loss. Interest expense that cannot be allocated directly to one of the development projects is recognised in profit or loss in the reporting period and not included in capitalised development costs. If research and development costs cannot be separated, the expenditures are recognised as expenses in the period in which they are incurred.

All development costs (both primary costs and costs incurred subsequently) are allocated to projects. The projects are broken down into the following phases in order to decide which cost components must be capitalised and which cannot be capitalised:

1. Design
- Definition of product design
- Specification of the expected economic benefit
- Initial cost and revenue forecast

2. Detailed specifications
- Compilation and review of precise specifications
- Troubleshooting process

3. Building and testing
- Software programming
- Product testing

4. Acceptance
- Planning and implementation of acceptance tests
- Analysis to identify weak points in functional, operational software
- Identification of inefficiencies

5. Simulation
- Preparation and implementation of simulation
- Compilation and testing of simulation software packages
- Compilation and review of documents

6. Roll-out
- Planning of product launch
- Compilation and dispatch of production systems
- Compilation and review of documents

In accordance with IAS 38, only expenses attributable to the “detailed specifications” and “building and testing” phases are capitalised. All other phases of software development projects are expensed.

Intangible assets

Capitalised development costs are amortised from the date of first use of the software using the straight-line method over the asset's expected useful life. The useful life of internally developed software is generally assumed to be five years; a useful life of seven years is used as the basis in the case of newly developed trading platforms and clearing or settlement systems, and for certain enhancements of these systems.

Purchased software is carried at cost and reduced by amortisation and, where necessary, impairment losses. Amortisation is charged using the straight-line method over the expected useful life or at most until the right of use has expired.

Useful life of software

Asset	Amortisation period
Standard software	3 to 10 years
Purchased custom software	3 to 7 years
Internally developed custom software	3 to 7 years

Intangible assets are derecognised on disposal or when no further economic benefits are expected to flow from them.

The amortisation period for intangible assets with finite useful lives is reviewed at a minimum at the end of each financial year. If the expected useful life of an asset differs from previous estimates, the amortisation period is adjusted accordingly.

Goodwill is recognised at cost and tested at least once a year for impairment.

The other intangible assets were largely acquired within the context of business combinations and refer to exchange licences, trade names and customer relationships. The acquisition costs correspond to the fair values as at the acquisition date.

Assets with a finite useful life are amortised using the straight-line method over their expected useful life. Depending on the relevant acquisition transaction, the expected useful life is 5 years for trade names, 4 to 24 years for participant and customer relationships, and 2 to 20 years for other intangible assets.

Assets with an indefinite useful life – exchange licences and transaction-dependent trade names – are tested for impairment at least once a year.

Since the acquired exchange licences have no time limit on their validity and, in addition, there is an intention to maintain the exchange licences disclosed as at 31 December 2018 as part of the general business strategy, an indefinite useful life is assumed. Moreover, it is assumed that the trade name of STOXX, certain trade names of 360T as well as certain registered trade names of EEX group also have an indefinite useful life. These umbrella brands benefit from strong brand awareness and are used in the course of operating activities, so there are no indications that their useful life is limited.

Property, plant and equipment

Depreciable items of property, plant and equipment are carried at cost less cumulative depreciation. The straight-line depreciation method is used. Costs of an item of property, plant and equipment comprise all costs directly attributable to the production process, as well as an appropriate proportion of production overheads. No borrowing costs were recognised in the reporting period as they could not be directly allocated to any particular development project.

Useful life of property, plant and equipment

Asset	Depreciation period
Computer hardware	3 to 5 years
Office equipment	5 to 25 years
Leasehold improvements	based on lease term

Repair and maintenance costs are expensed as incurred.

If it is probable that the future economic benefits associated with an item of property, plant and equipment will flow to the Group and the cost of the asset in question can be reliably determined, expenditure subsequent to acquisition is added to the carrying amount of the asset as incurred. The carrying amounts of any parts of an asset that have been replaced are derecognised.

Impairment losses on property, plant and equipment and intangible assets

Specific non-current non-financial assets are tested for impairment. At each reporting date, the Group assesses whether there are any indications that an asset may be impaired. If this is the case, the carrying amount is compared with the recoverable amount (the higher of value in use and fair value less costs of disposal) to determine the amount of any potential impairment.

Value in use is estimated on the basis of the discounted estimated future cash flows from continuing use of the asset and from its ultimate disposal, before taxes. For this purpose, discount rates are estimated based on the prevailing pre-tax weighted average cost of capital. If no recoverable amount can be determined for an asset, the recoverable amount of the cash-generating unit (CGU) to which the asset can be allocated is determined.

Irrespective of any indications of impairment, intangible assets with indefinite useful lives and intangible assets not yet available for use must be tested for impairment at least once a year. If the estimated recoverable amount of the asset or CGU is lower than the respective carrying amount, an impairment loss is recognised and the net carrying amount of the asset or CGU, respectively, is reduced to its estimated recoverable amount.

At the acquisition date, goodwill is allocated to identifiable groups of assets (cash-generating units) or groups of cash-generating units that are expected to create synergies from the relevant acquisition. If changes arise in the structure of cash-generating units, for example through a new segmentation, goodwill is allocated taking into account the relative fair values of the newly defined cash-generating units. Irrespective of any indications of impairment, these items must be tested for impairment at least annually at the lowest level of impairment at which Deutsche Börse Group monitors the respective goodwill. An impairment loss is recognised if the carrying amount of the cash-generating unit to which goodwill is allocated (including the carrying amount of that goodwill) is higher than the recoverable amount of this group of assets. The impairment loss is first allocated to the goodwill, then to the other assets in proportion to their carrying amounts.

A review is conducted at every reporting date to establish whether there are any indications that an impairment loss recognised on non-current assets (excluding goodwill) in prior periods no longer applies. If this is the case, the carrying amount of the asset is increased and the difference is recognised in profit or loss. The maximum amount of this reversal is limited to the carrying amount that would have resulted if no impairment loss had been recognised in prior periods. Impairment losses on goodwill are not reversed.

Fair value measurement

The fair value of a financial instrument is measured using quoted market prices, if available. If no quoted market prices are available, observable market prices, for example for interest rates or exchange rates, are used. This observable market information is then used as inputs for financial valuation techniques, e.g. option pricing models or discounted cash flow models. In isolated instances, fair value is determined exclusively on the basis of internal valuation models.

Investments in associates and joint ventures

Investments in associates and joint ventures are measured at cost on initial recognition and accounted for using the equity method upon subsequent measurement.

Financial instruments

Financial assets since 1 January 2018

Financial assets: recognition and derecognition of financial assets

Financial assets are recognised when the Group or one of its companies becomes a party to a financial instrument. Regular way purchases and sales of financial assets are generally recognised and derecognised at the trade date. Purchases and sales of debt instruments classified as “at amortised cost” and of equities eligible for clearing via the central counterparties (CCPs) of Deutsche Börse Group are recognised and derecognised at the settlement date.

Financial assets are derecognised when the contractual rights to the cash flows expire or when the company transfers these rights in a transaction that transfers substantially all risks and rewards of ownership of the financial assets.

Clearstream Banking S.A. acts as a principal in securities borrowing and lending transactions in the context of the ASLplus securities lending system. Legally, it operates between the lender and the borrower without being an economic party to the transaction (transitory items). In these transactions, the securities borrowed and lent match each other. Consequently, these transactions are not recognised in the consolidated balance sheet.

Financial assets: measurement

Since 1 January 2018, the Group has classified its financial assets according to the following measurement categories:

- fair value (through other comprehensive income or through profit or loss)
- amortised cost

The classification depends on the entity's business model for managing the financial assets and contractual terms of the cash flows.

For assets measured at fair value, gains and losses will be recognised in profit or loss or in other comprehensive income. For investments in debt instruments, the recognition method will depend on the business model according to which the investment is held. For investments in equity instruments that are not held for trading, this will depend on whether Deutsche Börse Group made use of the option at the time of initial recognition to account for the equity investment at fair value through other comprehensive income. The classficiation chosen may not be changed in future periods.

The Group reclassifies debt instruments when – and only when – its business model for managing such items changes.

Financial assets: initial measurement

At initial recognition, Deutsche Börse Group measures a financial asset at its fair value through profit or loss. In the case of financial assets measured through other comprehensive income, measurement also takes into account transaction costs that are directly attributable to the acquisition of the respective asset. Transaction costs of financial assets carried at fair value through profit or loss are recognised in profit or loss.

Financial assets with embedded derivatives are considered in their entirety when determining whether their cash flows are solely payment of principal and interest.

Financial assets: subsequent measurement of debt instruments

Subsequent measurement of debt instruments depends on the Group's business model for managing the asset and cash flow characteristics of the respective assets. Deutsche Börse Group allocates each debt instrument in one of the following categories:

- **Amortised cost:** Assets held for collection of contractual cash flows, where those cash flows represent solely payments of principal and interest, are measured at amortised cost. A gain or loss on a debt instrument that is subsequently measured at amortised cost is recognised through profit or loss when the asset is derecognised or impaired. Interest income from these financial assets is included in financial income or in net interest income from banking business using the effective interest rate method. Foreign-exchange gains and losses are shown in other operating income or expenses or in financial income or expense.
- **Fair value through other comprehensive income (FVOCI):** Assets that are held for collection of contractual cash flows and for selling the financial assets, where the assets' cash flows represent solely payments of principal and interest, are measured at FVOCI. Changes in the carrying amount are shown in other comprehensive income. An exception to this rule is the recognition of impairment gains or losses, interest revenue and foreign-exchange gains and losses which are recognised in profit or loss. When a financial asset is derecognised, the cumulative gain or loss previously recognised in other comprehensive income is reclassified from equity to profit or loss and recognised in other operating income or expenses. Interest income from these financial assets would be included in financial income or in net interest income from banking business using the effective interest rate method. Foreign-exchange gains and losses are presented in other operating income or expenses or in financial income or expense. Impairment expenses are shown in other operating expenses. The Group did not follow the business model to hold and to sell in the reporting period. Accordingly, no debt instruments were classified at FVOCI.
- **Fair value through profit or loss (FVPL):** Financial assets that do not meet the criteria for measurement at amortised cost or at FVOCI, are measured at FVPL. A gain or loss on a debt investment that is subsequently measured at FVPL and not part of a hedging relationship is recognised in profit or loss and included as a net amount in the consolidated income statement within net income from strategic investments in the period in which it arises.

Financial assets: subsequent measurement of equity instruments

Deutsche Börse Group subsequently measures all equity investments at fair value. Where the Group's management opted for presenting fair value gains and losses on equity investments in other comprehensive income, there is no subsequent reclassification of fair value gains and losses to profit or loss following the derecognition of the investment. Dividends from such investments are recognised in profit or loss as net income from strategic investments when the Group's right to receive payments is established.

Changes in the fair value of financial assets measured at fair value through profit or loss are recognised in net income from strategic investments in the consolidated income statement as applicable.

Impairment losses (and reversal of impairment losses) on equity investments measured at FVOCI are not reported separately from other changes in fair value.

As at the reporting date, Deutsche Börse Group has designated all equity instruments as at fair value through other comprehensive income.

Impairment

The Group assesses the expected credit losses associated with its debt instruments carried at amortised cost or at FVOCI on a forward-looking basis. The impairment is measured based on an amount equal to twelve-month expected losses or lifetime expected losses at Deutsche Börse Group. The impairment methodology applied depends on whether there has been a significant increase in credit risk. A loss allowance equal to twelve-month expected losses is recognised unless the credit risk on a financial instrument has increased significantly since initial recognition.

In accordance with IFRS 9, a default is assumed, and a transfer to stage 3 is required when a financial asset is credit-impaired, i.e. when one or more events that have a detrimental impact on the estimated future cash flows of that financial asset have occurred. Deutsche Börse Group has identified the following triggers to identify an event of default and which cause a transfer to stage 3 accordingly:

- **Legal default:** a contractual partner is unable to fulfil its contractual obligation according to an agreement with Deutsche Börse Group due to insolvency/bankruptcy.
- **Contractual default:** a contractual partner is unable or unwilling to fulfil, in a timely manner, one or more of its scheduled contractual obligations according to an agreement with Deutsche Börse Group. The non-fulfilment of the contractual obligation could potentially result in a financial loss for Deutsche Börse Group.

IFRS 9 sets out that a default is to be assumed if a debtor is past due for more than 90 days. This is only used as a fallback at Deutsche Börse Group, as the company expects to identify a debtor’s default based on the above-mentioned criteria at an earlier point in time. For trade receivables, a default is assumed for amounts which are overdue for more than 360 days.

Financial assets are considered to have low credit risk if listed bonds and other financial investments or counterparties have an investment-grade credit rating. For financial assets with a low credit risk rating, a risk provision is calculated that is equal to the twelve-month expected loss.

For trade receivables, the Group applies the simplified approach permitted by IFRS 9, which requires lifetime expected losses to be recognised from initial recognition of the receivables.

In case there is no reasonable expectation that the outstanding amounts can be collected, receivables are written off directly. Indicators used to arrive at the “uncollectability assumption” include the following:

- Insolvency proceedings are not started due to missing substance of the debtor.
- Insolvency proceedings have not resulted in any payment for a period of three years, and there is no indication that any amount will be received going forward.
- Enforcement activities are not pursued by Deutsche Börse Group due to cost-benefit analysis, or Deutsche Börse Group has tried unsuccessfully to collect the receivable for a period of three years.

Cash and cash equivalents

Cash and cash equivalents comprise cash on hand and demand deposits as well as financial assets that are readily convertible into cash. They are subject to only minor changes in value. Cash and cash equivalents are measured at amortised cost.

Restricted bank balances mainly include cash deposits by market participants that are invested largely overnight, mainly at central banks or in the form of reverse repurchase agreements with banks.

Financial assets until 31 December 2017

The Group has opted for retrospective application of IFRS 9 but did not elect to restate prior-year figures. Accordingly, the presented comparative information continues to be accounted for in line with the accounting policies previously applied for financial assets. These are set out in the following:

Financial assets: recognition and derecognition

Financial assets were recognised when a Group company became a party to the contractual provisions of the instrument. Regular purchases and sales of financial assets were generally recognised or derecognised, respectively, as at the trade date. The purchase and the sale of debt instruments carried at amortised cost, as well as equity securities that were settled via a central counterparty of Deutsche Börse Group, were recognised and derecognised, respectively, as at the settlement date.

Financial assets were derecognised when the contractual rights to the cash flows from the financial asset expired or when the company transferred these rights in a transaction where substantially all the risks and rewards of ownership of the financial asset were transferred.

Financial assets: initial measurement

Financial assets were initially measured at fair value; in the case of a financial asset that was not measured at fair value through profit or loss in subsequent periods; this included transaction costs. If they were settled within one year, they were allocated to current assets. All other financial assets were allocated to non-current assets.

Financial assets: subsequent measurement of financial assets

Subsequent measurement of financial instruments followed the categories which are described below. Until the end of 2016, Deutsche Börse Group had not made use of the option to allocate financial assets to the “held-to-maturity investments” category. In 2017, Deutsche Börse Group applied the option for the first time to designate financial assets at fair value through profit or loss (the fair value option) for a convertible bond.

The financial assets were allocated to the respective categories at initial recognition.

Assets held for trading
Derivatives that were not designated as hedging instruments, as well as financial instruments held by central counterparties (excluding collateral not yet collected from clearing participants) were measured at fair value through profit or loss.

If they resulted from banking business, realised and unrealised gains and losses were immediately recognised in the consolidated income statement as “other operating income”, “other operating expenses” and “net interest income from banking business” or, if incurred outside the banking business, as “financial income” and “financial expenses”.

Loans and receivables
Loans and receivables were recognised at amortised cost, taking into account any impairment losses, if applicable. Premiums and discounts were included in the amortised cost of the instrument concerned and were amortised using the effective interest method; they were contained in “net interest income from banking business” if they related to banking business, or in “financial income” and “financial expense”.

Cash and cash equivalents
Cash and cash equivalents comprised cash on hand and demand deposits as well as financial assets that were readily convertible to cash. They were subject to only minor changes in value. Cash and cash equivalents were measured at amortised cost.

Restricted bank balances mainly included cash deposits by market participants that were invested largely overnight, mainly at central banks or in the form of reverse repurchase agreements with banks.

Available-for-sale financial assets
Non-derivative financial assets were classified as “available-for-sale financial assets” if they could not be allocated to the “loans and receivables” or “assets held for trading” categories.

Available-for-sale financial assets were generally measured at the fair value observable in an active market. Unrealised gains and losses were recognised directly in equity in the revaluation surplus. Impairment losses and the effects of exchange rates on monetary items were excluded from this general principle and were recognised in profit or loss.

Equity instruments for which no active market existed were measured on the basis of current comparable market transactions, if these were available. If an equity instrument was not traded in an active market and alternative valuation methods could not be applied to that equity instrument, it was measured at cost, subject to an impairment test.

Realised gains and losses were generally recognised in “financial income” or “financial expense”. Interest income in connection with debt instruments in the banking business was recognised in the consolidated income statement in “net interest income from banking business” using the effective interest rate method. Other realised gains and losses were recognised in the consolidated income statement in “other operating income” and “other operating expenses”.

Derecognition of financial assets

Financial assets were derecognised when the contractual rights to the cash flows expired or when substantially all the risks and rewards of ownership of the financial assets were transferred.

Clearstream Banking S.A. acts as a principal in securities borrowing and lending transactions in the context of the ASLplus securities lending system. Legally, it operates between the lender and the borrower without being an economic party to the transaction (transitory items). In these transactions, the securities borrowed and lent match each other. Consequently, these transactions were not recognised in the consolidated balance sheet.

Impairment of financial assets

Financial assets that were not measured at fair value through profit or loss were reviewed at each reporting date to establish whether there were any indications of impairment.

Deutsche Börse Group had laid down criteria for assessing whether there was evidence of impairment. These criteria primarily included significant financial difficulties on the part of the debtor and breaches of contract. In the case of equity instruments, the assessment also took into account the duration and the amount of the impairment compared with cost. If the decline in value amounted to at least 20 per cent of the cost or lasted for at least nine months, or if the decline was at least 15 per cent of the cost and lasted for at least six months, Deutsche Börse Group took this to be evidence of impairment. Impairment was assumed in the case of debt instruments if there was a significant decline in the issuer’s credit quality.

The amount of an impairment loss for a financial asset measured at amortised cost was the difference between the carrying amount and the present value of the estimated future cash flows, discounted at the original effective interest rate. A subsequent reversal was recognised at a maximum at the carrying amount that would have resulted if no impairment loss had been recognised.

The amount of an impairment loss for a financial asset measured at cost (unlisted equity instruments) was the difference between the carrying amount and the present value of the estimated future cash flows, discounted at a current market interest rate. Subsequent reversal was not permitted.

In the case of available-for-sale financial assets, the impairment loss was calculated as the difference between cost and fair value. Any reduction in fair value previously recognised in equity was reclassified to profit or loss upon determination of the impairment loss. An impairment loss recognised on debt instruments was only permitted to be reversed in a subsequent period if the reason for the original impairment no longer applied.

Financial liabilities

Financial liabilities are recognised when a Group company becomes a party to the instrument. Purchases and sales of equities via the central counterparty Eurex Clearing AG are recognised at the settlement date analogous to financial assets.

Offsetting financial assets and liabilities
Financial assets and liabilities are offset and only the net amount is presented in the consolidated balance sheet when a Group company currently has a legally enforceable right to set off the recognised amounts and intends either to settle on a net basis or to realise the asset and settle the liability simultaneously.

Financial liabilities measured at amortised cost
Financial liabilities not held for trading are carried at amortised cost. The borrowing costs associated with the placement of financial liabilities are included in the carrying amount and accounted for using the effective interest method if they are directly attributable. Discounts are amortised over the term of the liabilities.

Financial liabilities measured at fair value through profit or loss
A forward transaction with a non-controlling shareholder for the acquisition of non-controlling interests that is settled in cash or by delivering other financial assets is a financial liability recognised at fair value. It is subsequently measured at fair value through profit or loss. The equity interest attributable to a non-controlling shareholder underlying the transaction is accounted for as if it had already been acquired at the time of the transaction.

Derivatives and hedging activities since 1 January 2018

Derivatives are initially recognised at fair value on the date a derivatives contract is entered into and are subsequently re-measured at their fair value at the end of each reporting period. The accounting for subsequent changes in fair value depends on whether the derivatives contract is designated as a hedging instrument.

The Group designates currency or interest rate derivatives as hedges of foreign-exchange risk associated with the cash flows of highly probable forecast transactions and interest rate swaps if required as hedges of interest rate risk associated with the expected issuance of fixed interest rate bonds in the future (both cash flow hedges).

Deutsche Börse Group has not entered into fair value hedges in 2017 or 2018.

At the inception of the hedging transaction, the Group documents the economic relationship between hedging instruments and hedged items including whether the hedging instrument is expected to offset changes in cash flows of hedged items. The Group also documents its risk management objective and strategy for undertaking various hedge transactions at that point in time.

The fair value of a hedging derivative is classified as a non-current asset or liability when the remaining maturity of the hedged item is more than twelve months; it is classified as a current asset or liability when the remaining maturity of the hedged item does not exceed twelve months.

Cash flow hedges that qualify for hedge accounting
The effective portion of changes in the fair value of derivatives that are designated and qualify as cash flow hedges is recognised in other comprehensive income, limited to the cumulative change in fair value of the hedged item on a present value basis from the inception of the hedge. The gain or loss relating to the ineffective portion is recognised immediately in profit or loss within net interest income from banking business or within financial income or expense.

Amounts accumulated in other comprehensive income are reclassified in the periods when the hedged item affects profit or loss, as follows:

- The amount accumulated in the cash flow hedge reserve is reclassified to profit or loss as a reclassification adjustment in the same period or periods during which the hedged future cash flows affect profit or loss. If that amount is a loss and Deutsche Börse Group expects that the entirety or a portion of that loss will not be recovered in one or more future periods, it immediately reclassifies the amount that is not expected to be recovered into profit or loss as a reclassification adjustment.
- The gain or loss relating to the effective portion of the interest rate-related instruments hedging fixed-rate borrowings is recognised in profit or loss within "financial expenses".

When a hedging instrument expires or is sold or terminated, or when a hedge no longer meets the criteria for hedge accounting, the Group discontinues hedge accounting. When the forecast transaction is no longer expected to occur, the cumulative gain or loss and deferred costs of hedging that were reported in equity are immediately reclassified to profit or loss.

Hedge ineffectiveness is recognised in profit or loss within net interest income from banking business or financial income or expenses.

Hedges of a net investment in a foreign operation
The portion of the gain or loss on the hedging instrument that is determined to be an effective hedge is recognised in other comprehensive income. It is recognised in profit or loss when the foreign operation is sold. The ineffective portion of the gain or loss on the hedging instrument is recognised immediately in the consolidated income statement.

Derivatives and hedges (until 31 December 2017)

Derivatives were used to hedge interest rate risk or currency risk. All derivatives were carried at their fair values.

Hedge accounting was used for derivatives that were part of a hedging relationship determined to be highly effective and for which certain conditions were met. This related in particular to the documentation of the hedging relationship and the risk strategy and to how reliably effectiveness could be measured.

Cash flow hedges
The portion of the gain or loss on the hedging instrument determined to be highly effective was recognised in other comprehensive income. This gain or loss ultimately adjusted the value of the hedged cash flow, i.e. the gain or loss on the hedging instrument was recognised in profit or loss when the hedged item was recognised in the balance sheet or in profit or loss. The ineffective portion of the gain or loss was recognised immediately in the consolidated income statement.

Fair value hedges
The gain or loss on the hedging instrument, together with the gain or loss on the hedged item (underlying) attributable to the hedged risk, was recognised immediately in the consolidated income statement. Any gain or loss on the hedged item adjusted its carrying amount.

Hedges of a net investment in a foreign operation
The effective portion of the gain or loss from a hedging transaction that was designated as a highly effective hedge was recognised in other comprehensive income. It was recognised in profit or loss when the foreign operation was sold. The ineffective portion of the gain or loss was recognised immediately in the consolidated income statement.

Derivatives that were not part of a hedging relationship
Gains or losses on derivative instruments that were not part of a highly effective hedging relationship were recognised immediately in the consolidated income statement.

Financial instruments held by central counterparties

European Commodity Clearing AG, Nodal Clear, LLC and Eurex Clearing AG act as central counterparties:

- Eurex Clearing AG guarantees the settlement of all transactions involving futures and options on Eurex Deutschland. It also guarantees the settlement of all transactions for Eurex Repo (repo trading platform), certain exchange transactions in equities on Frankfurter Wertpapierbörse (FWB, the Frankfurt Stock Exchange) and certain cash market transactions on the Irish Stock Exchange. Eurex Clearing AG also guarantees the settlement of off-order-book trades entered for clearing in the trading systems of the Eurex exchanges, Eurex Bonds, Eurex Repo, the Frankfurt Stock Exchange and the Irish Stock Exchange. In addition, Eurex Clearing AG clears over-the-counter (OTC) interest rate derivatives and securities lending transactions, where these meet the specified novation criteria.
- European Commodity Clearing AG guarantees the settlement of spot and derivatives transactions at the trading venues of EEX group and the connected partner exchanges.

- Nodal Clear, LLC was acquired by European Energy Exchange in 2017 as part of Nodal Exchange group. Nodal Clear, LLC is a Derivatives Clearing Organisation (DCO) registered in the United States and is the central counterparty for all transactions executed on Nodal Exchange.

The transactions of the clearing houses are only executed between the respective clearing house and a clearing member.

In accordance with IFRS 9, purchases and sales of equities and bonds via the Eurex Clearing AG central counterparty are recognised and simultaneously derecognised at the settlement date.

For products that are marked to market (futures, options on futures as well as OTC interest-rate deriva-tives), the clearing houses recognise gains and losses on open positions of clearing members on each exchange day. By means of the variation margin, profits and losses on open positions resulting from market price fluctuations are settled on a daily basis. The difference between this and other margin types is that the variation margin does not comprise collateral, but is a daily offsetting of profits and losses in cash. Therefore, futures and OTC interest rate derivatives are not reported in the consolidated balance sheet.

“Traditional” options, for which the buyer must pay the option premium in full upon purchase, are carried in the consolidated balance sheet at fair value. Receivables and liabilities from repo transactions and from cash-collateralised securities lending transactions are classified as held for trading and carried at fair value.

“Financial instruments held by central counterparties” are reported as non-current if the remaining maturity of the underlying transactions exceeds twelve months at the reporting date.

The fair values recognised in the consolidated balance sheet are based on daily settlement prices. These are calculated and published by the clearing house in accordance with the rules set out in the contract specifications (see also the clearing conditions of the respective clearing house).

Cash or securities collateral held by central counterparties

As the clearing houses of the Deutsche Börse Group guarantee the settlement of all traded contracts, they have established multi-level collateral systems. The central pillar of the collateral systems is the determination of the overall risk per clearing member (margin) to be covered by cash or securities collateral. Losses calculated on the basis of current prices and potential future price risks are covered up to the date of the next collateral payment.

In addition to these daily collateral payments, each clearing member must make contributions to the respective default fund (for further details, see the risk report in the combined management report). Cash collateral is reported in the consolidated balance sheet under “cash deposits by market participants” and the corresponding amounts under “restricted bank balances”.

Securities collateral is generally not derecognised by the clearing member providing the collateral, as the opportunities and risks associated with the securities are not transferred to the secure party. Recognition at the secure party is only permissible if the clearing member providing the transfer is in default according to the underlying contract.

Treasury shares

The treasury shares held by Deutsche Börse AG at the reporting date are deducted directly from shareholders' equity. Gains or losses on treasury shares are recognised in other comprehensive income. The transaction costs directly attributable to the acquisition of treasury shares are accounted for as a deduction from shareholders' equity (net of any related income tax benefit).

Non-current assets held for sale, disposal groups and discontinued operations

Non-current assets that are available for immediate sale in their present condition, and whose sale is highly probable within a reasonable period of time, are classified as "non-current assets held for sale". A transaction is highly probable if measures for the sale have already been initiated and the relevant bodies have adopted the corresponding resolutions. Disposal groups may comprise current and non-current assets, and the corresponding liabilities, which fulfil the criteria provided above and which are to be sold and discontinued. Income and expenses from non-current assets held for sale are recognised within continuing operations, provided such items are not included in net profit from discontinued operations.

Discontinued operations exclusively comprise assets and liabilities which are to be sold, entirely or partly, as part of an individual plan or are to be abandoned. Furthermore, discontinued operations are assets or liabilities of major lines of business or geographical areas of operations. Every line of business or geographical area of operation must be identifiable for operational and accounting purposes. Net profit from discontinued operations is recognised in the period in which it is incurred, and is disclosed separately in the consolidated income statement and the consolidated statement of comprehensive income. The corresponding cash flows are disclosed separately in the consolidated cash flow statement. Furthermore, the figures disclosed in the previous year's income statement and cash flow statement have been restated accordingly.

Pensions and other employee benefits

Pensions and other employee benefits relate to defined contribution and defined benefit pension plans.

Defined contribution plans

There are defined contribution plans as part of the occupational pension system using pension funds and similar pension institutions, as well as on the basis of 401(k) plans. In addition, contributions are paid to the statutory pension insurance scheme. The level of contributions is normally determined in relation to income. As a rule, no provisions are recognised for defined contribution plans. The contributions paid are reported as pension expenses in the year of payment.

There are defined contribution pension plans for employees in several countries. In addition, the employer pays contributions to employees' private pension funds.

Multi-employer plans

Several Deutsche Börse Group companies are, along with other financial institutions, member institutions of BVV Versicherungsverein des Bankgewerbes a.G. (BVV), a pension insurance provider with a registered office in Berlin, Germany. Employees and employers make regular contributions, which are used to provide guaranteed pension plans and a potential surplus. The contributions to be made are calculated based on contribution rates applied to active employees' monthly gross salaries, taking into account specific financial thresholds. Member institutions are liable in the second degree regarding the fulfilment of BVV's agreed pension benefits. However, we consider the risk that said liability would actually be utilised as remote. Given that BVV membership is governed by a Works Council Agreement, membership termination is subject to certain conditions. Deutsche Börse Group considers BVV pension obligations as multi-employer defined benefit pension plans (leistungsorientierte Pläne). However, the Group currently lacks information regarding the allocation of BVV assets to individual member institutions and the respective beneficiaries, as well as regarding Deutsche Börse Group's actual share in BVV's total obligations. Hence, Deutsche Börse Group discloses this plan as a defined contribution plan ("beitragsorientierter Plan"). Based on its latest publications, BVV does not suffer any deficient cover with a potential impact on Deutsche Börse Group's future contributions.

EPEX Netherlands B.V. participates in the ABP pension fund within the EEX subgroup. Participation is mandatory for all employees. Employer contributions are calculated by ABP and adjusted, if necessary. This pension plan was reported as a defined contribution plan, given the limited information regarding the allocation of fund assets to member institutions and beneficiaries.

Defined benefit plans

Provisions for pension obligations are measured separately for each pension plan, using the projected unit credit method on the basis of actuarial opinions. The fair value of plan assets is deducted from the present value of pension obligations, reflecting the asset ceiling rules if there are any excess plan assets. This results in the net defined benefit liability or asset. Net interest expense for the financial year is calculated by applying the discount rate determined at the beginning of the financial year to the net defined benefit liability determined as at that date.

The relevant discount rate is determined by reference to the return on long-term corporate bonds with a rating of at least AA (Moody's Investors Service, S&P Global Ratings, Fitch Ratings and Dominion Bond Rating Service) on the basis of the information provided by Bloomberg, and a maturity that corresponds approximately to the maturity of the pension obligations. Moreover, the bonds must be denominated in the same currency as the underlying pension obligation. Measurement of the pension obligations in euros is, in principle, based on a discount rate of 1.75 per cent, which is determined according to the Towers Watson "GlobalRate:Link" methodology updated in line with the current market trend.

Actuarial gains or losses resulting from changes in expectations with regard to life expectancy, pension trends, salary trends and the discount rate as compared with the estimate at the beginning of the period or compared with the actual development during the period are recognised directly in other comprehensive income. Actuarial gains and losses recognised in other comprehensive income may not be reclassified to profit or loss in subsequent periods. Similarly, differences between the (interest) income on plan assets determined at the beginning of the period and the return on plan assets actually recorded at the end of the period are also recognised directly in other comprehensive income. The actuarial gains or losses and the difference between the expected and the actual return or loss on plan assets are recognised in the revaluation surplus.

Other long-term benefits for employees and members of executive boards (total disability pension, transitional payments and surviving dependants' pensions) are also measured using the projected unit credit method. Actuarial gains and losses and past service cost are recognised immediately and in full through profit or loss.

Other provisions

Provisions are recognised if the Group has a present obligation from an event in the past, it is probable that there will be an outflow of resources embodying economic benefits to settle the obligation and the amount of this obligation can be estimated reliably. The amount of the provision corresponds to the best estimate of the expenditure required to settle the obligation at the reporting date.

A restructuring provision is only recognised when an entity has a detailed formal plan for the restructuring and has raised a valid expectation in those affected that the restructuring measures will be implemented, for example, by starting to implement such plan or by announcing its principal features to those affected. Provisions in the context of the programme resolved in 2018 to reduce structural costs (Structural Performance Improvement Programme, SPIP) as well as provisions recognised for contractually agreed early retirement agreements and severance agreements, are recorded in other provisions.

Contingent liabilities are not recognised, but rather disclosed unless the possibility of an outflow of resources embodying economic benefits is remote.

Share-based payment

Deutsche Börse Group operates the Group Share Plan (GSP), the Stock Bonus Plan (SBP), the Co-Performance Investment Plan (CPIP) and the Performance Share Plan (PSP) as well as the Long-term Sustainable Instrument (LSI) and the Restricted Stock Units (RSU), which provide share-based payment components for employees, senior executives and executive board members.

Group Share Plan (GSP)

Under the GSP, shares are generally granted at a discount to the market price to the non-executive staff of Deutsche Börse AG and of participating subsidiaries who have been employed on a non-temporary basis since at least 31 March of the previous year. The expense of this discount is recognised in the income statement at the grant date.

Stock Bonus Plan (SBP)

The SBP for senior executives of Deutsche Börse AG and of participating subsidiaries grants a long-term remuneration component in the form of so-called SBP shares. These are generally accounted for as share-based payments for which Deutsche Börse AG has a choice of settlement in cash or equity instruments for certain tranches. Tranches due in previous years were each settled in cash. Regarding the 2018 tranche, cash settlement has been agreed upon too. Under these circumstances, it is presently presumed in accordance with IFRS 2 that all SBP shares will be settled in cash. Accordingly, Deutsche Börse Group has measured the SBP shares as cash-settled share-based payment transactions. The cost of the options is estimated using an option pricing model (fair value measurement) and recognised in staff costs in the consolidated income statement. Any right to payment of a stock bonus only vests after the expiration of the service or performance period of four years on which the plan is based.

Performance Share Plan (PSP)

The PSP was launched in financial year 2016 for members of the Executive Board of Deutsche Börse AG as well as selected senior executives and employees of Deutsche Börse AG and of participating subsidiaries. The number of phantom PSP shares to be allocated is calculated based on the number of shares granted and the increase of net profit for the period attributable to Deutsche Börse AG shareholders, as well as on the relative performance of the total shareholder return (TSR) on Deutsche Börse AG's shares compared with the total shareholder return of the STOXX Europe 600 Financials Index constituents. The shares are subject to a performance period of five years. The subsequent payment of the stock bonus will be settled in cash. For further details on this plan, please see the “Principles governing the PSP and assessing target achievement for performance shares” section in the remuneration report.

Long-term Sustainable Instrument (LSI)

In order to meet regulatory requirements, the LSI for risk takers (employees whose professional activities have a material impact on the operations of institutions) was introduced in financial year 2014 (see note 28). LSI shares are generally settled in cash. Regarding the 2014 tranche, the respective companies have the option to fulfil their obligations by delivering shares of Deutsche Börse AG. The remaining tranches will be settled in cash. Deutsche Börse Group thus measures the LSI shares as cash-settled share-based payment transactions. The options are measured using an option pricing model (fair value measurement). Any right to payment of a stock bonus only vests after the expiration of the one-year service period on which the plan is based, taking certain waiting periods into account.

Restricted Stock Units (RSU)

Like the LSI plan, the RSU plan applies to risk takers within Deutsche Börse Group. RSU shares are settled in cash; Deutsche Börse Group thus measures the RSU shares as cash-settled share-based payment transactions. The options are measured using an option pricing model (fair value measurement). Any right to payment of a stock bonus only vests after the expiration of the one-year service period on which the plan is based, taking a three-year retention period and a one-year waiting period into account.

Deferred tax assets and liabilities

Deferred tax assets and liabilities are computed using the balance sheet liability approach. The deferred tax calculation is based on temporary differences between the carrying amounts of assets and liabilities in the IFRS financial statements and their tax base that will lead to a future tax liability or benefit when assets are used or sold or liabilities are settled.

The deferred tax assets or liabilities are measured using the tax rates that are currently expected to apply when the temporary differences reverse, based on tax rates that have been enacted or substantively enacted by the reporting date. Deferred tax assets are recognised for the unused tax loss carryforwards only to the extent that it is probable that future taxable profit will be available. Deferred tax assets and deferred tax liabilities are offset where a legally enforceable right to set off current tax assets against current tax liabilities exists, and the deferred tax assets and deferred tax liabilities relate to income taxes levied by the same taxation authority.

Leases

Leases are classified as operating leases or finance leases. A lease is classified as a finance lease if it transfers substantially all the risks and rewards incidental to ownership of the asset from the lessor to the lessee. All other leases are classified as operating leases.

Leased assets and the associated liabilities are recognised at the lower of the fair value and present value of the minimum lease payments if the criteria for classification as a finance lease are met. The leased asset is depreciated or amortised using the straight-line method over its useful life or the lease term, if shorter. In subsequent periods, the liability is measured using the effective interest method.

Expenses incurred in connection with operating leases are recognised as an expense on a straight-line basis over the lease term.

For details regarding changes to the accounting of leases as of 1 January 2019, see note 1.

Consolidation

Deutsche Börse AG and all subsidiaries directly or indirectly controlled by Deutsche Börse AG are included in the consolidated financial statements. Deutsche Börse AG controls a company if it is exposed to variable returns resulting from its involvement with the company in question or has rights to such returns and is able to influence them by using its power over the company.

Initial consolidation of subsidiaries in the course of business combinations uses the purchase method. The acquiree’s identifiable assets, liabilities and contingent liabilities are recognised at their acquisition date fair values. Any excess of cost over the acquirer’s interest in the fair value of the subsidiary’s net identifiable assets is recognised as goodwill. Goodwill is reported in subsequent periods at cost less accumulated impairment losses.

Intra-Group assets and liabilities are eliminated. Income arising from intra-Group transactions is eliminated against the corresponding expenses. Intermediate profits or losses arising from deliveries of intra-Group goods and services, as well as dividends distributed within the Group, are eliminated. Deferred taxes for consolidation adjustments are recognised where these are expected to reverse in subsequent years.

Interests in equity attributable to non-controlling interest shareholders are carried under “non-controlling interests” within equity. Where these are classified as “puttable instruments”, they are reported under “liabilities”.

Currency translation

Transactions denominated in a currency other than a company’s functional currency are translated into the functional currency at the spot exchange rate applicable at the transaction date. At the reporting date, monetary balance sheet items in foreign currency are measured at the exchange rate at the reporting date, while non-monetary balance sheet items recognised at historical cost are measured at the exchange rate on the transaction date. Non-monetary balance sheet items measured at fair value are translated at the exchange rate prevailing at the valuation date. Exchange rate differences are recorded as other operating income or expenses in the period in which they arise unless the underlying transactions are hedged. Gains and losses from a monetary item that forms part of a net investment in a foreign operation are recognised directly in “accumulated profit”.

The annual financial statements of companies whose functional currency is not the euro are translated into the reporting currency as follows: assets and liabilities are translated into euros at the closing rate. The items in the consolidated income statement are translated at the average exchange rates for the reporting period. Resulting exchange differences are recognised directly in “accumulated profit”. When the relevant subsidiary is sold, these exchange rate differences are recognised in the net profit for the period in which the deconsolidation gain or loss is realised.

The following euro exchange rates of consequence to Deutsche Börse Group were applied:

Exchange rates

		Average rate 2018	Average rate 2017	Closing price as at 31 Dec 2018	Closing price as at 31 Dec 2017
Swiss francs	CHF	1.1512	1.1155	1.1264	1.1680
US dollars	USD (US$)	1.1801	1.1360	1.1433	1.1969
Czech koruna	CZK	25.6605	26.2997	25.7315	25.5683
Singapore dollar	SGD	1.5907	1.5605	1.5577	1.5990
British pound	GBP (£)	0.8863	0.8750	0.8978	0.8860

Any goodwill arising on the acquisition of a foreign operation and any fair value adjustments to the carrying amounts of assets and liabilities arising from initial consolidation are reported in the functional currency of the foreign operation and translated at the closing rate.

Estimates, measurement uncertainties and discretionary judgements

The application of accounting policies, the presentation of assets and liabilities, and the recognition of income and expenses requires the Executive Board to make discretionary judgements and estimates. Adjustments in this context are taken into account in the period the change was made, as well as in subsequent periods, where necessary.

Impairment of non-financial assets

Deutsche Börse Group tests goodwill, as well as intangible assets with indefinite useful lives, and intangible assets not yet available for use for impairment at least once a year. Certain assumptions have to be made to determine the recoverable amount, which is calculated regularly using discounted cash flow models. This is based on the relevant business plans with a detailed planning period of up to five years. These plans, in turn, contain assumptions about the future financial performance of the assets and cash-generating units. If their actual financial performance differs from these assumptions then corresponding adjustments may be necessary. For further information on the effects of changes in the discount rate, as well as on further assumptions, please see note 11.

Financial instruments

Since financial instruments are measured at fair value, there is discretion in the determination of the fair value of unlisted instruments. In this context, Deutsche Börse Group makes partial use of internal measurement models where the parameters and assumptions may deviate from the actual results in the future.

Pensions and other employee benefits

Pensions and other employee benefits are measured using the projected unit credit method, which calculates the actuarial present value of the accumulated benefit obligation. Calculating the present value requires certain actuarial assumptions (e.g. discount rate, staff turnover rate, salary and pension trends) to be made. The current service cost and the net interest expense or income for the subsequent period are calculated on the basis of these assumptions. Any departures from these assumptions, for example, because of changes in the macroeconomic environment, are recognised in other comprehensive income in the following financial year. A sensitivity analysis of the key factors is presented in note 17.

Income taxes

Deutsche Börse Group is subject to the tax laws of those countries in which it operates and generates income. Considerable discretion has to be exercised in determining the tax provisions. For a large number of transactions and calculations, no definitive tax-relevant information is available at the time these figures are determined. Deutsche Börse Group recognises corresponding provisions for risks expected from external tax audits. If the final results of these external audits differ from the estimates, the resulting effects on current and deferred taxes are recognised in the period in which they become known.

Legal risks

The companies of Deutsche Börse Group are subject to litigation. Such litigation may lead to orders to pay against the entities of the Group. If it is more likely than not that an outflow of resources will occur, a provision will be recognised based on an estimate of the most probable amount necessary to settle the obligation if such amount is reasonably estimable. The management of the entity affected must judge whether the possible obligation results from a past event, as well as evaluate the probability of a cash outflow and estimate its amount. As the outcome of litigation is usually uncertain, the judgement is reviewed continuously. For further information on other risks please see note 26.

Share-based payments

Note 28 contains disclosures on the valuation model used for the stock options and subscription rights. Adjustments are necessary to the extent that the estimates of the valuation parameters originally applied differ from the actual values at the time the options or subscription rights were exercised; such adjustments are based on cash-settled share-based payment transactions recognised in the consolidated income statement in the respective reporting period.

Provisions

When recognising provisions for expected losses from rental agreements the probability of utilisation is estimated (see note 19). In recognising personnel-related restructuring provisions, certain assumptions were made, for example, with regard to the fluctuation rate, the discount rate and salary trends. Adjustments may be necessary if the actual values were to deviate from these assumptions.

Consolidated income statement disclosures

4. Net revenue

Composition of net revenue (part 1)

	Sales revenue		Net interest income from banking business	
	2018 €m	2017 (restated) €m	2018 €m	2017 €m
Xetra (cash equities)				
Trading and clearing	187.6	182.3	0	0
Listing	17.5	15.5	0	0
Other	40.3	41.7	0	0
	245.4	**239.5**	**0**	**0**
Eurex (financial derivatives)				
Equity index derivatives	514.2	433.1	0	0
Interest rate derivatives	233.6	209.7	0	0
Equity derivatives	49.8	41.9	0	0
OTC clearing	23.6	9.1	0	0
Margin fees	13.4	12.5	40.2	25.2
Infrastructure	74.2	73.1	0	0
Other	26.8	21.2	–0.1	0
	935.6	**800.6**	**40.1**	**25.2**
EEX (commodities)				
Power derivatives	88.2	69.0	5.9	0.6
Power spot	67.3	63.0	0	0
Gas	44.9	38.8	0	0
Other	71.0	59.2	3.0	0.5
	271.4	**230.0**	**8.9**	**1.1**
360T (foreign exchange)				
Trading	70.1	57.0	0	0
Other	6.6	10.0	0	0
	76.7	**67.0**	**0**	**0**

	Other operating income		Volume-related costs		Net revenue	
	2018 €m	2017 (restated) €m	2018 €m	2017 €m	2018 €m	2017 €m
	5.3	6.3	–22.3	–27.5	170.6	161.1
	0.8	0.4	–0.5	–0.5	17.8	15.4
	0	0.1	0	0	40.3	41.8
	6.1	**6.8**	**–22.8**	**–28.0**	**228.7**	**218.3**
	0.1	0.2	–48.1	–43.6	466.2	389.7
	0.1	0.1	–1.8	–1.7	231.9	208.1
	0	0	–6.0	–5.5	43.8	36.4
	3.6	2.0	–1.6	–0.3	25.6	10.8
	–3.6	–2.0	0	0	50.0	35.7
	0	0	0	0	74.2	73.1
	21.4	23.7	–3.7	–2.2	44.4	42.7
	21.6	**24.0**	**–61.2**	**–53.3**	**936.1**	**796.5**
	0	0	–12.0	–9.7	82.1	59.9
	0	0	–0.2	–0.5	67.1	62.5
	0	0	–8.3	–8.0	36.6	30.8
	1.3	0.5	–4.5	–1.2	70.8	59.0
	1.3	**0.5**	**–25.0**	**–19.4**	**256.6**	**212.2**
	0	0	–3.4	–0.5	66.7	56.5
	5.5	0	0	0	12.1	10.0
	5.5	**0**	**–3.4**	**–0.5**	**78.8**	**66.5**

Composition of net revenue (part 2)

	Net revenue		Net interest income from banking business	
	2018 €m	2017 (restated) €m	2018 €m	2017 €m
Clearstream (post-trading)				
Custody	514.9	515.9	0	0
Settlement	113.2	114.4	0	0
Net interest income from banking business	0	0	155.5	106.3
Third-party services	32.5	29.2	0	0
Other	97.4	91.9	0	0
	758.0	**751.4**	**155.5**	**106.3**
GSF (collateral management)				
Repo	44.2	43.0	0	0
Securities lending	91.8	90.1	0	0
	136.0	**133.1**	**0**	**0**
IFS (investment fund services)				
Custody	68.5	62.7	0	0
Settlement	52.6	48.8	0	0
Other	41.2	33.5	0	0
	162.3	**145.0**	**0**	**0**
Data				
Cash and derivatives	127.8	122.6	0	0
Regulatory services	19.8	13.2	0	0
Other	49.7	43.1	0	0
	197.3	**178.9**	**0**	**0**
STOXX (index business)				
ETF licences	47.3	45.4	0	0
Exchange licences	34.2	30.6	0	0
Other licences	77.1	65.3	0	0
	158.6	**141.3**	**0**	**0**
Total	**2,941.3**	**2,686.8**	**204.5**	**132.6**
Consolidation of internal revenue	**–47.4**	**–43.2**	**0**	**0**
Group	**2,893.9**	**2,643.6**	**204.5**	**132.6**

	Other operating income		Volume-related costs		Net revenue	
	2018 €m	2017 (restated) €m	2018 €m	2017 €m	2018 €m	2017 €m
	1.7	0.7	–133.8	–131.5	382.8	385.1
	0	0	–37.2	–34.9	76.0	79.5
	0	0	0	0	155.5	106.3
	0	0	–0.4	–0.5	32.1	28.7
	11.1	6.5	–27.6	–30.3	80.9	68.1
	12.8	**7.2**	**–199.0**	**–197.2**	**727.3**	**667.7**
	0	0	–0.9	–0.6	43.3	42.4
	0	0	–52.0	–50.9	39.8	39.2
	0	**0**	**–52.9**	**–51.5**	**83.1**	**81.6**
	0	0.1	–2.6	–1.5	65.9	61.3
	0	0	–3.2	–3.6	49.4	45.2
	0	0	–2.2	–2.4	39.0	31.1
	0	**0.1**	**–8.0**	**–7.5**	**154.3**	**137.6**
	0	0	– 14.2	– 13.8	113.6	108.8
	0	0	–2.0	–2.5	17.8	10.7
	0.4	1.0	–11.2	–9.4	38.9	34.7
	0.4	**1.0**	**–27.4**	**–25.7**	**170.3**	**154.2**
	0	0	–3.5	–3.9	43.8	41.5
	0	0	–2.9	–3.5	31.3	27.1
	0.1	0.3	–7.8	–6.5	69.4	59.1
	0.1	**0.3**	**–14.2**	**–13.9**	**144.5**	**127.7**
	47.8	**39.9**	**–413.9**	**–397.0**	**2,779.7**	**2,462.3**
	–13.8	**–13.6**	**61.2**	**56.8**	**0**	**0**
	34.0	**26.3**	**–352.7**	**–340.2**	**2,779.7**	**2,462.3**

Composition of net interest income from banking business

	2018 €m	2017 (restated)[1)] €m
Interest income from positive interest environment	**216.3**	**129.1**
Financial instruments measured at amortised cost	161.6	90.7
Financial assets or liabilities measured at fair value through profit or loss	54.7	38.4
Interest expenses from positive interest environment	**– 64.9**	**– 36.1**
Financial liabilities measured at amortised cost	– 53.4	– 31.5
Financial assets or liabilities measured at fair value through profit or loss	– 11.5	– 4.6
Interest income from negative interest environment	**224.7**	**224.8**
Financial instruments measured at amortised cost	219.5	217.2
Financial assets or liabilities measured at fair value through profit or loss	5.2	7.6
Interest expenses from negative interest environment	**– 171.6**	**– 185.2**
Financial liabilities measured at amortised cost	– 169.9	– 182.9
Financial assets or liabilities measured at fair value through profit or loss	– 1.7	– 2.3
Total	**204.5**	**132.6**

1) Due to changes in the presentation of balance-sheet positions in accordance with IFRS 9, prior-year figures have been restated. For details, see note 3.

Composition of other operating income

	2018 €m	2017 (restated)[1)] €m
Income from exchange rate differences	4.6	2.6
Income from impaired receivables	0.6	1.2
Rental income from subleases	1.1	0.8
Income from agency agreements	0.5	1.7
Miscellaneous	27.2	20.0
Total	**34.0**	**26.3**

1) €5.1 million from other operating income were reclassified as sales revenue for the 2017 financial year. For details, see note 3.

For details of expected rental income from subleases see note 27.

Miscellaneous other operating income includes income from cooperation agreements, training and services rendered according to progress made on a project as well as valuation adjustments.

As part of a comprehensive analysis of customer contracts due to the first-time adoption of IFRS 15 as at 1 January 2018, reporting of connectivity and maintenance fees within Deutsche Börse Group has been harmonised. In this context, €5.1 million from other operating income were reclassified as sales revenue for the 2017 financial year. Prior-year figures were restated accordingly.

5. Staff costs

Composition of staff costs

	2018 €m	2017 (restated) €m
Wages and salaries	660.1	528.0
Social security contributions, retirement and other benefits	163.9	122.5
Total	**824.0**	**650.5**

Staff costs include costs of €158.2 million (2017: €26.4 million) recognised in connection with efficiency programmes as well as costs of €2.0 million (2017: €3.1 million) for Nodal Exchange Holdings, LLC, Tysons Corner, Virginia, USA, (Nodal Exchange, which has been consolidated since 3 May 2017), of €3.0 million (2017: nil) for 360TGTX Inc., New York, USA (which has been consolidated since 29 June 2018) and of €1.0 million (2017: nil) for Clearstream Funds Centre Ltd. (which has been consolidated since 1 October 2018).

Since 1 January 2018, personnel-related costs for continuing professional development, food and drink have been reported under "staff costs" in order to improve transparency. Before then, such costs were contained in other operating expenses. Prior-year figures were restated accordingly.

6. Other operating expenses

Composition of other operating expenses

	2018 €m	2017 (restated) €m
Costs for IT service providers and other consulting services	164.9	162.5
IT costs	123.0	108.3
Premises expenses	80.0	75.6
Non-recoverable input tax	44.3	47.1
Travel, entertainment and corporate hospitality expenses	22.7	23.4
Advertising and marketing costs	22.6	19.8
Insurance premiums, contributions and fees	15.8	13.0
Voluntary social benefits	5.6	4.1
Cost of exchange rate differences	5.2	4.3
Supervisory Board remuneration	4.5	4.2
Cost of agency agreements	0.3	0.5
Miscellaneous	27.3	18.3
Total	**516.2**	**481.1**

Costs for IT service providers and other consulting services relate mainly to expenses in conjunction with software development. An analysis of development costs is presented in note 7. These costs also contain costs of strategic and legal consulting services as well as of audit activities. Prior-year figures were restated in order to improve transparency. For details, see note 5.

Composition of fees paid to the auditor

	2018		2017	
	Total €m	Germany €m	Total €m	Germany €m
Statutory audit services	4.3[1]	2.6	4.0[3]	2.3
Other assurance or valuation services	1.2[2]	0.8	0.7[4]	0.6
Tax advisory services	0.3	0.2	0.9	0.2
Other services	0	0	0.1	0
Total	**5.8**	**3.6**	**5.7**	**3.1**

1) Thereof €0.1 million for 2017
2) Thereof €0.2 million for 2017
3) Thereof €0.3 million for 2016
4) Thereof €0.2 million for 2016

Fees paid for “statutory audit services” rendered by KPMG AG Wirtschaftsprüfungsgesellschaft mainly comprise the audit of the consolidated financial statements of Deutsche Börse AG according to IFRS, of the annual financial statements of Deutsche Börse AG according to the Handelsgesetzbuch (HGB, German Commercial Code) and of the annual financial statements of various subsidiaries according to the respective local GAAP and IFRS. This item also includes statutory additions to the audit scope as well as key points of audit agreed with the Supervisory Board. Services rendered during the reporting year also included reviews of the interim financial statements.

“Other assurance and valuation services” comprise fees paid in connection with ISAE 3402 and ISAE 3000 reports. Fees for “tax advisory services” include support services rendered in connection with completing tax returns as well as value-added tax advice on individual matters. The item “other services” comprises fees paid for training and quality-assurance services.

7. Research and development costs

Own expenses capitalised relate solely to development costs of internally developed software, involving the following systems and projects in the individual segments:

Research and development costs (part 1)

	Total expense for software development		of which capitalised	
	2018 €m	2017 (restated)[1] €m	2018 €m	2017 (restated)[1] €m
Eurex (financial derivatives)				
T7 derivatives trading platform	7.2	5.3	5.1	4.0
C7	8.6	6.7	5.2	5.4
OTC Clear	9.1	3.3	5.7	1.2
Eurex Clearing Prisma	0.6	0	0.4	0
Securities Lending	5.0	4.5	2.3	1.6
F7	1.8	0	1.3	0
Other Eurex software	3.6	8.8	0.4	2.6
	35.9	**28.6**	**20.4**	**14.8**
EEX (commodities)				
XBID / M7	1.7	7.5	0.7	2.1
Other EEX software	11.2	11.7	8.5	4.7
	12.9	**19.2**	**9.2**	**6.8**
360T (foreign exchange)				
Trading platform of 360T group	3.9	9.7	3.0	4.9
	3.9	**9.7**	**3.0**	**4.9**
Xetra (cash equities)				
T7 trading platform for the cash market	4.3	5.1	2.7	2.6
CCP releases	0	1.8	0	0
Other Xetra software	0.6	6.3	0	1.3
	4.9	**13.2**	**2.7**	**3.9**
Clearstream (post-trading)				
Local Market Partnership (LMP)	3.5	4.2	2.9	3.7
1CAS Custody	4.2	16.6	3.1	14.8
CSDR	21.6	12.6	21.2	10.1
TARGET2-Securities (T2S)	2.4	11.9	0.9	8.4
One CLS Settlement Reporting (One CSR)	0	3.0	0	2.2
Customer onboarding	6.6	0	5.7	0
Other Clearstream software	4.8	4.1	1.9	1.7
	43.1	**52.4**	**35.7**	**40.9**

Research and development costs (part 2)

	Total expense for software development		of which capitalised	
	2018 €m	2017 (restated)[1] €m	2018 €m	2017 (restated)[1] €m
IFS (investment fund services)				
IFS Arrow	2.0	0.6	1.5	0.5
IFS Unity	3.8	0	2.9	0
IFS Swift	0	2.8	0	2.2
Other IFS software	0.5	0	0	0
	6.3	**3.4**	**4.4**	**2.7**
GSF (collateral management)				
One CMS	0.2	1.3	0.2	1.0
Customer onboarding	0.7	0	0.6	0
One SecLend	0	1.7	0	1.6
Other GSF software	0.6	0	0.2	0
	1.5	**3.0**	**1.0**	**2.6**
STOXX (index business)				
Other STOXX software	3.0	3.9	0	0
	3.0	**3.9**	**0**	**0**
Data				
Regulatory Reporting Hub	16.3	12.7	3.6	10.5
Other Data software	0.6	6.5	0.2	0
	16.9	**19.2**	**3.8**	**10.5**
Research expense	**2.4**	**1.8**	**0**	**0**
Total	**130.8**	**154.4**	**80.2**	**87.1**

1) Prior-year figures were restated due to changes in the segment structure. For details, see note 24.

8. Net income from strategic investments

Composition of net income from strategic investments

	2018 €m	2017 €m
Equity method-accounted result of associates		
China Europe International Exchange AG	–2.0	–2.5
Deutsche Börse Commodities GmbH	0.8	0.7
Digital Vega FX Ltd	0.1	0
enermarket GmbH	–0.2	0
HQLAx S.à r.l.	–0.5	0
LuxCSD S.A.	–0.2	0
R5FX Ltd	0	–1.1
RegTek Solutions Inc.	–0.1	–0.2
Switex GmbH	–0.1	0.1
Tradegate AG Wertpapierhandelsbank	4.9	4.6
Total income from equity method measurement[1)]	**2.7**	**1.6**
Net income from other strategic investments	**1.5**	**196.2**
Net income from strategic investments	**4.2**	**197.8**

1) Including impairment losses

Net income from associates includes an impairment loss amounting to €0.6 million attributable to the investment in Switex GmbH (2017: impairment loss of €1.1 million attributable to the investment in R5FX Ltd). The investment was written down to the value of the selling price received. The impairment loss was allocated to the Data segment. The impairment loss was offset by net income from the equity method measurement of Switex GmbH amounting to €0.5 million.

During the year under review, the company received dividends amounting to €3.8 million (2017: €2.8 million) from investments in associates.

For the development of net income from other strategic investments please refer to note 13.2.

9. Financial result

Due to the changes to the accounting method in the context of the first-time application of IFRS 9, financial income and expenses for the reporting year and the previous year are shown in separate tables. Prior-year figures have not been restated to reflect the new accounting method.

Composition of financial income in 2018

	2018 €m
Income from other financial assets measured at fair value through profit or loss	0.3
Interest income from financial assets measured at amortised cost	1.0
Interest income on tax refunds	6.0
Other interest income and similar income	0.1
Total	**7.4**

Composition of financial income in 2017

	2017 €m
Interest income on tax refunds	3.1
Income from valuation of derivatives classified as “held for trading”	2.0
Other interest income on receivables classified as “loans and receivables”	0.5
Interest on bank balances classified as “loans and receivables”	0.4
Income from available-for-sale securities	0.4
Other interest and similar income	0.2
Total	**6.6**

Composition of financial expense in 2018

	2018 €m
Interest expense from financial liabilities measured at amortised cost	47.5
Interest expense on taxes	26.7
Interest expense from financial assets measured at amortised cost	3.1
Expense of the unwinding of the discount on pension provisions	2.5
Transaction cost of financial liabilities measured at amortised cost	1.8
Other interest expense	1.4
Interest-equivalent expenses for derivatives held as hedging instruments	0.7
Expense from other financial liabilities measured at fair value through profit or loss	0.1
Total	**83.8**

Composition of financial expense in 2017

	2017 €m
Interest expense on non-current loans[1)]	47.5
Interest expense on taxes	21.2
Other interest expense[1)]	5.3
Interest expense from financial assets[1)]	3.6
Transaction costs of non-current liabilities[1)]	3.1
Interest-equivalent expenses for derivatives held as hedging instrument[1)]	2.8
Expenses from the unwinding of the discount on pension provisions	2.7
Interest expense on current liabilities[1)]	0.1
Total	**86.3**

1) Measured at amortised cost

10. Income tax expense

Composition of income tax expense

	2018 €m	2017 €m
Current income tax expense	**339.7**	**412.0**
for the current year	320.5	376.2
for previous years	19.2	35.8
Deferred income tax expense/(income)	**–36.0**	**–20.6**
due to temporary differences	–12.0	–18.4
due to tax loss carryforwards	–1.6	0.1
due to changes in tax legislation and/or tax rates	–22.4	–2.7
for previous years	0	0.4
Total	**303.7**	**391.4**

Allocation of income tax expense to Germany and foreign jurisdictions

	2018 €m	2017 €m
Current income tax expense	**339.7**	**412.0**
Germany	237.7	213.8
Foreign jurisdictions	102.0	198.2
Deferred income tax expense/(income)	**–36.0**	**–20.6**
Germany	–5.9	–51.4
Foreign jurisdictions	–30.1	30.8
Total	**303.7**	**391.4**

Tax rates of 27.4 to 31.9 per cent (2017: 27.4 to 31.9 per cent) were used in the reporting period to calculate income tax for the German companies of Deutsche Börse Group. These reflect trade income tax at rates of 11.6 to 16.1 per cent (2017: 11.6 to 16.1 per cent), corporation tax of 15 per cent (2017: 15 per cent) and the 5.5 per cent solidarity surcharge (2017: 5.5 per cent) on corporation tax.

A tax rate of 26.0 per cent (2017: 27.1 per cent) was used for the Luxembourgian Group companies, reflecting trade income tax at a rate of 6.7 per cent (2017: 6.7 per cent) and corporation tax at 19.3 per cent (2017: 20.4 per cent).

Tax rates of 10.0 to 34.0 per cent (2017: 12.5 to 46.0 per cent) were applied to the Group companies in the remaining countries; see note 2.

In the year under review, Deutsche Börse Group did not utilise any previously unrecognised tax loss carryforwards (2017: decline in current tax expenses of €0.1 million).

Deferred tax income increased by €0.7 million (2017: nil) due to previously unrecognised tax losses.

The following table shows the carrying amounts of deferred tax assets and liabilities as at the reporting date by line item or loss carryforward:

Composition of deferred taxes

	Deferred tax assets		Deferred tax liabilities	
	31 Dec 2018 €m	31 Dec 2017[1] €m	31 Dec 2018 €m	31 Dec 2017[1] €m
Intangible assets	**50.3**	**56.0**	**–210.9**	**–238.8**
Internally developed software	43.0	48.4	–31.8	–41.7
Other intangible assets	7.3	7.6	–179.1	–197.1
Financial assets	0.3	0	–2.3	–3.7
Other assets	3.7	5.0	–2.4	0
Provisions for pensions and other employee benefits	61.4	59.8	–8.7	–12.4
Other provisions	13.9	8.4	–0.1	–0.7
Liabilities	3.8	0.9	–2.0	–1.4
Tax loss carryforwards	2.8	1.2	0	0
Deferred taxes (before netting)	**136.2**	**131.3**	**–226.4**	**–257.0**
Thereof recognised in profit or loss	87.3	85.5	–224.5	–253.2
Thereof recognised in other comprehensive income[2]	48.9	45.8	–1.9	–3.8
Deferred taxes set off	–31.9	–30.2	31.9	30.2
Total	**104.3**	**101.1**	**–194.5**	**–226.8**

1) The presentation of items was modified compared to the previous year. Prior-year figures were restated accordingly. Deferred taxes were restated as at 1 January 2018 due to the first-time adoption of IFRS 9 and IFRS 15; see note 3.
2) See note 15 for further information on deferred taxes recognised in other comprehensive income.

Short-term elements of deferred taxes are recognised in non-current assets and liabilities, in line with IAS 1 "Presentation of Financial Statements".

At the end of the reporting period, accumulated unused tax losses amounted to €30.5 million (2017: €33.7 million), for which no deferred tax assets were recognised. The unused tax losses are attributable to domestic losses totalling €0.2 million and to foreign tax losses totalling €30.3 million (2017: domestic tax losses €0.9 million, foreign tax losses €32.8 million).

The losses can be carried forward indefinitely in Germany subject to the minimum taxation rules. In the US, losses may be carried forward for a maximum period of 20 years, provided they were incurred before 1 January 2018. In accordance with the latest tax reform in the US, adopted at the end of December 2017, losses incurred after 31 December 2017 may be carried forward indefinitely, taking into account newly introduced minimum taxation rules. In all other countries, losses can be carried forward indefinitely.

There were no unrecognised deferred tax liabilities on future dividends of subsidiaries and associates or on gains from the disposal of subsidiaries and associates in the reporting period (2017: nil).

Reconciliation of expected with reported tax expense

	2018 €m	2017 €m
Earnings before tax (EBT)	1,156.8	1,288.9
Expected tax expense	312.3	348.0
Effects of different tax rates	–20.5	17.2
Effects of non-deductible expenses	13.1	13.7
Effects of tax-exempt income	–9.4	–7.7
Tax effects from loss carryforwards	1.0	1.6
Changes in valuation allowance for deferred tax assets	0	–0.5
Effects from changes in tax rates	–5.1	–2.7
Effects from intra-Group restructuring	–10.9	–21.2
Other	4.0	6.8
Income tax expense arising from the current year	**284.5**	**355.2**
Income taxes for previous years	19.2	36.2
Income tax expense	**303.7**	**391.4**

To determine the expected tax expense, earnings before tax have been multiplied by the composite tax rate of 27 per cent assumed for 2018 (2017: 27 per cent).

As at 31 December 2018, the reported tax rate stood at 26.3 per cent (2017: 30.4 per cent).

Consolidated balance sheet disclosures

11. Intangible assets

Intangible assets (part 1)

	Purchased software €m	Internally developed software €m	Goodwill €m	Payments on account and construction in progress[1] €m	Other intangible assets €m	Total €m
Historical cost as at 1 Jan 2017	**260.6**	**782.4**	**2,721.1**	**184.3**	**931.5**	**4,879.9**
Acquisitions from business combinations	0	3.5	56.5	2.2	84.4	146.6
Additions	17.7	37.1	0	50.1	1.2	106.1
Disposals	–2.0	0	0	–0.9	0	–2.9
Reclassifications	0.8	144.7	0	–145.5	0	0
Exchange rate differences	0.8	–1.8	–6.7	–0.2	–7.5	–15.4
Historical cost as at 31 Dec 2017	**277.9**	**965.9**	**2,770.9**	**90.0**	**1,009.6**	**5,114.3**
Acquisitions through business combinations[2]	5.0	0	90.6	0	66.2	161.8
Disposals due to changes to the basis of consolidation	0	–0.5	0	0	0	–0.5
Additions	13.2	36.4	0	44.8	0.4	94.8
Disposals	–107.2	0	0	–0.3	–1.4	–108.9
Reclassifications	0	74.0	0	–74.0	0	0
Exchange rate differences	0	0.3	4.1	0	4.3	8.7
Historical cost as at 31 Dec 2018	**188.9**	**1,076.1**	**2,865.6**	**60.5**	**1,079.1**	**5,270.2**

1) Additions to payments on account and construction in the previous year relate exclusively to internally developed software.
2) This relates primarily to additions within the scope of initial consolidation of 360TGTX Inc. and Clearstream Funds Centre Ltd., see note 2.

Intangible assets (part 2)

	Purchased software €m	Internally developed software €m	Goodwill €m	Payments on account and construction in progress[1)] €m	Other intangible assets €m	Total €m
Transfer historical cost as at 31 Dec 2018	188.9	1,076.1	2,865.6	60.5	1,079.1	5,270.2
Amortisation and impairment losses as at 1 Jan 2017	**225.1**	**608.5**	**0**	**2.7**	**71.6**	**907.9**
Amortisation	17.5	72.3	0	0	26.8	116.6
Impairment losses	0	0	0	1.3	0	1.3
Disposals	–1.8	0	0	–0.8	0	–2.6
Exchange rate differences	0.5	–0.4	0	0	0	0.1
Amortisation and impairment losses as at 31 Dec 2017	**241.3**	**680.4**	**0**	**3.2**	**98.4**	**1,023.3**
Amortisation	18.6	79.4	0	0	29.4	127.4
Impairment losses	0	31.5	0	5.2	0	36.7
Disposals due to changes to the basis of consolidation	0	–0.4	0	0	0	–0.4
Disposals	–106.8	0	0	–0.2	–1.4	–108.4
Amortisation and impairment losses as at 31 Dec 2018	**153.1**	**790.9**	**0**	**8.2**	**126.4**	**1,078.6**
Carrying amount as at 31 Dec 2017	36.6	285.5	2,770.9	86.8	911.2	4,091.0
Carrying amount as at 31 Dec 2018	**35.8**	**285.2**	**2,865.6**	**52.3**	**952.7**	**4,191.6**

1) Additions to payments on account and construction in progress in the previous year relate exclusively to internally developed software.

Software, payments on account and construction in progress

Additions to software mainly relate to the implementation of the European Central Securities Depositories Regulation (CSDR) in the Clearstream (post-trading) segment and the development of the foreign-exchange trading platform in the 360T (foreign exchange) segment.

Carrying amounts of material software and construction in progress as well as remaining amortisation periods of software applications

	Carrying amount[1] as at		Remaining amortisation period as at	
	31 Dec 2018 €m	31 Dec 2017 €m	31 Dec 2018 years	31 Dec 2017 years
Eurex (financial derivatives)				
C7	36.9	38.9	2.5 – 4.9	3.5 – 5.4
T7 trading platform for derivatives	20.5	23.4	0.9 – 4.9	0.9 – 4.9
Eurex Clearing Prisma	16.8	23.4	1.3 – 4.7	2.3 – 4.9
OTC CCP	11.9	10.5	0.3 – 4.9	0.4 – 4.9
Clearstream (post-trading)				
TARGET2-Securities (T2S)	71.8	85.7	3.9 – 5.1	4.9 – 6.1
1CAS Custody & Portal	37.9	39.5	6.2	n.a.
CSDR	31.3	10.1	n.a.	n.a.
One CLS Settlement Reporting (One CSR)	10.8	12.8	5.1 – 6.2	6.1
Single Network	7.4	8.8	5.1	6.1
360T (foreign exchange)				
Trading platform of 360T group	18.5	14.3	1.8 – 6.9	2.8 – 6.9
Xetra (cash equities)				
T7 trading platform for the cash markets	8.4	6.7	3.9 – 5.5	4.9 – 6.5
TARGET2-Securities (T2S)[2]	5.7	8.5	2.0	4.1

1) Individual releases of a software application are combined and reported as a single asset.
2) TARGET2-Securities is the interface between the CCP system of Deutsche Börse Group and the TARGET2-Securities system of the European Central Bank. Due to a new estimate as at the end of the 2018 financial year, the remaining useful life of TARGET2-Securities was shortened by one year.

All intangible assets are subject to event-driven impairment testing procedures. In addition, intangible assets that are not yet ready for use are tested for impairment at least annually. Based on this, impairment losses totalling €36.7 million (2017: €1.3 million) were recognised in 2018. They are disclosed in the "depreciation, amortisation and impairment losses" item and relate mainly to the following assets or cash-generating units (CGUs):

- An impairment loss of €16.0 million (recoverable amount: negative) in the second quarter of 2018 relates to the carrying amount of the Regulatory Reporting Hub IT platform. This was due to significant adjustments to the platform made to meet changed requirements. As a response to this, Deutsche Börse Group has been continuously readjusting its software since the third quarter of 2018 to accommodate the changed requirements.

- An impairment loss of €9.4 million in the fourth quarter of 2018 relates to the post-trading area (recoverable amount: €29.5 million) on the level of the "Future Market Access" CGU. This was mainly due to market participants' lower than expected acceptance of subordinate services offered by Clearstream (e.g. segregated accounts). The impairment loss was proportionally allocated to the intangible assets of the CGU. Due to an internal restructuring of Clearstream's product portfolio and in order to distinguish it more clearly from other business areas, the CGU was considered at a more granular level compared to the previous year.
- Further impairment losses totalling €5.4 million in the fourth quarter of 2018 (recoverable amount: each negative) relate to three assets from the securities financing business: One SecLend, One CMS and LH Connect. For each of these assets, actual revenue fell short of expectations. Concerning One SecLend and One CMS, the company had expected that the migration to the TARGET2-Securities platform would materially increase demand – especially from larger customers – for services in the areas of interoperability, collateral pooling and CeBM Triparty Services. However, this has not materialised and is not expected to materialise in 2019. The impairment loss for LH Connect was mainly caused by reduced demand for the liquidity pool, which is offered by Clearstream's agent banks.
- An additional impairment loss of €4.0 million (recoverable amount: negative) in the fourth quarter of 2018 relates to capitalised development costs for the IFS Arrow project. This was also due to a lack of demand.

The recoverable amount for the above-mentioned software or CGUs was determined based on fair value less costs of disposal, using a discounted cash flow model (level 3 inputs). The applied maturity-specific discounts range from 5.8 to 7.2 per cent. For details on the allocation of the impairment losses to Deutsche Börse Group's reporting segments, see note 24.

Goodwill and other intangible assets from business combinations

Given the change in Deutsche Börse Group's segment structure, effective 1 January 2018, and the corresponding split of (groups of) CGUs, including the respective goodwill allocation, the Group reallocated the corresponding carrying amounts. The reallocation was made on the basis of the ratio between the fair value of the new (group of) CGU(s) to the fair value of the existing (group of) CGU(s). The following table provides details on the reallocation of goodwill to the corresponding (group of) CGU(s), as well as its development:

Changes in goodwill classified by (groups of) CGUs in 2018

	Eurex €m	Clear-stream €m	360T €m	GSF €m	EEX €m	IFS €m	Data €m	Index €m	Xetra €m	Total €m
Balance as at 1 Jan 2018	**1,293.4**	**969.0**	**189.2**	**142.1**	**113.2**	**19.6**	**19.3**	**18.4**	**6.7**	**2,770.9**
Acquisitions through business combinations	0	0.1	54.0	0	0	36.5	0	0	0	90.6
Exchange rate differences	0.1	0	0.9	0	2.4	0.5	0.1	0.1	0	4.1
Balance as at 31 Dec 2018	**1,293.5**	**969.1**	**244.1**	**142.1**	**115.6**	**56.6**	**19.4**	**18.5**	**6.7**	**2,865.6**

Changes in goodwill classified by (groups of) CGUs in 2017

	Eurex Core €m	Clearstream Core €m	360T €m	EEX €m	MD+S segment €m	Fund Services €m	Börse Frankfurt Zertifikate €m	Total €m
Balance as at 1 Jan 2017	**1,279.9**	**1,111.1**	**189.2**	**61.6**	**55.1**	**19.6**	**4.6**	**2,721.1**
Acquisitions through business combinations	0	0	0	56.5	0	0	0	56.5
Exchange rate differences	0	0	0	–5.0	–1.7	0	0	–6.7
Balance as at 31 Dec 2017	**1,279.9**	**1,111.1**	**189.2**	**113.1**	**53.4**	**19.6**	**4.6**	**2,770.9**

Other intangible assets are divided into the following categories:

Changes in other intangible assets by category

	Exchange licences €m	Trade names €m	Member and customer relationships €m	Miscellaneous intangible assets €m	Total €m
Balance as at 1 Jan 2017	**0.7**	**453.8**	**400.9**	**4.5**	**859.9**
Acquisitions through business combinations	24.5	4.9	55.0	0	84.4
Additions	0	0	0.4	0.8	1.2
Amortisation	0	–0.1	–25.7	–1.0	–26.8
Exchange rate differences	–2.2	–0.4	–4.9	0	–7.5
Balance as at 31 Dec 2017	**23.0**	**458.2**	**425.7**	**4.3**	**911.2**
Acquisitions through business combinations	0	1.7	64.1	0.4	66.2
Exchange rate differences	0	0	0	0.4	0.4
Amortisation	0	–0.1	–28.2	–1.1	–29.4
Exchange rate differences	1.0	0.2	3.1	0	4.3
Balance as at 31 Dec 2018	**24.0**	**460.0**	**464.7**	**4.0**	**952.7**

An impairment test is carried out, at least annually, concerning goodwill and certain other intangible assets with an indefinite useful life. Since these assets do not generate any cash inflows that are largely independent of those from other assets, the recoverable amount is determined for the (group of) CGUs that the respective asset is allocated to. Impairment tests for (group of) CGUs with allocated goodwill are carried out on 30 September every financial year. Due to the acquisition of Swisscanto Funds Centre Ltd. in the fourth quarter of 2018, the IFS (investment fund services) CGU was subject to another impairment test, effective 31 December 2018. The recoverable amount of the (groups of) CGUs was determined based on the fair value less costs to sell. Only if the fair value less costs to sell did not exceed the carrying amount, the value in use was determined. Given that no active market was available for the (groups of) CGUs, the determination of fair values less costs to sell was based on the discounted cash flow method (level 3 input factors). The detailed planning period covers a respective time period of five years; for (groups of) CGUs, which have been allocated an asset with an indefinite useful life, such time period ends in perpetuity.

The material assumptions used to determine the recoverable amount depend on the respective (group of) CGU(s); please refer to the following table for details:

Key assumptions used for impairment tests in 2018

						CAGR[1]	
(Group of) CGUs	Allocated carrying amount €m	Risk-free interest rate %	Market risk premium %	Discount rate %	Perpetuity growth rate %	Net revenue %	Operating costs %
Goodwill							
Eurex	1,293.5	0.9	6.5	7.2	1.0	8.0	3.9
Clearstream	969.1	0.9	6.5	7.4	1.0	4.7	0.8
360T	244.1	0.9	6.5	8.7	2.5	13.0	9.0
GSF	142.1	0.9	6.5	8.5	1.5	3.1	1.8
EEX	115.6	0.9	6.5	7.7	1.5	9.2	6.3
IFS	56.6	0.9	6.5	7.4	1.5	10.2	6.7
Data	19.4	0.9	6.5	7.5	1.5	6.5	4.2
STOXX	18.5	0.9	6.5	7.5	1.5	8.6	7.4
Xetra	6.7	0.9	6.5	7.3	1.0	3.2	–0.5
Trade names and exchange licences							
STOXX	420.0	0.8	6.5	7.6	1.5	7.9	8.0
Nodal	28.0	2.9	6.5	9.4	1.5	13.6	10.0
360T[2]	19.9	0.8	6.5	7.9	2.5	11.5	6.5
EEX[3]	13.9	0.8	6.5	7.3	1.5	7.1	4.5
360TGTX	1.7	2.9	6.5	9.9	2.5	12.4	9.4
Structured products	0.2	0.8	6.5	7.3	1.0	3.9	3.6

1) CAGR = compound annual growth rate
2) Excluding 360TGTX
3) Excluding Nodal

Key assumptions used for impairment tests in 2017

	Allocated carrying amount €m	Risk-free interest rate %	Market risk premium %	Discount rate %	Perpetuity growth rate %	CAGR[1)] Net revenue %	Operating costs %
Goodwill							
Eurex Core	1,279.9	0.9	6.5	8.6[3)]	1.0	7.1	2.9
Clearstream Core	1,111.1	0.9	6.5	11.6[2)]	1.0	8.6	2.7
360T	189.2	0.9	6.5	8.2[3)]	2.5	16.4	11.9
EEX	113.1	0.9	6.5	9.1[3)]	1.5	1.7	4.7
MD+S segment	53.4	1.0	6.5	8.5[3)]	2.0	6.1	4.1
Fund Services	19.6	0.9	6.5	13.1[3)]	2.0	1.4	1.4
Börse Frankfurt Zertifikate	4.6	1.0	6.5	12.2[3)]	2.0	1.4	1.6
Trade names and exchange licences							
STOXX	420.0	0.9	6.5	9.8[3)]	2.0	7.5	6.4
Nodal	26.8	2.6	6.5	8.8[3)]	2.0	15.5	8.7
360T	19.9	0.8	6.5	8.2[3)]	2.5	16.4	11.9
EEX	13.9	0.9	6.5	9.1[3)]	1.5	1.7	4.7
Börse Frankfurt Zertifikate	0.2	1.0	6.5	12.2[3)]	2.0	1.4	1.6

1) CAGR = compound annual growth rate
2) Before tax
3) After tax

Individual costs of capital are determined for each (group of) CGU(s), for the purpose of discounting projected cash flows. These capital costs are based on data incorporating beta factors, borrowing costs, as well as the capital structure of the respective peer group. Pricing, trading volumes, assets under custody, market share assumptions or general business development assumptions are based on past experience or market research. Other key assumptions are mainly based on external factors and generally correspond to internal management planning. Significant macroeconomic indicators include, for instance, equity index levels, volatility of equity indices, as well as interest rates, exchange rates, GDP growth, unemployment levels and government debt. When calculating the value in use, the projections are adjusted for the effects of future restructurings and performance investments, if appropriate.

Even in case of a reasonably possible change of one of the parameters, assuming none of the other parameters change, none of the above-mentioned (groups of) CGUs would be impaired.

12. Property, plant and equipment

Property, plant and equipment

	Fixtures and fittings €m	Computer hardware, operating and office equipment €m	Payments on account and construction in progress €m	Total €m
Historical costs as at 1 Jan 2017	**79.6**	**357.8**	**2.2**	**439.6**
Acquisitions through business combinations	0	0.1	0	0.1
Additions	6.4	35.6	1.1	43.1
Disposals	–1.3	–3.4	–1.1	–5.8
Reclassifications	0	0.1	–0.1	0
Exchange rate differences	–0.4	0.5	0.1	0.2
Historical costs as at 31 Dec 2017	**84.3**	**390.7**	**2.2**	**477.2**
Acquisitions through business combinations	0.3	0.6	0	0.9
Disposals from change in scope of consolidation	0	–0.1	0	–0.1
Additions	5.4	46.7	13.1	65.2
Disposals	–6.5	–167.5	0	–174.0
Reclassifications	0	0.5	–0.5	0
Exchange rate differences	0	0.2	0	0.2
Historical costs as at 31 Dec 2018	**83.5**	**271.1**	**14.8**	**369.4**
Depreciation and impairment losses as at 1 Jan 2017	**43.7**	**282.4**	**0**	**326.1**
Amortisation	7.2	34.8	0	42.0
Disposals	–1.3	–3.3	0	–4.6
Exchange rate differences	–0.1	0.4	0	0.3
Depreciation and impairment losses as at 31 Dec 2017	**49.5**	**314.3**	**0**	**363.8**
Amortisation	8.5	37.9	0	46.4
Disposals from change in scope of consolidation	0	–0.1	0	–0.1
Disposals	–5.8	–165.8	0	–171.6
Depreciation and impairment losses as at 31 Dec 2018	**52.2**	**186.3**	**0**	**238.5**
Carrying amount as at 31 Dec 2017	34.8	76.4	2.2	113.4
Carrying amount as at 31 Dec 2018	**31.3**	**84.8**	**14.8**	**130.9**

13. Financial instruments

13.1 Overview of financial instruments

Deutsche Börse Group holds the following financial instruments:

Overview of financial instruments

	Notes	31 Dec 2018 €m	31 Dec 2017 (restated) €m
Non-current assets			
Financial investments measured at FVOCI[1]	13.3	108.8	–
Financial assets measured at amortised cost	13.4	1,057.1	–
Financial assets measured at FVPL[2]			
Financial instruments of the central counterparties	13.7	9,985.4	4,837.2
Derivatives	13.8	0	0.1
Other financial assets measured at FVPL	13.9	17.3	1.2
Available-for-sale financial assets	13.5	–	1,692.0
Loans and receivables		–	4.9
Current assets			
Financial assets measured at amortised cost			
Trade receivables	13.4	397.5	331.8
Other financial assets measured at amortised cost	13.4	19,722.6	–
Financial assets measured at FVPL			
Financial instruments of the central counterparties	13.7	94,280.3	79,510.7
Derivatives	13.8	4.7	5.2
Other financial assets measured at FVPL	13.9	0.4	0
Available-for-sale financial assets	13.5	–	254.5
Loans and receivables		–	12,922.9
Restricted bank balances	13.10	29,833.6	29,392.0
Other cash and bank balances		1,322.3	1,297.6
Non-current liabilities			
Financial liabilities measured at amortised cost	13.6	2,283.2	1,688.4
Financial liabilities measured at FVPL			
Financial instruments of the central counterparties	13.7	9,985.4	4,837.2
Other financial liabilities measured at FVPL	13.9	0.2	0.8
Current liabilities			
Financial liabilities measured at amortised cost			
Trade payables	13.6	195.0	150.1
Other financial liabilities measured at amortised cost	13.6	19,024.7	13,976.2
Financial liabilities measured at FVPL			
Financial instruments of the central counterparties	13.7	94,068.3	78,798.6
Derivatives	13.8	3.0	32.0
Cash deposits from market participants	13.11	29,559.2	29,215.3

1) FVOCI = fair value through other comprehensive income
2) FVPL = fair value through profit or loss

Deutsche Börse Group's exposure to various risks associated with the financial instruments is discussed in note 25. The maximum exposure to credit risk at the end of the reporting period is the carrying amount of each class of financial assets mentioned above.

13.2 Recognised fair value measurements

The financial assets and liabilities that are measured at fair value are required to be allocated to the following three hierarchy levels: financial assets and liabilities are allocated to level 1 if there is a quoted price for identical assets and liabilities in an active market that can be accessed by the entity. They are allocated to level 2 if the inputs on which fair value measurement is based are observable either directly or indirectly; these inputs must be based on market expectations. Financial assets and liabilities are allocated to level 3 if fair value is determined on the basis of unobservable inputs. There were no transfers between levels for recurring fair value measurements during the year under review.

As at 31 December 2018, the financial assets and liabilities measured at fair value were allocated to the following levels of the fair value hierarchy:

Fair value hierarchy

	Fair value as at 31 Dec 2018	thereof attributable to:		
		Level 1	Level 2	Level 3
	€m	€m	€m	€m
Recurring fair value measurements				
ASSETS				
Financial assets measured at FVOCI[1)]				
Equity investments measured at FVOCI	108.8	19.1	0	89.7
Total	**108.8**	**19.1**	**0**	**89.7**
Financial assets measured at FVPL[2)]				
Non-current financial instruments of the central counterparties	9,985.4	0	9,985.4	0
Other non-current financial assets measured at FVPL	17.3	8.6	0	8.7
Current financial instruments of the central counterparties	94,280.3	0	94,280.3	0
Current derivatives	4.7	0	4.7	0
Other current financial assets measured at FVPL	0.4	0	0	0.4
Total	**104,288.1**	**8.6**	**104,270.4**	**9.1**
Total assets	**104,396.9**	**27.7**	**104,270.4**	**98.8**
LIABILITIES				
Financial liabilities measured at FVPL				
Non-current financial instruments of the central counterparties	–9,985.4	0	–9,985.4	0
Non-current financial liabilities measured at FVPL	–0.2	0	0	–0.2
Current financial instruments of the central counterparties	–94,068.3	0	–94,068.3	0
Current derivatives	–3.0	0	–3.0	0
Total liabilities	**–104,056.9**	**0**	**–104,056.7**	**–0.2**

1) FVOCI = fair value through other comprehensive income
2) FVPL = fair value through profit or loss

By comparison, the financial assets and liabilities measured at fair value as at 31 December 2017 were allocated as follows to the hierarchy levels:

Fair value hierarchy

	Fair value as at 31 Dec 2017	thereof attributable to:		
		Level 1	Level 2	Level 3
	€m	€m	€m	€m
Recurring fair value measurements				
ASSETS				
Financial assets available for sale				
Equity investments available for sale	40.4	33.8	0	6.6
Non-current financial assets available for sale	1,587.5	1,587.5	0	0
Current financial assets available for sale	254.5	254.5	0	0
Total	**1,882.4**	**1,875.8**	**0**	**6.6**
Financial assets held for trading				
Non-current financial instruments of the central counterparties	4,837.2	0	4,837.2	0
Current financial instruments of the central counterparties	79,238.7	0	79,238.7	0
Non-current derivatives	0.1	0	0	0.1
Current derivatives	5.2	0	5.2	0
Non-current financial assets measured at FVPL[1]	1.2	0	0	1.2
Total	**84,082.4**	**0**	**84,081.1**	**1.3**
Total assets	**85,964.8**	**1,875.8**	**84,081.1**	**7.9**
LIABILITIES				
Financial liabilities held for trading				
Non-current financial liabilities measured at FVPL	–0.8	0	0	–0.8
Non-current financial instruments of the central counterparties	–4,837.2	0	–4,837.2	0
Current financial instruments of the central counterparties	–78,526.6	0	–78,526.6	0
Non-current derivatives	0	0	0	0
Current derivatives	–32.0	0	–29.1	–2.9
Total liabilities	**–83,396.6**	**0**	**–83,392.9**	**–3.7**

1) FVPL = fair value through profit or loss

Financial assets and liabilities listed in levels 2 and 3 as at 31 December 2018 are measured as follows:

- The derivatives listed in level 2 comprise forward foreign-exchange transactions. The fair value of the forward foreign-exchange transactions is determined on the basis of the forward exchange rates for the remaining period to maturity as at the reporting date. They are based on observable market prices.
- The fair value of the financial instruments held by central counterparties allocated to level 2 is determined by market transactions for identical or similar assets in markets that are not active and by option pricing models based on observable market prices.

As at the reporting date, the items allocated to level 3 and their measurements were as follows:

Changes in level 3 financial instruments

	Assets			Liabilities		Total
	Equity investments €m	Financial assets measured at FVPL[1] €m	Derivatives €m	Financial liabilities measured at FVPL €m	Derivatives €m	€m
Balance as at 1 Jan 2017	**6.5**	**0**	**0.4**	**–0.2**	**–8.2**	**–1.5**
Additions	0	1.2	0	–0.4	0	0.8
Disposals	–0.4	0	–0.3	0	1.4	0.7
Realised capital gains/(losses)	0	0	0	0	3.4	3.4
Other operating income	0	0	0	0	3.4	3.4
Unrealised capital gains/(losses) recognised in profit or loss	0	0	0	–0.2	0.5	0.3
Other operating expenses	0	0	0	–0.2	0	–0.2
Other operating income	0	0	0	0	0.5	0.5
Changes recognised in the revaluation surplus	0.5	0	0	0	0	0.5
Balance as at 31 Dec 2017	**6.6**	**1.2**	**0.1**	**–0.8**	**–2.9**	**4.2**
Adjustments according to IFRS 9	61.2	6.3	0	–0.3	2.9	70.1
Balance as at 1 Jan 2018	**67.8**	**7.5**	**0.1**	**–1.1**	**0**	**74.3**
Acquisitions from business combinations	0.1	0	0	0	0	0.1
Additions	13.6	3.1	0	0	0	16.7
Disposals	–0.3	–1.8	0	0.3	0	–1.8
Unrealised capital gains/(losses) recognised in profit or loss	0	0.3	–0.1	0.6	0	0.8
Financial results	0	0	0	–0.1	0	–0.1
Other operating expenses	0	0	–0.1	0	0	–0.1
Other operating income	0	0.4	0	0.7	0	1.1
Net income from strategic investments	0	–0.1	0	0	0	–0.1
Changes recognised in the revaluation surplus	7.5	0	0	0	0	7.5
Unrealised gains/(losses) from currency translation recognised in equity	1.0	0	0	0	0	1.0
Balance as at 31 Dec 2018	**89.7**	**9.1**	**0**	**–0.2**	**0**	**98.6**

1) FVPL = fair value through profit or loss

The value of level 3 equity investments is reviewed on a quarterly basis using internal valuation models. During the year under review, fair value measurement resulted in positive effects of €11.3 million and negative effects of €3.8 million, both recognised directly in equity.

Financial instruments measured at fair value through profit or loss include investment fund units. Their fair value measurement is based on the net asset value determined by the issuer and yielded negative effects of €0.2 million recognised in net income from strategic investments. This item also comprised a convertible bond and a convertible loan, whose market values are determined using internal valuation models. Measurement at fair value had an effect on profit or loss amounting to €0.1 million reported in net income from strategic investments.

Furthermore, the item "financial assets measured at fair value through profit or loss" included financial instruments from an incentive programme of Eurex Frankfurt AG with a carrying amount of €0.4 million as at 31 December 2018. The financial instruments are regularly measured at fair value through profit or loss using internal models at the quarterly reporting dates. During the year under review, subsequent measurement of the financial instruments led to gains of €0.4 million disclosed under "other operating income". Since these are internal models, the parameters can differ from those at the settlement date. However, the derivatives will not exceed an amount of €0.8 million. These amounts arise if all beneficiaries of the incentive programme fulfil the conditions and a repayment of the contribution is not taken into consideration.

The fair value of a call option included in derivatives was derived using a Black-Scholes model based on unobservable market data. The fair value stood at nil as at the reporting date, yielding an unrealised loss of €0.1 million recognised in other operating expense.

At the beginning of the 2018 financial year, financial liabilities at fair value through profit or loss comprised two contingent purchase price components in the aggregate amount of €0.8 million. These two purchase price components are measured on the basis of internal discounted cash flow models, which discount the expected future payment obligations to the measurement date, using interest rates appropriate to the risk.

The bonds issued by Deutsche Börse Group have a fair value of €2,422.9 million (31 December 2017: €2,451.5 million) and are disclosed under liabilities measured at amortised cost. The fair value of such instruments is based on the debt instruments' quoted prices. Due to insufficient market liquidity, the liabilities were allocated to level 2.

Fixed-income securities held by Deutsche Börse Group have a fair value of €1,627.0 million. They are recognised as part of debt instruments measured at amortised cost. The fair value of the securities was determined by reference to published price quotations in an active market. The securities were allocated to level 1.

The carrying amounts of the following items represent a reasonable approximation of their fair value:

- Other financial assets reported under (non-)current debt financial instruments measured at amortised cost
- Restricted bank balances
- Cash and other bank balances
- Cash deposits by market participants
- Trade receivables
- Trade payables
- Other financial liabilities reported under current financial liabilities measured at amortised cost

13.3 Financial investments measured at fair value through other comprehensive income

Financial investments measured at fair value through other comprehensive income (FVOCI) comprise equity investments which are not held for trading and which Deutsche Börse Group has irrevocably elected to recognise in this category at initial recognition. As these instruments are strategic investments of Deutsche Börse Group, the classification at fair value through other comprehensive income is in line with the business rationale.

Equity investments measured at fair value through other comprehensive income comprise the following investments:

Equity investments measured at fair value through other comprehensive income

	2018 €m
Listed securities	
Bombay Stock Exchange Ltd.[1]	19.1
Total listed securities	**19.1**
Unlisted securities	
Taiwan Futures Exchange Corp[1]	42.6
Digital Asset Holdings LLC[1]	6.2
figo GmbH[1]	3.3
Trifacta Inc. [1]	5.4
Trumid Holdings, LLC[1]	12.8
LMRKTS LLC	9.2
S.W.I.F.T. SCRL[1]	10.2
Total unlisted securities	**89.7**
Total	**108.8**

1) In financial year 2017, Deutsche Börse Group classified equity investments as “available for sale”; see note 13.5 for further details.

In 2018, Deutsche Börse Group disposed of parts of its investment in S.W.I.F.T. SCRL as a result of transactions initiated by the issuer. The shares disposed of had a fair value of €0.3 million, and the Group realised a gain of €0.2 million, which had initially been included in other comprehensive income. The gain has been transferred to retained earnings upon disposal.

None of the equity investments have been pledged as collateral by Deutsche Börse Group.

During the year under review, the following gains/(losses) were recognised in profit or loss and in other comprehensive income in connection with the investments:

Amounts recognised in profit or loss and in other comprehensive income

	2018 €m	2017[1] €m
Gains/(losses) recognised in other comprehensive income	−7.2	101.6
Gains/(losses) reclassified from other comprehensive income to profit or loss	–	192.5[2]
Dividends from equity investments held at FVOCI[3]		
Related to investments derecognised during the reporting period	0	3.9
Related to investments held as at the end of the reporting period	2.9	2.1
Total	**−4.3**	**300.1**

1) The figures for the 2017 financial year relate to available-for-sale financial assets.
2) Relates primarily to income generated from the disposal of shares in BATS Global Markets, Inc. as well as of an additional equity investment in the 2017 financial year
3) FVOCI = fair value through other comprehensive income

13.4 Financial assets measured at amortised cost

Financial assets measured at amortised cost include the following debt instruments:

Composition of fair value of financial assets measured at amortised cost

	31 Dec 2018			31 Dec 2017[1]		
	Non-current €m	Current €m	Total €m	Non-current €m	Current €m	Total €m
Listed debt securities	1,052.0	572.4	1,624.4	n.a.	n.a.	n.a.
Expected loss on listed debt securities						
Stage 1	0	0	0	n.a.	n.a.	n.a.
Total expected loss on listed debt securities	0	0	0	n.a.	n.a.	n.a.
Listed debt securities net of expected loss	**1,052.0**	**572.4**	**1624.4**	**n.a.**	**n.a.**	**n.a.**
Trade receivables	0	403.2	403.2	0	331.8	331.8
Expected loss on trade receivables						
Stage 2	0	–4.8	–4.8	n.a.	n.a.	n.a.
Stage 3	0	–0.9	–0.9	n.a.	n.a.	n.a.
Total expected loss on trade receivables	0	–5.7	–5.7	n.a.	n.a.	n.a.
Trade receivables net of expected loss	**0**	**397.5**	**397.5**	**0**	**331.8**	**331.8**
Other financial assets measured at amortised cost[2]						
Reverse repurchase agreements	0	6,516.2	6,516.2	0	4,843.5	4,843.5
Balances on nostro accounts	0	2,244.7	2,244.7	0	1,287.2	1,287.2
Money market lendings	0	6,435.9	6,435.9	0	5,859.9	5,859.9
Margin calls	0	18.5	18.5	0	14.8	14.8
Overdrafts from settlement business	0	2,253.3	2,253.3	0	754.7	754.7
Receivables from related parties	0.4	0.1	0.5	0.3	0.1	0.4
Interest receivables	0	45.2	45.2	0	41.3	41.3
Receivables from deposits	4.6	3.8	8.4	4.6	2.9	7.5
Central counterparty balances	0	1,608.9	1,608.9	0	112.4	112.4
Other	0.1	23.6	23.7	0	6.1	6.1
Total other financial assets measured at amortised cost	5.1	19,150.2	19,155.3	4.9	12,922.9	12,927.8
Other financial assets measured at amortised cost, net of expected loss	**5.1**	**19,150.2**	**19,155.3**	**4.9**	**12,922.9**	**12,927.8**
Total	**1,057.1**	**20,120.1**	**21,177.2**	**4.9**	**13,254.7**	**13,259.6**

1) If comparable prior-year figures do not exist due to the first-time adoption of IFRS 9 in the year under review, this is marked as “n.a.”
2) 2017: loans and receivables

Financial assets measured at amortised cost include securities with an amount of €5.1 million pledged to the Industrie- und Handelskammer (IHK, the Chamber of Commerce) Frankfurt/Main.

All of the debt instruments held as at 31 December 2018 were listed and issued by sovereign or sovereign-guaranteed issuers.

As in the previous year, there were no trade receivables due after more than one year as at 31 December 2018.

Overdrafts from settlement business represent short-term loans up to a duration of two days that are usually secured by collateral. The potential concentration of credit risk is monitored for counterparty credit limits; see note 25).

13.5 Financial assets previously classified as available-for-sale financial assets

Available-for-sale financial assets included the following classes of financial assets in 2017:

Financial assets classified as “available for sale” in 2017

	31 Dec 2017 (restated) €m
Non-current assets	
Listed securities	
Equity investments	33.8
Debt securities and corporate bonds	1,577.5
ETFs and other funds	15.1
Total	**1,626.4**
Unlisted securities	
Equity investments	65.6
Total	**65.6**
Total non-current assets	1,692.0
Current assets	
Listed debt securities	254.5
Total current assets	**254.5**
Total	**1,946.5**

As the category “available for sale” no longer exists under the requirements introduced by IFRS 9 on 1 January 2018, no comparable figures for 2018 have been disclosed within this note.

Following the requirements of IFRS 9, listed debt instruments for 2018 are shown under financial instruments measured at amortised cost in note 13.4, whereas equity investments (listed and unlisted) have been classified as equity instruments measured at fair value through other comprehensive income as disclosed in note 13.3. Investments in funds are shown in note 13.9 as they had been classified as debt instruments measured at fair value through profit or loss.

13.6 Financial liabilities measured at amortised cost

Financial liabilities measured at amortised cost are comprised as follows:

Composition of financial liabilities measured at amortised cost

	31 Dec 2018 Carrying amount			31 Dec 2017 Carrying amount		
	Non-current €m	Current €m	Total €m	Non-current €m	Current €m	Total €m
Bonds issued	2,283.2	0	2,283.2	1688.4	599.7	2,288.1
Trade payables	0	195.0	195.0	0	150.1	150.1
Deposits from securities settlement business	0	16,796.8	16,796.8	0	12,436.5	12,436.5
Deposits from customers	0	16,166.5	16,166.5	0	12,411.8	12,411.8
Deposits from credit institutions	0	630.3	630.3	0	24.7	24.7
Commercial paper issued	0	402.2	402.2	0	274.7	274.7
Money market lendings	0	36.6	36.6	0	508.3	508.3
Bank overdrafts	0	0	0	0	7.3	7.3
Margin deposits	0	17.9	17.9	0	15.4	15.4
Interest liabilities	0	36.6	36.6	0	29.3	29.3
Liabilities from CCP positions	0	1,714.9	1,714.9	0	101.7	101.7
Associate payables	0	0.1	0.1	0	0.3	0.3
Miscellaneous	0	19.6	19.6	0	3.0	3.0
Total	2,283.2	19,219.7	21,502.9	1,688.4	14,126.3	15,814.7

The financial liabilities recognised on the balance sheet were not secured by liens or similar rights as at 31 December 2017 or as at 31 December 2018.

13.7 Financial instruments of the central counterparties

Composition of financial instruments of the central counterparties

	31 Dec 2018 €m	31 Dec 2017 €m
Repo transactions	63,147.3	62,914.9
Options	40,428.1	20,140.0
Other	690.3	1,293.0
Total	**104,265.7**	**84,347.9**
thereof non-current	9,985.4	4,837.2
thereof current	94,280.3	79,510.7

1) FFVPL = fair value through profit or loss

The aggregate financial instruments held by central counterparties are classified into current and non-current in the consolidated balance sheet. Receivables and liabilities that may be offset against a clearing member are reported on a net basis. Financial liabilities of €212.0 million (2017: €712.1 million) were eliminated because of intra-Group GC Pooling transactions.

The following table gives an overview of the effects of offsetting the financial instruments held by the central counterparties:

Gross presentation of offset financial instruments held by the central counterparties

	Gross amount of financial instruments		Gross amount of offset financial instruments		Net amount of financial instruments	
	31 Dec 2018 €m	31 Dec 2017 €m	31 Dec 2018 €m	31 Dec 2017 €m	31 Dec 2018 €m	31 Dec 2017 €m
Financial assets from repo transactions	98,083.3	83,297.8	–34,936.0	–20,382.9	63,147.3	62,914.9
Financial liabilities from repo transactions	–97,871.3	–82,585.7	34,936.0	–20,382.9	–62,935.3	–62,202.8
Financial assets from options	76,089.8	65,735.2	–35,661.7	–45,595.2	40,428.1	20,140.0
Financial liabilities from options	– 76,089.8	– 65,735.2	35,661.7	45,595.2	– 40,428.1	– 20,140.0

13.8 Derivative financial instruments

Derivatives are only used for economic hedging purposes and not as speculative investments. However, where derivatives do not meet the hedge accounting criteria, they are classified as “held for trading” for accounting purposes and are accounted for at fair value through profit or loss. Deutsche Börse Group uses derivative financial instruments to hedge existing or expected transactions in order to reduce interest rate risks or foreign-exchange risks. As at the reporting date, the following transactions have been recognised:

Derivative financial instruments

	Notional amount 31 Dec 2018 €m	Carrying amount 31 Dec 2018 €m	Notional amount 31 Dec 2017 €m	Carrying amount 31 Dec 2017 €m
ASSETS				
Non-current assets				
Options to acquire equity investments	2.0	0	2.0	0.1
Foreign currency derivatives not designated in hedges	0	0	0	0
Total non-current assets	**2.0**	**0**	**2.0**	**0.1**
Current assets				
Foreign currency derivatives not designated in hedges	2,094.8	4.7	788.0	4.5
Foreign currency derivatives qualifying as cash flow hedges	0	0	75.2	0.7
Total current assets	**2,094.8**	**4.7**	**863.2**	**5.2**
Total assets	**2,096.8**	**4.7**	**865.2**	**5.3**
LIABILITIES				
Current liabilities				
Foreign currency derivatives not designated in hedges	1,289.5	3.0	1,711.9	29.1
Embedded derivatives	0	0	2.9	2.9
Total current liabilities	**1,289.5**	**3.0**	**1,714.8**	**32.0**
Total liabilities	**1,289.5**	**3.0**	**1,714.8**	**32.0**

Derivatives that do not qualify as hedges

Deutsche Börse Group has entered into transactions involving derivatives to economically reduce the foreign-exchange rate risk. These transactions have not been designated as hedging relationships:

As at 31 December 2018, currency swaps expiring in less than six months had a notional value of €3,383.2 million (2017: €2,494.6 million) as well as a negative fair value of €2.9 million and a positive fair value amounting to €4.7 million (2017: negative fair value of €29.0 million and positive fair value amounting to €4.5 million). These swaps were entered into to convert foreign currencies resulting from the commercial paper programme into euros and to economically hedge short-term foreign currency receivables and liabilities in euros.

As at 31 December 2018 and as at 31 December 2017, European Energy Exchange AG had entered into forward transactions in order to economically hedge the foreign-exchange risk associated with forecast net cash outflows in British pounds for the following year. As at 31 December 2018, these derivatives had a notional value of €1.1 million (£1.0 million) and a remaining maturity of less than twelve months. The fair value of these instruments amounted to nil. As at 31 December 2017, the forward contracts with a notional value of €4.6 million (£4.0 million) had a negative fair value of €0.1 million. A US dollar swap with a notional value of €0.8 million had a fair value of nil as of 31 December 2017. All contracts concluded in 2017 settled in 2018 without any material impact on net profit for the period attributable to Deutsche Börse AG shareholders.

Cash flow hedges

The effective portion of changes in the fair value of derivatives that are designated and qualify as cash flow hedges is recognised in the cash flow hedge reserve within revaluation surplus. The gain or loss relating to the ineffective portion is recognised immediately in profit or loss. Amounts are subsequently transferred to profit or loss. For the development of the revaluation surplus, please refer to note 15.

The effectiveness of a hedging relationship is determined at the inception of the hedging relationship and through periodic effectiveness assessments to ensure that there is an economic relationship between hedged item and hedging instrument. In order to hedge foreign currency risk, the Group enters into hedging relationships where the critical terms of the hedging instrument match exactly the terms of the hedged item.

The cash flow hedges developed as follows:

Changes in cash flow hedges

	2018 €m	2017 €m
Cash flow hedges as at 1 January	0.7	0
Amount recognised in other comprehensive income during the year	0	–3.4
Amount recognised in profit or loss during the year	–0.7	0
Closed-out	0	4.1
Cash flow hedges as at 31 December	**0**	**0.7**

In 2017, Clearstream Banking S.A. had entered into a cash flow hedge to reduce the impact of fluctuations in the euro/US dollar exchange rate on its US dollar-based net interest income for the 2018 financial year. The US dollar-related net interest income is derived from US dollar placements from customer cash balances less the corresponding compensation for customers. Twelve forward foreign-exchange contracts – one contract for the end of each of the twelve months in 2018 – were concluded on 16 November 2017. The hedge is considered 100 per cent effective as the hedging foreign-exchange transactions can be set off directly against the US dollar-based net interest income. At the end of each month, the change in fair value of the forward foreign-exchange contracts will be recognised in equity, and the gain or loss realised on the maturing foreign-exchange contract will be classified as interest income. As at 31 December 2017, the fair value of the hedging instruments amounted to €0.7 million. To hedge the US dollar risk for financial year 2019, Clearstream Banking S.A. concluded similar transactions in 2019; as at the reporting date, no derivatives had been designated as cash flow hedges.

13.9 Other financial instruments measured at fair value through profit or loss

The financial instruments measured at fair value through profit or loss (FVPL) are comprised as follows:

Composition of other financial instruments measured at fair value through profit or loss

	31 Dec 2018 €m	31 Dec 2017 €m
ASSETS		
Non-current assets		
Convertible bonds and loans	2.7	1.2
Investment in ETFs and equity funds	14.6	15.1
Total	17.3	16.3
Current assets		
Incentive programmes	0.4	0
Total	1.0	0
Total assets	**17.7**	**16.3**
LIABILITIES		
Non-current liabilities		
Contingent purchase price components	0.2	0.8
Total liabilities	**0.2**	**0.8**

During the year under review, the following gains/(losses) were recognised in profit or loss:

Amounts recognised in profit or loss

	2018 €m	2017 €m
Fair value (losses)/gains on other financial assets at FVPL[1]	–1.5	0
Distributions from ETFs	0.3	0.4
Fair value gains/(losses) on contingent purchase price components	0.6	–0.2
Total	**–0.6**	**0.2**

1) FVPL = fair value through profit or loss

13.10 Restricted bank balances

Amounts reported separately under liabilities as cash deposits by market participants are restricted. Such amounts are mainly invested via bilateral or triparty reverse repurchase agreements and in the form of overnight deposits at banks (restricted bank balances). Government and government-guaranteed bonds with an external rating of at least AA– are accepted as collateral for the reverse repurchase agreements. Reported restricted bank balances total €29,833.6 million (2017: €29,392.0 million).

13.11 Cash deposits by market participants

Composition of cash deposits by market participants

	31 Dec 2018 €m	31 Dec 2017 €m
Liabilities from margin payments		
made to Eurex Clearing AG by clearing members	23,673.9	26,555.0
made to European Commodity Clearing AG by clearing members	5,502.2	2,268.8
made to Nodal Clear, LLC by clearing members	372.7	387.2
made to European Energy Exchange AG by clearing members	0.3	n.a.
Liabilities from cash deposits by participants in equity trading	10.1	4.3
Total	**29,559.2**	**29,215.3**

14. Other current assets

Composition of other current assets

	31 Dec 2018 €m	31 Dec 2017 €m
Other receivables from CCP transactions	543.9	364.4
Tax receivables (excluding income taxes)	41.6	49.8
Prepaid expenses	50.4	32.0
Miscellaneous	3.9	5.5
Total	**639.8**	**451.7**

15. Equity

Changes in equity are presented in the consolidated statement of changes in equity. As at 31 December 2018, the number of no-par value registered shares of Deutsche Börse AG in issue was 190,000,000 (31 December 2017: 193,000,000).

Subject to the agreement of the Supervisory Board, the Executive Board is authorised to increase the subscribed share capital by the following amounts:

Composition of authorised share capital

	Amount in €	Date of authorisation by the shareholders	Expiry date	Existing shareholders' pre-emptive rights may be disapplied for fractioning and/or may be disapplied if the share issue is:
Authorised share capital I[1]	13,300,000	11 May 2016	10 May 2021	n.a.
Authorised share capital II[1]	19,300,000	13 May 2015	12 May 2020	▪ for cash at an issue price not significantly lower than the stock exchange price, up to a maximum amount of 10 per cent of the nominal capital.
				▪ against non-cash contributions for the purpose of acquiring companies, parts of companies, interests in companies, or other assets.
Authorised share capital III[1]	38,600,000	13 May 2015	12 May 2020	n.a.
Authorised share capital IV[1]	6,000,000	17 May 2017	16 May 2022	n.a

1) Shares may only be issued, excluding shareholders' pre-emptive subscription rights, provided that the aggregate amount of new shares issued excluding shareholders' pre-emptive rights during the term of the authorisation (including under other authorisations) does not exceed 20 per cent of the issued share capital.

Contingent capital

In accordance with the resolution by the Annual General Meeting on 15 May 2014, the Executive Board was authorised, subject to the approval of the Supervisory Board, to issue on one or more occasions in the period up to 14 May 2019 convertible bonds and/or bonds with warrants or a combination of such instruments in a total nominal amount of up to €2,500,000,000 with or without maturity restrictions. The Executive Board was also authorised to grant the holders or creditors of these bonds conversion or option rights to new no-par value registered shares of Deutsche Börse AG with a proportionate interest in the share capital totalling up to €19,300,000, as specified in more detail in the terms and conditions of the convertible bonds or in the terms and conditions of the warrants attaching to the bonds with warrants.

The Executive Board is authorised, subject to the approval of the Supervisory Board, to exclude shareholders' pre-emptive rights to bonds with conversion or option rights to shares of Deutsche Börse AG in the following cases: (i) to avoid fractional amounts, (ii) when the issue price of a bond is not materially below the theoretical fair value determined in accordance with recognised financial techniques and the total number of shares attributable to these bonds does not exceed 10 per cent of the share capital, (iii) to grant the holders of conversion or option rights to shares of Deutsche Börse AG subscription rights to offset any dilutive effects to the same extent as they would be entitled to receive after exercising these rights.

The bonds may also be issued by companies based in Germany or abroad that are affiliated with Deutsche Börse AG within the meaning of sections 15ff. of the Aktiengesetz (AktG, German Stock Corporation Act). Accordingly, the share capital was contingently increased by up to €19,300,000 (contingent capital 2014). To date, the authorisation to issue convertible bonds and/or bonds with warrants has not been exercised.

There were no further subscription rights to shares as at 31 December 2018 or 31 December 2017.

Revaluation surplus

The development of the revaluation surplus is as follows:

Revaluation surplus

	Recognition of hidden reserves from fair value measurement €m	Available-for-sale investments €m	Equity investments measured at FVOCI[1] €m
Balance as at 1 Jan 2017 (gross)	**103.7**	**111.4**	**0**
Changes from defined benefit and similar obligations	0	0	0
Fair value measurement	0	101.6	0
Reclassifications	0	0	0
Reversal to profit or loss	0	–192.5	0
Balance as at 31 Dec 2017 (gross)	**103.7**	**20.5**	**0**
First-time adoption of IFRS 9 at 1 Jan 2018	0	–20.5	23.7
Changes from defined benefit obligations	0	0	0
Fair value measurement	0	0	–7.2
Balance as at 31 Dec 2018 (gross)	**103.7**	**0**	**16.5**
Deferred taxes			
Balance as at 1 Jan 2017	**0**	**–44.2**	**0**
Additions	0	77.4	0
Reversals	0	–34.3	0
Balance as at 31 Dec 2017	**0**	**–1.1**	**0**
First-time adoption of IFRS 9 at 1 Jan 2018	0	1.1	–1.7
Additions	0	0	0.1
Reversals	0	0	–0.3
Balance as at 31 Dec 2018	**0**	**0**	**–1.9**
Balance as at 1 Jan 2017 (net)	**103.7**	**67.2**	**0**
Balance as at 31 Dec 2017 (net)	**103.7**	**19.4**	**0**
Balance as at 31 Dec 2018 (net)	**103.7**	**0**	**14.6**

1) FFVOCI = fair value through other comprehensive income

	Available-for-sale debt instruments €m	Cash flow hedges €m	Defined benefit obligations €m	Other €m	Total €m
	9.1	**– 3.5**	**– 183.8**	**0**	**36.9**
	0	0	30.6	0	30.6
	1.2	0.7	0	0	103.5
	– 0.1	0	0	0	– 0.1
	0.3	2.8	0	0	– 189.4
	10.5	**0**	**– 153.2**	**0**	**– 18.5**
	– 10.5	0	0	0	– 7.3
	0	0	– 23.9	– 0.3	– 24.2
	0	0	0	0	– 7.2
	0	**0**	**– 177.1**	**– 0.3**	**– 57.2**
	– 2.5	**1.0**	**50.3**	**0**	**4.6**
	0	**0**	**0**	**0**	**77.4**
	– 0.2	– 1.0	– 8.4	0	– 43.9
	– 2.7	**0**	**41.9**	**0**	**38.1**
	2.7	0	0	0	2.1
	0	0	6.9	0.1	7.1
	0	0	0	0	– 0.3
	0	**0**	**48.9**	**0**	**47.0**
	6.6	**– 2.5**	**– 133.5**	**0**	**41.5**
	7.8	**0**	**– 111.3**	**0**	**19.6**
	0	**0**	**– 128.3**	**– 0.2**	**– 10.2**

Accumulated profit

The “accumulated profit” item includes exchange rate differences amounting to €–6.8 million (2017: €–16.4 million). €8.2 million (2017: €–14.4 million) were added due to currency translation for foreign subsidiaries in the reporting period as well as €1.4 million (2017: €–7.1 million) relating to transactions used to hedge against currency risk.

Regulatory capital requirements and regulatory capital ratios

As in the past, Clearstream Banking S.A., Clearstream Banking AG and Eurex Clearing AG, in their capacity as credit institutions, are subject to solvency supervision by the German or Luxembourg banking supervisory authorities (Bundesanstalt für Finanzdienstleistungsaufsicht, BaFin, and Commission de Surveillance du Secteur Financier, CSSF, respectively). The same applies to the Clearstream Holding at a regulatory group level. Eurex Repo GmbH and 360 Treasury Systems AG are also subject to specific provisions applicable to certain investment firms under BaFin solvency supervision. Until it ceased its business operations effective 31 December 2017, Eurex Bonds GmbH had also been subject to BaFin supervision.

Following the return of its licence as an “Approved Clearing House” (ACH) in March 2018, Eurex Clearing Asia Pte. Ltd. is no longer subject to any capital requirements under the Securities and Futures Act (Singapore) or to other specific requirements of the Monetary Authority of Singapore (MAS). Eurex Clearing Asia Pte. Ltd. is presently being liquidated.

Since the authorisation of both Eurex Clearing AG and European Commodity Clearing AG as central counterparties under the provisions of Regulation (EU) No 648/2012 (European Market Infrastructure Regulation, EMIR) in 2014, these companies have been subject to the capital requirements under Article 16 of EMIR. These requirements apply to Eurex Clearing AG in parallel to the solvency supervision requirements applicable to credit institutions. In each concrete case, the more stringent requirement has to be met. Irrespective of its status as a specialist credit institution according to German law, European Commodity Clearing AG is only subject to EMIR capital requirements.

Clearstream Banking AG, Clearstream Banking S.A. and LuxCSD S.A. are central securities depositories (CSDs) within the meaning of Article 2 Paragraph 1 Number 1 of the Regulation (EU) No. 909/2014 (Central Securities Depositories Regulation, CSDR). While the review of the submitted applications for authorisation by the respective supervisory authorities is ongoing, the companies operate under existing transitional provisions. Upon authorisation as CSD pursuant to Article 16 of the CSDR, the affected central securities depository will be subject to the capital requirements set forth in Article 47 of the CSDR. In addition and parallel to such capital requirements, going forward, Clearstream Banking AG and Clearstream Banking S.A. will also be subject to a capital surcharge for credit institutions applicable for the provision of intra-day credit pursuant to Article 54 Paragraph 3 Letter d of the CSDR.

Nodal Clear, LLC is a Derivatives Clearing Organisation (DCO) subject to regulation by the US Commodity Futures Trading Commission (CFTC). Given its DCO status, Nodal Clear, LLC is obliged to maintain sufficient financial resources to cover all current costs for a minimum period of twelve months; moreover, Nodal Clear, LLC must provide sufficient highly liquid assets to cover all current costs for at least six months.

REGIS-TR S.A., as trade repository according to EMIR, is subject to supervision exercised by the European Securities and Markets Authority (ESMA) pursuant to Article 21 (b) of Delegated Regulation (EU) No 150/2013.

Powernext SAS is a regulated market in France, and is hence subject to supervision exercised by the Autorité des marchés financiers (AMF); furthermore, Powernext SAS is obliged to fulfil the regulatory capital requirements set forth in the "Arrêté du 2 juillet 2007 relatif au capital minimum, aux fonds propres et au contrôle interne des entreprises de marché".

The EMIR capital requirements for central counterparties are in large part based on the EU own funds requirements for credit institutions (see below), but the details differ in relation to the capital components, the capital requirement components and capital deduction items. Moreover, EMIR does not specify any capital buffers such as those introduced by the Directive (EU) No 36/2013 (Capital Requirements Directive, CRD IV) and the Regulation (EU) No 575/2013 (Capital Requirements Regulation, CRR) for banks.

Since 1 January 2014, the own funds requirements for credit institutions have been primarily subject to the EU-wide requirements of the CRR as well as the supplementary national regulations implementing CRD IV, which transposed the "Basel III" rules into European law.

All companies that are directly or indirectly (i.e. by means of EMIR requirements) subject to the CRR own funds requirements are exempted from compliance with trading book requirements. Market risk exposures consist only of relatively small open foreign currency positions. The companies concerned uniformly apply the standardised approach for credit risk. As a result of the specific business of the credit institutions and central counterparties belonging to Deutsche Börse Group, their recognised assets are subject to sharp fluctuations. This leads to correspondingly volatile total capital ratios at the Clearstream companies. The volatility of the ratio is subject to major fluctuations on a day-to-day basis in the course of the year. Due to a high degree of collateralised or zero-weighted cash investments, the own funds requirements for credit and market risk exposures of Eurex Clearing AG and European Commodity Clearing AG are relatively stable despite volatile total assets in the course of the year.

To calculate operational risk, Eurex Clearing AG and European Commodity Clearing AG use the basic indicator approach, while the Clearstream companies apply the advanced measurement approach (AMA).

Due to the specific arrangements for the two investment firms, Eurex Repo GmbH and 360 Treasury Systems AG, no explicit own funds requirements for operational risk are determined in accordance with Article 95 of the CRR. Instead, the total own funds requirement is determined either as the own funds requirement amount for credit and market risk or as 25 per cent of fixed overhead costs, depending on which is higher. Since credit and market risks are low, the relevant criterion for both companies is the own funds requirement on the basis of overhead costs.

None of the Group companies subject to solvency supervision has Tier 2 supplementary capital.

A minimum total capital ratio of 8 per cent generally applies to credit institutions subject to the CRR. The credit institutions that are subject to the provisions of the CRR fall into two groups: those designated as not systemically important, which includes Clearstream Banking AG, Clearstream Holding group and Eurex Clearing AG; and those designated as "Other Systemically Important Institution (O-SII)", which includes Clearstream Banking S.A. as of 1 January 2018. CRD IV introduced various capital buffers, which the supervised (credit) institutions generally have to meet over and above the minimum total capital ratio of 8 per cent, although they may temporarily fall below these levels. The capital buffers were introduced in stages up until 1 January 2019, depending on the economic environment and systemic risk components: since 2014, CSSF has imposed a standard capital conservation buffer of 2.5 per cent of Tier 1 capital on all Luxembourg credit institutions; this arrangement represents a departure from the general transitional provisions of CRD IV. This means that the minimum total capital ratio is 10.5 per cent. Besides the capital buffers imposed by CSSF for all Luxembourg credit institutions, an additional capital conservation buffer of 1.875 per cent (2.5 per cent starting in 2019) is applied to all regulated Group companies subject to CRR regulations. Taking these effects into account, the minimum total capital ratio was 9.875 per cent. Similarly, an anticyclical capital buffer is required to be available in order to ensure that banks accumulate a buffer during a period in which a specific region experiences economic growth while such buffer may fall to a lower level during an economic downturn in such region. The respective percentage is generally determined by the competent authority of the country in which the (credit) risk positions are located. Therefore, a bank's individual percentage is a combined rate, which takes into account the total volume of credit transactions in the various countries. As at 31 December 2018, the bank-specific anticyclical capital buffer requirements for Clearstream Banking S.A. stood at 0.12 per cent of risk-weighted assets. In addition, a buffer for systemically relevant institutions and a systemic risk buffer must be applied if required by the competent authority. As at 31 December 2018, the systemic risk buffer was not yet required in Luxembourg. However, according to Regulation CSSF No. 18-06, Clearstream Banking S.A. is required to apply a buffer for O-SIIs amounting to 0.375 per cent, which increased to 0.5 per cent, effective 1 January 2019.

The individual companies' capital resources sufficiently reflect the fluctuation in risk-weighted assets. Stress considerations are used to determine the capital required for expected peaks, and additional reserves for unexpected events are added. In addition, buffers are taken into account that cover the recovery indicators specified in the recovery plans and thus prevent recovery scenarios from being triggered even for peak own funds and capital requirements. The own funds and capital requirements determined in this way will be met on the basis of medium-term capital planning. As the actual own funds and capital requirements are below the expected peaks – significantly so under normal circumstances – this may lead to a very high total capital ratio or EMIR capital cover, especially at the closing date.

The own funds requirements of the Clearstream companies remained almost stable in the reporting period. However, changes occurred regarding own funds requirements for operational risks as well as credit and market risks, both at the single entity and Group levels. As of September 2016, the Clearstream Holding group has applied a different method, the AMA, for the calculation of operational risk own funds requirements. Since then, the calculation has been made using the so-called Direct VaR.

The Clearstream Holding group has already responded to the (expected) higher own funds requirements by launching a programme to strengthen its capital base; this programme continued in 2017. Further measures are planned for the coming years in the context of medium-term capital planning. In the year under review, the Clearstream Holding group's capital base was boosted by retaining profits at different companies.

In the medium to long term, the Clearstream Holding group expects moderately increasing own funds requirements at a regulatory group level for the following reasons:

- The successively increasing capital buffers under CRD IV
- The future applicability of own funds requirements based on the Central Securities Depositories Regulation (CSDR)
- The establishment of own funds requirements resulting from the introduction of minimum requirements for equity and eligible liabilities (MREL) as a result of Directive (EU) No 59/2014
- The implementation of the so-called CRR II package and other amendments under Basel III (presumably applicable not before the third quarter of 2019)

Eurex Clearing AG's own funds requirements increased compared with the previous year. Given the increase in revenue, own funds requirements for operational risk rose according to our model; own funds requirements for credit and market risk also increased markedly.

The own funds requirements calculated with Eurex Clearing AG's internal risk model are higher than the own funds requirements derived from the basic indicator approach, which follows regulatory stipulations and is based on the balance sheet. Hence, Eurex Clearing AG always applies additional capital buffers for such risks, surpassing regulatory minimum requirements. Against this background, banking supervisors requested in 2011 that Eurex Clearing AG increase the basis for the calculation of regulatory own funds requirements by considering an appropriate share of clearing-related fees received for the account of operating entities. The own funds requirements for operational risk are calculated once a year based on a three-year average of historical income, including the assumed clearing fees, and are therefore not subject to daily fluctuations. Compliance with the minimum regulatory ratio is maintained at all times due to the sufficient capital buffer for uncollateralised cash investments.

Eurex Clearing AG's capital requirements according to EMIR are currently significantly above CRD IV capital buffer requirements. For this reason, Eurex Clearing AG does not currently expect the CRD IV capital buffers to have any material impact on its capital requirements. Independently of this, the capital resources of Eurex Clearing AG are reviewed on an ongoing basis and monitored as part of medium-term capital planning. Eurex Clearing AG received contributions to its capital reserve in an amount of €100.0 million in 2017 and a further €50.0 million in 2018 from parent company Eurex Frankfurt AG. Further contributions are scheduled for the coming years, in order to continuously strengthen Eurex Clearing AG's capital base.

Composition of own funds requirements

	Own funds requirements for operational risk		Own funds requirements for credit and market risk		Total capital requirements	
	31 Dec 2018 €m	31 Dec 2017 €m	31 Dec 2018 €m	31 Dec 2017 €m	31 Dec 2018 €m	31 Dec 2017 €m
Clearstream Holding group	409.9	420.1	146.9	67.7	556.6	487.8
Clearstream Banking S.A.	312.5	306.2	93.5	49.9	406.0	356.1
Clearstream Banking AG	97.4	113.8	5.9	3.6	103.2	117.4
Eurex Clearing AG	75.2	70.9	26.1	3.9	101.3	74.8
European Commodity Clearing AG	19.4	8.1	3.7	1.6	23.1	9.7

Regulatory capital ratios[1]

	Own funds requirements		Regulatory equity		Total capital ratio	
	31 Dec 2018 €m	31 Dec 2017 €m	31 Dec 2018 €m	31 Dec 2017 €m	31 Dec 2018 %	31 Dec 2017 %
Clearstream Holding group	556.6	487.7	1,525.5	1,289.7	21.9	21.2
Clearstream Banking S.A.	406.0	356.1	1,112.0	1,061.3	21.9	23.8
Clearstream Banking AG	103.2	117.4	369.3	308.9	28.6	21.0
Eurex Clearing AG	101.3	74.8	514.8	464.8	40.6	49.7

1) Regulatory capital ratios according to Regulation (EU) No. 575/2013 (CRR)

The capital requirements under Article 16 of EMIR do not stipulate a specific ratio. Instead, the total amount of share capital, retained earnings and reserves, less certain items (including the central counterparty's own contribution to the default fund), is compared with the capital requirements. This total has to be at least equal to these requirements. In other words, EMIR requires a capital cover of at least 100 per cent. A reporting requirement to the competent authority – in this case BaFin – is triggered when this ratio falls below 110 per cent. €50.0 million of the €100.0 million contribution made to the capital reserve of Eurex Clearing AG was added to Eurex Clearing AG's own contribution to the default fund in 2017. In 2018, €50.0 million were added to the capital reserve of Eurex Clearing AG. Eurex Clearing AG's own contribution to the default fund remained unchanged.

The capital resources of European Commodity Clearing AG are currently well above the regulatory requirements. As at the reporting date, total equity as disclosed in the statement of financial position was not fully available to cover the risks according to Article 16 of EMIR, given that parts of this equity do not fulfil the required liquidity standards. Similar to the other companies, the capital base is consistently monitored. Given the increase in the regulatory minimum requirements for contributions to the default fund, European Commodity Clearing AG's default fund contribution was increased. As at 31 December 2018, European Commodity Clearing AG's total default fund contribution amounted to €11.5 million, and thus exceeded regulatory minimum requirements. A further increase in the contribution is planned for 2019. Depending on future business performance, and in particular on changes in the regulatory framework, the capital resources will be adjusted as needed; this is expected for the first half of 2019.

Capital adequacy requirements under EMIR

	Eurex Clearing AG		European Commodity Clearing AG	
	31 Dec 2018 €m	31 Dec 2017 €m	31 Dec 2018 €m	31 Dec 2017 €m
Own funds requirement for operational, credit and market risk	101.3	74.8	23.2	9.7
Other EMIR capital requirements	77.9	78.7	42.0	27.2
Total EMIR capital requirements under Article 16 of EMIR	**179.2**	**153.5**	**65.2**	**36.9**
Equity	514.8	464.8	108.9	88.9
EMIR deductions	0	0	–7.4	–8.3
Own contribution to default fund	–150.0	–150.0	–11.5	–10.0
EMIR capital adequacy ratio	**364.8**	**314.8**	**90.0**	**70.6**

In connection with the merger of Eurex Repo GmbH into Eurex Bonds GmbH and the subsequent name change of the latter to Eurex Repo GmbH as at 15 August 2018, the capital resources of Eurex Repo GmbH increased significantly and now markedly exceed regulatory requirements. Therefore, further contributions to capital are not expected to be required in the medium term.

Composition of own funds/capital requirements

	Own funds requirements for credit and market risk		Own funds requirements on the basis of fixed overheads		Own funds requirements to be met	
	31 Dec 2018 €m	31 Dec 2017 €m	31 Dec 2018 €m	31 Dec 2017 €m	31 Dec 2018 €m	31 Dec 2017 €m
Eurex Bonds GmbH[1)]	–	0.2	–	0.7	–	0.9
Eurex Repo GmbH	0.5	0.3	2.8	3.5	3.3	3.8
360 Treasury Systems AG	7.4	4.6	1.0	3.8	8.4	8.4

1) Eurex Bonds GmbH ceased its business operations as at 31 December 2017.

Compliance with own funds requirements

	Own funds requirements		Regulatory equity		Equity ratio	
	31 Dec 2018 €m	31 Dec 2017 €m	31 Dec 2018 €m	31 Dec 2017 €m	31 Dec 2018 %	31 Dec 2017 %
Eurex Bonds GmbH[1)]	–	0.9	–	10.4	–	1,200.0
Eurex Repo GmbH	3.3	3.8	18.0	7.0	545.5	184.2
360 Treasury Systems AG	8.4	8.4	28.8	28.5	342.9	339.3

1) Eurex Bonds GmbH ceased its business operations as at 31 December 2017.

According to Delegated Regulation (EU) No 150/2013, REGIS-TR S.A. is required to maintain equity in the amount of at least 50 per cent of annual operating costs.

According to the MAS, Cleartrade Exchange Pte. Limited is required to maintain own funds at the rate of either 18 per cent of annual operating revenue or 50 per cent of annual operating costs, depending on which is higher. Powernext SAS is obliged to maintain own funds in the amount of operating costs for the next six months. Regarding the anticipated upswing in the business development of Powernext SAS and Cleartrade Exchange Pte. Limited, own funds requirements for both entities are expected to increase slightly going forward. While the capital base of Powernext SAS is considered appropriate for the anticipated upswing, Cleartrade Exchange Pte. Limited's capital base will be adjusted, if required.

Compliance with own funds requirements

	Own funds requirements		Regulatory equity	
	31 Dec 2018 €m	31 Dec 2017 €m	31 Dec 2018 €m	31 Dec 2017 €m
REGIS-TR S.A.	5.2	3.9	9.9	6.4
Cleartrade Exchange Pte. Limited	0.9	0.7	1.6	1.2
Powernext SAS	9.3	9.7	33.5	33.5
Nodal Clear, LLC	5.9	3.6	26.4	26.0

The regulatory minimum requirements were complied with at all times by all companies during the reporting period and in the period up to the preparation of the consolidated financial statements.

16. Shareholders' equity and appropriation of net profit of Deutsche Börse AG

The annual financial statements of the parent company Deutsche Börse AG, prepared as at 31 December 2018 in accordance with the provisions of the Handelsgesetzbuch (HGB, the German Commercial Code), report net profit for the period of €532.2 million (2017: €615.7 million) and shareholders' equity of €2,526.5 million (2017: €2,800.9 million). In 2018, Deutsche Börse AG distributed €453.3 million (€2.45 per eligible share) from the unappropriated surplus of the previous year.

Net profit for the period 2018 is lower than last year.

Proposal on the appropriation of the unappropriated surplus

	31 Dec 2018 €m
Net profit for the period	532.2
Appropriation to other retained earnings in the annual financial statements	–17.2
Unappropriated surplus	**515.0**
Proposal by the Executive Board:	
Distribution of a regular dividend to the shareholders of €2.70 per share for 183,347,045 no-par value shares carrying dividend rights	495.0
Appropriation to retained earnings	20.0

No-par value shares carrying dividend rights

	Number
Number of shares issued as at 31 December 2017	**193,000,000**
Shares retired in November 2018	–3,000,000
Number of shares issued as at 31 December 2018	**190,000,000**
Number of treasury shares as at the reporting date	–6,652,955
Number of shares outstanding as at 31 December 2018	**183,347,045**

The proposal on the appropriation of the unappropriated surplus reflects treasury shares held directly or indirectly by the company that do not carry dividend rights under section 71b of the Aktiengesetz (AktG, the German Stock Corporation Act). The number of shares carrying dividend rights can change until the Annual General Meeting through the repurchase or sale of further treasury shares. In this case, with a dividend of €2.70 per eligible share, an amended resolution for the appropriation of the unappropriated surplus will be proposed to the Annual General Meeting.

17. Provisions for pensions and other employee benefits

Defined benefit pension plans

The defined benefit obligations of the companies of Deutsche Börse Group relate primarily to final salary arrangements and pension plans based on capital components, which guarantee employees a choice of either lifelong pensions or capital payments on the basis of the final salary paid. In Switzerland, there are guaranteed defined contribution plans. Deutsche Börse Group uses external trust solutions to cover some of its pension obligations.

Net liability of defined benefit obligations

	Germany €m	Luxembourg €m	Other €m	Total 31 Dec 2018 €m	Total 31 Dec 2017 €m
Present value of defined benefit obligations that are at least partially funded	441.1	72.3	18.5	531.9	503.3
Fair value of plan assets	–308.1	–47.1	–16.9	–372.1	–363.4
Funded status	**133.0**	**25.2**	**1.6**	**159.8**	**139.9**
Present value of unfunded obligations	3.6	0.6	0.1	4.3	4.3
Net liability of defined benefit obligations	**136.6**	**25.8**	**1.7**	**164.1**	**144.2**
Impact of minimum funding requirement/ asset ceiling	0	0	0	0	0
Amount recognised in the balance sheet	**136.6**	**25.8**	**1.7**	**164.1**	**144.2**

The defined benefit plans comprise a total of 2,768 beneficiaries (2017: 2,744). The present value of defined benefit obligations can be allocated to the beneficiaries as follows:

Allocation of the present value of the defined benefit obligation to the beneficiaries

	Germany €m	Luxembourg €m	Other €m	Total 31 Dec 2018 €m	Total 31 Dec 2017 €m
Eligible current employees	206.0	70.6	18.3	294.9	271.7
Former employees with vested entitlements	147.9	1.6	0.3	149.8	141.2
Pensioners or surviving dependants	90.8	0.7	0	91.5	94.7
	444.7	**72.9**	**18.6**	**536.2**	**507.6**

Essentially, the retirement benefits encompass the following retirement benefit plans:

Executive boards of Group companies (Germany and Luxembourg)
Individual commitment plans exist for executive board members of certain Group companies; they are based on the plan for executives described in the second paragraph below, i.e. in each calendar year the company provides an annual contribution to a capital component calculated in accordance with actuarial principles. The benefit assets equal the total of the acquired capital components of the individual years and are converted into a lifelong pension once the benefits fall due. In addition, retirement benefit agreements are in place with members of the executive boards of Group companies, under which they are entitled to pension benefits upon reaching the age of 63 and following reappointment. When the term of office began, the replacement rate was 30 per cent of individual pensionable income. It rose by 5 percentage points with each reappointment, up to a maximum of 50 per cent of pensionable income. Details of the pension commitments for members of Deutsche Börse AG's Executive Board can be found in the remuneration report.

Germany
There has been an employee-funded deferred compensation plan for employees of certain Deutsche Börse Group companies in Germany since 1 July 1999. This plan gives employees the opportunity to convert parts of their future remuneration entitlements into benefit assets of equal value. The benefits consist of a capital payment upon reaching the age of 65 or earlier, if applicable, in the case of disability or death; when due, the payment is made in equal annual payments over a period of three years. The benefit assets earn interest at a rate of 6 per cent p.a. As a rule, new commitments are entered into on the basis of this deferred compensation plan; employees with pension commitments under retirement benefit arrangements in force before 1 July 1999 were given an option to participate in the deferred compensation plan by converting their existing pension rights.

In the period from 1 January 2004 to 30 June 2006, executives in Germany were offered the opportunity to participate in the following pension system based on capital components: the benefit is based on annual income received, composed of fixed annual salary and the variable remuneration. Every year, participating Group companies provide for an amount that corresponds to a certain percentage of the pensionable income. This amount is multiplied by a capitalisation factor depending on age, resulting in the "annual capital component". The benefit assets equal the total of the acquired capital components of the individual years and are converted into a lifelong pension once the benefits fall due. This benefit plan was closed to new staff on 30 June 2006; the executives who were employed in the above period can continue to earn capital components.

As part of adjustments to the remuneration systems to bring them into line with supervisory requirements contracts were adjusted for some executives in prior years. For senior executives affected, whose contracts only provided for the inclusion of income received and variable remuneration over and above the upper limit of the contribution assessment (Beitragsbemessungsgrenze) of the statutory pension insurance provisions as pensionable income to date, pensionable income was fixed on the basis of annual income received in 2016. This income is adjusted on an annual basis, to reflect the increase in the cost of living, based on the consumer price index for Germany published by the German Federal Statistical Office. For executives affected, whose capital components were calculated on the basis of income received, without observing the upper limit of the contribution assessment, an amount has been determined that will be reviewed annually, and adjusted if necessary, by the Supervisory Board, taking any changes in circumstances in terms of income and purchasing power into account.

Luxembourg

The Clearstream subgroup, based in Luxembourg, operates separate defined benefit plans. The only defined benefit pension plan still in operation to the benefit of Luxembourg employees of Clearstream International S.A., Clearstream Banking S.A. and Clearstream Services S.A. is funded by means of cash contributions to an “association d'épargne pension” (ASSEP) organised in accordance with Luxembourg law. The benefits consist of a one-off capital payment, which is generally paid upon reaching the age of 65. The benefit plan does not cover disability or death in service. Contributions to the ASSEP are funded in full by the participating companies. The contributions are determined annually on the basis of actuarial opinions, and the amount of the obligation is calculated in accordance with Luxembourg law.

For other employees, a group plan has been entered into with Swiss Life (Luxembourg) S.A., which covers pensions as well as disability and death. The contributions are paid annually by the employer. Benefits depend on the length of employment at the Group company and consist of quarterly payments starting upon the employee reaching the age of 65. In the case of disability or death, differing provisions apply. The contributions are determined annually on the basis of actuarial reports.

Switzerland

A separate pension plan (basic pension plan) and a supplementary benefits plan (bonus plan) exist for employees in Switzerland; both plans are based on insurance policies and, in addition to retirement benefits, comprise disability benefits and dependants' pensions. The contributions to the basic pension plan are paid by the employee and the employer based on progressive percentages of the insured wage (annual wage less coordination deduction). For the bonus plan, which is also funded by contributions from the employer and employees, the contributions are determined as a percentage of the bonus. The retirement age is 65 for men and 64 for women. The beneficiaries can choose between pension payments or a one-off payment.

The present value of defined benefit obligations can be reconciled as follows with the provisions reported in the consolidated balance sheet:

Changes in net defined benefit obligations

	Present value of obligations €m	Fair value of plan assets €m	Total €m
Balance as at 1 Jan 2017	**492.6**	**–324.7**	**167.9**
Current service cost	26.9	–	26.9
Interest expense/(income)	8.3	–5.5	2.8
	35.2	**–5.5**	**29.7**
Remeasurements			
Return on plan assets, excluding amounts already recognised in interest income	–	–24.3	–24.3
Losses from changes in financial assumptions	–1.0	–	–1.0
Experience gains	–5.1	–	–5.1
Effect of exchange rate differences	–0.1	–0.1	–0.2
	–6.2	**–24.4**	**–30.6**[1]
Effect of exchange rate differences	–1.4	1.3	–0.1
Contributions:			
Employers	–	–23.4	–23.4
Plan participants	0.8	–0.8	0
Benefit payments	–13.2	13.2	0
Settlements	0.6	–0.5	0.1
Tax and administration costs	–0.8	1.4	0.6
Balance as at 31 Dec 2017	**507.6**	**–363.4**	**144.2**
Current service cost	27.4	–	27.4
Interest expense/(income)	8.9	–6.5	2.4
Past service cost and gains and losses on settlements	2.7	–	2.7
	39.0	**–6.5**	**32.5**
Remeasurements			
Losses on plan assets, excluding amounts already recognised in interest income	–	22.9	22.9
Return from changes in demographic assumptions	–0.5	–	–0.5
Losses from changes in financial assumptions	3.7	–	3.7
Experience gains	–2.3	–	–2.3
Effect of exchange rate differences	–	–	0
	0.9	**22.9**	**23.8**[1]
Effect of exchange rate differences	0.5	–0.2	0.3
Contributions:			
Employers	–	–37.3	–37.3
Plan participants	0.6	–0.6	0
Benefit payments	–11.6	11.6	0
Settlements	–	–	0
Tax and administration costs	–0.8	1.4	0.6
Balance as at 31 Dec 2018	**536.2**	**–372.1**	**164.1**

1) Thereof €–0.1 million (2017: nil) in the offsetting item for non-controlling interests

In financial year 2018, employees converted a total of €6.9 million (2017: €6.4 million) of their variable remuneration into deferred compensation benefits.

Assumptions

Provisions for pension plans and other employee benefits are measured annually at the reporting date using actuarial techniques. The assumptions for determining the actuarial obligations for the pension plans differ according to the individual conditions in the countries concerned and are shown in the following table:

Actuarial assumptions

	31 Dec 2018			31 Dec 2017		
	Germany %	Luxembourg %	Switzerland %	Germany %	Luxembourg %	Switzerland %
Discount rate	1.75	1.75	1.00	1.80	1.80	0.70
Salary growth	3.50	3.30	1.00	3.50	3.30	1.00
Pension growth	2.00	1.80	0	2.00	1.80	0
Staff turnover rate	2.00[1]	2.00[1]	n.a.[2]	2.00[1]	2.00[1]	n.a.[2]

1) Up to the age of 50, afterwards 0 per cent
2) Staff turnover rate in accordance with the Bundesgesetz über die berufliche Alters-, Hinterlassenen- und Invalidenvorsorge (BVG, Swiss Federal Occupational Retirement, Survivors' and Disability Pension Plans Act)

In Germany, the "2018 G" mortality tables (generation tables) developed by Prof Klaus Heubeck are used. For Luxembourg, generation tables of the Institut national de la statistique et des études économiques du Grand-Duché du Luxembourg are used. For Switzerland, the BVG 2015 generation tables are used.

Sensitivity analysis

The sensitivity analysis presented in the following considers the change in one assumption at a time, leaving the other assumptions unchanged from the original calculation, i.e. possible correlation effects between the individual assumptions are not taken into account.

Sensitivity analysis of defined benefit obligation

	Change in actuarial assumption	Effect on defined benefit obligation		Effect on defined benefit obligation	
		31 Dec 2018 defined benefit obligation €m	Change %	31 Dec 2017 defined benefit obligation €m	Change %
Present value of the obligation[1]		536.2	–	507.6	–
Discount rate	Increase by 1.0 percentage point	460.2	–14.2	433.3	–14.6
	Increase by 0.5 percentage points	496.3	–7.4	468.6	–7.7
	Reduction by 0.5 percentage points	582.7	8.7	552.4	8.8
	Reduction by 1.0 percentage point	634.2	18.3	602.3	18.7
Salary growth	Increase by 0.5 percentage points	549.9	2.6	520.2	2.5
	Reduction by 0.5 percentage points	529.1	–1.3	497.3	–2.0
Pension growth	Increase by 0.5 percentage points	549.3	2.4	520.0	2.4
	Increase by 0.25 percentage points	542.9	1.2	513.6	1.2
	Reduction by 0.25 percentage points	531.7	–0.8	502.1	–1.1
	Reduction by 0.5 percentage points	525.6	–2.0	496.2	–2.2
Life expectancy	Increase by one year	537.6	0.3	521.1	2.7
	Reduction by one year	536.0	0	494.0	–2.7

1) Present value of the obligations using assumptions in accordance with the "Actuarial assumptions" table

Composition of plan assets

Germany

In Germany, plan assets are held by a trustee in safekeeping for individual companies of Deutsche Börse Group and the beneficiaries. At the company's instruction, the trustee uses the funds transferred to acquire securities, without any consulting by the trustee. The contributions are invested in accordance with an investment policy, which may be amended by the companies represented in the investment committee. The trustee may refuse to carry out instructions if they are in conflict with the fund's allocation rules or the payment provisions. In accordance with the investment policy, a value preservation mechanism is applied; investments can be made in different asset classes.

Luxembourg

In Luxembourg, the Board of Directors of the Clearstream Pension Fund is responsible for determining the investment strategy, with the aim of maximising returns in relation to a benchmark. This benchmark is 75 per cent derived from the return on five-year German federal government bonds and 25 per cent from the return on the EURO STOXX 50 Index. According to the investment policy, the fund may only invest in fixed-income and variable-rate securities, as well as listed investment fund units; it may hold cash, including in the form of money market funds.

Switzerland

The assets of the pension funds of the affected companies have been invested with AXA Stiftung Berufliche Vorsorge and are therefore reported under “qualifying insurance policies”.

Composition of plan assets

	31 Dec 2018		31 Dec 2017	
	€m	%	€m	%
Bonds	**299.8**	**80.5**	**258.2**	**71.0**
Government bonds	217.3		197.3	
Multilateral development banks	0		0	
Corporate bonds	82.5		60.9	
Derivatives	**2.5**	**0.7**	**1.7**	**0.5**
Equity index futures	–0.3		–0.3	
Interest rate futures	2.8		2.0	
Investment funds	**20.7**	**5.6**	**19.5**	**5.4**
Total listed	**323.0**	**86.8**	**279.4**	**76.9**
Qualifying insurance policies	16.9	4.5	14.9	4.1
Cash	32.2	8.7	69.1	19.0
Total unlisted	**49.1**	**13.2**	**84.0**	**23.1**
Total plan assets	**372.1**	**100.0**	**363.4**	**100.0**

As at 31 December 2018, plan assets did not include any financial instruments held by Deutsche Börse Group (2017: nil), nor did they include any property occupied or other assets used by Group companies.

Risks

In addition to the general actuarial risks, the risks associated with the defined benefit obligations relate especially to financial risks in connection with the plan assets, including in particular counterparty credit and market risks.

Market risk

The return on plan assets is assumed to be the discount rate determined on the basis of corporate bonds with an AA rating. If the actual rate of return on plan assets is lower than the discount rate used, the net defined benefit liability increases accordingly. If volatility is low, the actual return is further expected to exceed the return on corporate bonds with a good rating in the medium to long term.

The level of the net liability is influenced by the discount rates in particular, whereby the current low interest rates contribute to a relatively high net liability. A continued decline in returns on corporate bonds will lead to a further increase in defined benefit obligations, which can be only partially offset by the positive development of the fair values of the assets included in plan assets.

Deutsche Börse Group considers the share price risk resulting from derivative positions in equity index futures in the plan assets to be appropriate. The company bases its assessment on the expectation that the overall volume of payments from the pension plans will be manageable in the next few years, that the total amount of the obligations will also be manageable and that it will be able to meet these payments in full from operating cash flows. Any amendments to the investment policy take into account the duration of the pension obligation as well as the expected payments over a period of ten years.

Inflation risk

Possible inflation risks that could lead to an increase in defined benefit obligations exist because some pension plans are final salary plans or the annual capital components are directly related to salaries, i.e. a significant increase in salaries would lead to an increase in the benefit obligation from these plans. In Germany, however, there are no contractual arrangements with regard to inflation risk for these pension plans. An interest rate of 6 per cent p.a. has been agreed for the employee-financed deferred compensation plan; the plan does not include any arrangements for inflation, so that it has to be assumed that there will be little incentive for employees to contribute to the deferred compensation plan in times of rising inflation.

In Luxembourg, salaries are adjusted for the effects of inflation on the basis of a consumer price index no more than once a year; this adjustment leads to a corresponding increase in the benefit obligation from the pension plan. Since the obligation will be met in the form of a capital payment, there will be no inflation-linked effects once the beneficiary reaches retirement age.

In Switzerland, the benefit plan at AXA Stiftung Berufliche Vorsorge includes the provision that the board of this foundation decides annually whether the retirement pensions will be adjusted to reflect price trends. The decision takes into account, in particular, the financial capability of the foundation. There are no arrangements for automatic adjustments to price increases over and above the legal requirements that apply to certain surviving dependants' and disability pensions.

Duration and expected maturities of the pension obligations

The weighted duration of the pension obligations was 16.1 years (2017: 16.6 years) as at 31 December 2018.

Expected maturities of undiscounted pension payments

	Expected pension payments[1] 31 Dec 2018 €m	Expected pension payments[1] 31 Dec 2017 €m
Less than 1 year	19.6	17.7
Between 1 and 2 years	14.5	15.1
Between 2 and 5 years	42.8	40.7
More than 5 years up to 10 years	112.4	99.8
Total	**189.3**	**173.3**

1) The expected payments in Swiss francs were translated into euros at the relevant closing rate on 31 December.

The expected costs of defined benefit plans amount to approximately €16.5 million for the 2019 financial year, including net interest expense.

Defined contribution pension plans and multi-employer plans

During the reporting period, the costs associated with defined contribution plans, and designated multi-employer plans, amounted to €39.6 million (2017: €36.7 million).

In 2019, Deutsche Börse Group expects to make contributions to multi-employer plans amounting to around €10.2 million.

18. Changes in other provisions

Changes in other provisions (part 1)

	Restructuring and efficiency measures €m	Bonuses €m	Interest on taxes €m	Share-based payments €m	Recourse and litigation risks €m
Balance as at 1 Jan 2018	**57.3**	**100.8**	**66.4**	**42.1**	**3.7**
Reclassification[1]	0	–9.2	0.3	–1.0	0
Utilisation	–17.0	–75.3	–3.3	–6.4	–2.0
Reversal	–4.3	–11.8	0	–1.2	–0.3
Additions	111.9	114.8	16.2	36.6	11.2
Currency translation	0	0.1	0	0	0
Interest	0.6	0	0	0	0
Balance as at 31 Dec 2018	**148.5**	**119.4**	**79.6**	**70.1**	**12.6**

1) Relates primarily to reclassifications to the employee-funded deferred compensation plan (see note 17) as well as to reclassifications from liabilities

Changes in other provisions (part 2)

	Pension obligations to IHK[1] €m	Operational claims €m	Other personnel provisions €m	Miscellaneous €m	Total (part 1 and part 2) €m
Balance as at 1 Jan 2018	**9.2**	**5.1**	**14.8**	**12.5**	**311.9**
Reclassification[2]	0	0	3.1	0.1	– 6.7
Utilisation	0	– 0.5	– 8.0	– 0.3	– 112.8
Reversal	– 1.1	– 2.7	– 3.4	– 1.0	– 25.8
Additions	0	1.0	8.7	9.6	310.0
Currency translation	0	0	0	0	0.1
Interest	0.2	0	0	0	0.8
Balance as at 31 Dec 2018	**8.3**	**2.9**	**15.2**	**20.9**	**477.5**

1) IHK = Industrie- und Handelskammer Frankfurt am Main (the Frankfurt/Main Chamber of Industry and Commerce)
2) Relates primarily to reclassifications to the employee-funded deferred compensation plan (see note 17) as well as to reclassifications from liabilities

Provisions for restructuring and efficiency measures include provisions for contractually agreed early retirement benefits and severance payments (€88.1 million) as well as expenses directly related to restructuring measures (€1.4 million). Furthermore, this item includes provisions amounting to €59.0 million for the implementation of the restructuring plan. A total of €108.3 million of the additions to the provisions relate to the programme resolved in 2018 to reduce structural costs (Structural Performance Improvement Programme, SPIP).

The “other personnel provisions” item as at 31 December 2018 includes, inter alia, personnel-related provisions of €5.9 million (2017: €5.8 million) for work anniversaries, and of €9.0 million (2017: €8.5 million) for other personnel costs.

The “miscellaneous” item includes, inter alia, provisions for anticipated losses of €10.7 million (2017: €7.3 million) and provisions for rent and service costs of €2.0 million (2017: €1.3 million).

For details on share-based payments, see note 28.

19. Other non-current provisions

Other non-current provisions have more than one year to maturity.

Composition of other non-current provisions

	31 Dec 2018 €m	31 Dec 2017 €m
Restructuring and efficiency measures	84.5	52.4
Share-based payments	64.5	36.1
Anticipated losses	9.8	5.0
Pension obligations to IHK[1]	8.3	9.2
Bonuses	7.1	10.0
Other non-current personnel provisions	6.2	6.2
Miscellaneous	3.9	1.4
Total	**184.3**	**120.3**
thereof with remaining maturity of between 1 and 5 years	165.6	96.8
thereof with remaining maturity of more than 5 years	18.7	23.5

1) IHK = Industrie- und Handelskammer Frankfurt am Main (the Frankfurt/Main Chamber of Industry and Commerce)

20. Other current provisions

Composition of other current provisions

	31 Dec 2018 €m	31 Dec 2017 €m
Bonuses	112.3	90.8
Interest on taxes[1)]	79.6	66.4
Restructuring and efficiency measures	64.0	4.9
Recourse and litigation risks	12.6	3.7
Other current personnel provisions	9.0	8.5
Share-based payments	5.6	6.0
Operational claims	2.9	5.1
Miscellaneous	7.2	6.2
Total	**293.2**	**191.6**

1) Provisions for interest on taxes amounting to €10.8 million (2017: nil) have an estimated remaining maturity of more than one year.

21. Other liabilities

Deutsche Börse Group reports the following contract liabilities resulting from contracts with customers:

Contract liabilities

	31 Dec 2018 €m	31 Dec 2017 €m
Contract liabilities (long-term)	10.0	0
Contract liabilities (short-term)	5.4	5.9
Total	**15.4**	**5.9**

The adjustment effects resulting from the change in the accounting method as at 1 January 2018 amount to €10.7 million for contract liabilities (long-term); for details, please see note 3.

Current liabilities are composed as follows:

Composition of other current liabilities

	31 Dec 2018 €m	31 Dec 2017 €m
Liabilities from CCP positions	543.9	364.4
Tax liabilities (excluding income taxes)	36.4	37.7
Vacation entitlements, flexitime and overtime credits	24.5	21.7
Social security liabilities	6.8	7.6
Deferred income	0.4	0.6
Contract liabilities	5.4	5.9
Special payments and bonuses	2.8	2.8
Liabilities to supervisory bodies	2.7	2.6
Miscellaneous	5.9	11.7
Total	**628.8**	**455.0**

Other disclosures

22. Consolidated cash flow statement disclosures

Cash flows from operating activities

After adjustments to net profit for the period for non-cash items, cash flows from operating activities excluding CCP positions amounted to €1,176.5 million (2017: €1,107.2 million). After adjustment for the change in CCP positions cash flow from operating activities amounted to €1,298.2 million (2017: €1,056.2 million). For details on the adjustments see the “Financial position” section of the combined management report.

Deutsche Börse Group discloses incoming dividend payments (€6.7 million; 2017: €8.6 million) and income tax payments (€303.3 million; 2017: €308.8 million) within cash flows from operating activities. Interest payments are generally included in cash flows from operating activities unless they result from banking business. In the reporting period, interest paid amounting to €218.0 million (2017: €213.9 million) and interest received amounting to €203.6 million (2017: €192.6 million) are disclosed in cash flows from operating activities.

Other non-cash effects consist (consisted) of the following items:

Composition of other non-cash income

	2018 €m	2017 €m
Subsequent measurement of non-derivative financial instruments	–30.5	89.4
Reversal of discount and transaction costs from long-term financing	2.9	3.4
Reversal of the revaluation surplus for cash flow hedges	0.7	2.8
Equity method measurement	1.0	1.0
Impairment of financial instruments	0.9	0
Subsequent measurement of derivatives	0.8	–8.0
Changes in contract liabilities	–1.2	0
Gains on the disposal of subsidiaries and equity investments	0	–191.0
Miscellaneous	4.1	6.0
Total	**–21.3**	**–96.4**

Cash flows from investing activities

Cash flows from investing activities amounted to €792.0 million (2017: €181.9 million). In the 2018 financial year, it reflected in particular cash inflows from banking business. Changes in receivables and liabilities which relate to the banking business of the Clearstream subgroup and which have an original maturity of more than three months are disclosed within cash flows from investing activities. Receivables from banking business decreased by €655.1 million (2017: increase in receivables amounting to €47.7 million) while the respective liabilities increased by €250.3 million (2017: nil).

In addition, cash flows from investing activities reflected the acquisition of Swisscanto Funds Centre Ltd., London, United Kingdom, (renamed Clearstream Funds Centre Ltd.), as well as the acquisition of the significant assets and liabilities of the GTX Electronic Communication business (GTX ECN) as part of a business combination. As part of the acquisition of the shares in Swisscanto Funds Centre Ltd. effective 1 October 2018, outflows cash and cash equivalents amounting to €83.3 million (after deduction of cash and cash equivalents acquired amounting to €9.4 million) were recorded. The acquisition of the GTX ECN business on 29 June 2018 resulted in an outflow of cash and cash equivalents amounting to €85.9 million.

Investments in intangible assets and property, plant and equipment amounted to €160.0 million (2017: €149.2 million). Among the investments in intangible assets and property, plant and equipment, the measures undertaken under the strategic growth initiatives and infrastructure projects are classified as expansion investments, while all remaining investments are reported as replacement investments. The investments in intangible assets and property, plant and equipment are broken down by segment as follows:

Payment to acquire intangible assets and property, plant and equipment

	2018 €m	2017 (restated)[1)] €m
Expansion investments		
Eurex (financial derivatives)	20.4	17.8
EEX (commodities)	8.8	3.4
360T (foreign exchange)	3.0	0
Xetra (cash equities)	2.7	3.9
Clearstream (post-trading)	35.8	41.0
IFS (investment fund services)	4.4	0.5
GSF (collateral management)	1.0	2.6
STOXX (index business)	0	0
Data	3.8	10.5
	79.9	**79.7**
Replacement investments		
Eurex (financial derivatives)	14.4	10.9
EEX (commodities)	12.4	10.8
360T (foreign exchange)	1.3	3.3
Xetra (cash equities)	6.1	2.8
Clearstream (post-trading)	22.0	19.2
IFS (investment fund services)	11.8	5.3
GSF (collateral management)	2.6	2.7
STOXX (index business)	3.4	1.6
Data	6.1	12.9
	80.1	**69.5**
Total investments according to segment reporting	**160.0**	**149.2**

1) Prior-year figures were restated due to changes in the segment structure. For details, see note 24.

Investments in long-term financial instruments totalling €38.7 million (2017: €312.4 million) included €22.2 million (2017: €292.9 million) for the purchase of floating-rate notes in the banking business. In addition, equity investments were acquired in a total amount of €13.4 million (2017: €14.5 million).

Non-current debt instruments and equity instruments totalling €259.5 million (2017: €859.1 million) matured or were sold in the 2018 financial year. The disposal of shares in BATS Global Markets, Inc., as well as of an additional equity investment, resulted in cash inflows amounting to a total of €274.7 million in the 2017 financial year.

Cash flows from financing activities

Cash outflows from financing activities totalled €832.9 million (2017: €501.0 million).

Deutsche Börse AG paid dividends totalling €453.3 million for the 2017 financial year (dividend for the 2016 financial year: €439.0 million).

In addition, cash flows from financing activities included the acquisition of treasury shares as part of the share repurchase programme (€364.2 million; 2017: 28.2 million) as well as payments to non-controlling shareholders (€-14.9 million; 2017: €39.3 million).

In the 2018 financial year, a bond issued by Deutsche Börse AG and amounting to €600.0 million matured. Deutsche Börse AG has issued a ten-year Eurobond in the same amount.

Reconciliation of cash and cash equivalents

Reconciliation of cash and cash equivalents

	31 Dec 2018 €m	31 Dec 2017 (restated) €m
Restricted bank balances	29,833.6	29,392.0
Other cash and bank balances	1,322.3	1,297.6
Net position of financial instruments held by central counterparties	212.0	712.1
Current financial instruments measured at amortised cost	19,722.6	13,172.6
less financial instruments with an original maturity exceeding 3 months	–2,666.6	–1,507.1
Current financial liabilities measured at amortised cost	–19,024.7	–13,976.2
less financial instruments with an original maturity exceeding 3 months	1,999.0	733.5
Derivatives	0	–29.0
Current liabilities from cash deposits by market participants	–29,559.2	–29,215.3
Cash and cash equivalents	**1,839.0**	**580.2**

23. Earnings per share

Under IAS 33, earnings per share are calculated by dividing the net profit for the period attributable to Deutsche Börse AG shareholders (net income) by the weighted average number of shares outstanding.

In order to determine diluted earnings per share, potentially dilutive ordinary shares that may be acquired under the share-based payment programmes (see also note 28) were added to the average number of shares. In order to calculate the number of potentially dilutive ordinary shares, the exercise prices were adjusted for the fair value of the services still to be provided.

In order to determine diluted earnings per share, the 2014 Long-term Sustainable Instrument (LSI) tranche, for which cash settlement has not been resolved, is assumed to be settled with equity instruments – regardless of actual accounting in accordance with IFRS 2. The following potentially dilutive rights to purchase shares were outstanding as at 31 December 2018:

Calculation of the number of potentially dilutive ordinary shares

Tranche	Exercise price €	Adjustment of the exercise price according to IAS 33 €	Average number of outstanding options 31 Dec 2018	Average price for the period[1] €	Number of potentially dilutive ordinary shares 31 Dec 2018
2014[2]	0	0	7,605	111.50	7,605
Total					**7,605**

1) Volume-weighted average price of Deutsche Börse AG shares on Xetra calculated on a daily basis for the period 1 January to 31 December 2018
2) This relates to share subscription rights within the scope of the Long-term Sustainability Instrument (LSI) for senior executives. The quantity of subscription rights under the 2014 LSI tranche may still change from the quantity reported as at the reporting date, since subscription rights will only be granted in future financial years.

As the volume-weighted average share price calculated on a daily basis was higher than the adjusted exercise price for the 2014 tranche, these stock options are considered to be dilutive under IAS 33 as at 31 December 2018.

Calculation of earnings per share (basic and diluted)

	2018	2017
Number of shares outstanding as at beginning of period	186,610,158	186,805,015
Number of shares outstanding as at end of period	183,347,045	186,610,158
Weighted average number of shares outstanding	184,887,281	186,835,673
Number of potentially dilutive ordinary shares	7,605	17,366
Weighted average number of shares used to compute diluted earnings per share	184,894,886	186,853,039
Net profit for the period attributable to Deutsche Börse AG shareholders (€m)	824.3	874.3
Earnings per share (basic) (€)	4.46	4.68
Earnings per share (diluted) (€)	4.46	4.68

As in the previous year, there were no subscription rights in 2018 that were excluded from the calculation of the weighted average of potentially dilutive shares for having a dilutive effect during the reporting year ending on the reporting date.

24. Segment reporting

Segment reporting is governed by the internal organisational and reporting structure. Since 1 January 2018, Deutsche Börse Group has divided its business activities into nine segments:

- The former Eurex segment was divided into three segments: Eurex (financial derivatives), EEX (commodities) and 360T (foreign exchange).
- The former Clearstream segment was divided into three segments: Clearstream (post-trading), IFS (investment fund services) and GSF (collateral management).
- The former Market Data + Services (MD+S) segment was separated into STOXX (index business) and Data. Revenues from the Infrastructure Services division, the third pillar of the former MD+S segment, have been allocated to the Eurex and Xetra segments.
- The Group continues to report on business developments in the cash market within the Xetra (cash equities) segment.

This structure serves as a basis for the Group’s internal management and financial reporting (see the table entitled “Internal organisational and reporting structure” for details). This more detailed segment reporting further enhances transparency, highlighting growth areas. Recognising the growing importance of some business lines, these have been shown as independent reporting segments as of the 2018 financial year. Hence, the Group also reports these business lines’ cost base and EBITDA on the segment level.

Internal organisational and reporting structure

Segment	Business areas
Eurex (financial derivatives)	▪ Electronic trading of European derivatives (Eurex Exchange) ▪ Eurex Repo over-the-counter (OTC) trading platform ▪ Electronic clearing architecture C7 ▪ Central counterparty for on- and off-exchange derivatives and repo transactions
EEX (commodities)	▪ Electronic trading of power and gas products as well as emissions certificates (EEX group) ▪ Central counterparty for traded spot and derivatives products
360T (foreign exchange)	▪ Electronic trading of foreign exchange (360T) ▪ Central counterparty for on-and off-exchange traded derivatives
Xetra (cash equities)	▪ Cash market with the Xetra, Börse Frankfurt and Tradegate trading venues ▪ Central counterparty for equities and bonds ▪ Admission of securities (listing)
Clearstream (post-trading)	▪ Custody and settlement services for domestic and international securities
IFS (investment fund services)	▪ Investment funds and hedge funds services (order routing, settlement and custody)
GSF (collateral management)	▪ Global securities financing services and collateral management, repos and securities lending
STOXX (index business)	▪ Development and sales of indices (STOXX and DAX)
Data	▪ Distribution of licences for trading and market signals ▪ Technology and reporting solutions for external customers ▪ Trading participant connectivity

Segment reporting (part 1)

	Net revenue		Operating costs		EBITDA	
	2018 €m	2017 (restated) €m	2018 €m	2017 €m	2018 €m	2017 €m
Eurex (financial derivatives)	936.1	796.5	–376.3	–326.4	559.4	663.0
EEX (commodities)	256.6	212.2	–149.2	–124.0	107.2	88.2
360T (foreign exchange)	78.8	66.5	–49.9	–46.5	28.9	20.0
Xetra (cash equities)	228.7	218.3	–118.8	–108.4	115.5	115.1
Clearstream (post-trading)	727.3	667.7	–351.9	–294.6	375.2	373.1
IFS (investment fund services)	154.3	137.6	–108.3	–85.7	46.0	51.7
GSF (collateral management)	83.1	81.6	–48.4	–38.7	34.2	42.9
STOXX (index business)	144.5	127.7	–53.9	–47.7	90.6	79.9
Data	170.3	154.2	–83.5	–59.6	86.7	94.6
Group	**2,779.7**	**2,462.3**	**–1,340.2**	**–1,131.6**	**1,443.7**	**1,528.5**

Segment reporting (part 2)

	Depreciation		EBIT		Investments[1]		Employees (as at 31 Dec)	
	2018 €m	2017 €m	2018 €m	2017 €m	2018 €m	2017 €m	2018	2017
Eurex (financial derivatives)	–48.4	–53.3	511.0	609.7	34.8	28.8	1,265	1,223
EEX (commodities)	–26.5	–21.2	80.7	67.0	21.2	14.2	725	628
360T (foreign exchange)	–15.8	–14.0	13.1	6.0	4.3	3.3	253	231
Xetra (cash equities)	–11.3	–9.1	104.2	106.0	8.8	6.7	488	497
Clearstream (post-trading)	–50.0	–36.4	325.2	336.7	57.8	60.2	1,767	1,741
IFS (investment fund services)	–19.5	–12.4	26.5	39.3	16.2	5.8	752	675
GSF (collateral management)	–11.5	–4.8	22.7	38.1	3.6	5.3	242	230
STOXX (index business)	–5.7	–4.9	84.9	75.0	3.4	1.6	197	172
Data	–21.8	–3.8	64.9	90.8	9.9	23.3	275	243
Group	**–210.5**	**–159.9**	**1,233.2**	**1,368.6**	**160.0**	**149.2**	**5,964**	**5,640**

1) Excluding goodwill

Sales revenue is presented separately by external sales revenue and internal (inter-segment) sales revenue. Inter-segment services are charged on the basis of measured quantities or at fixed prices, e.g. the provision of data by the Eurex (financial derivatives) segment to the Data segment.

Non-cash valuation allowances and bad debt losses resulted from the following segments:

Breakdown of non-cash valuation allowances and bad debt losses

	2018 €m	2017 €m
Eurex (financial derivatives)	0.2	0.1
EEX (commodities)	0	0
360T (foreign exchange)	0.5	0.3
Xetra (cash equities)	1.4	0.5
Clearstream (post-trading)	–0.3	0.4
IFS (investment fund services)	0	0
GSF (collateral management)	0.1	0
STOXX (index business)	1.2	–0.1
Data	0.1	0
Total	**3.2**	**1.2**

In the year under review, there was an extraordinary impairment loss of €0.6 million in strategic investments (2017: €1.1 million, see note 8). An additional extraordinary impairment loss totalled €36.7 million (2017: €1.3 million, see note 11 and note 12). Of this amount, €7.2 million related to the Clearstream segment (for Future Market Access and Malmo), €6.1 million to GSF (for One SecLend, One CMS and LH Connect), €5.4 million to IFS (for IFS Arrow), €16.1 million to the Data segment (for the Regulatory Reporting Hub), €1.3 million to the Eurex segment, €0.4 million to Xetra, and €0.1 million related to STOXX (for a central IT application).

Deutsche Börse Group's business model – and that of its segments – is focused on an internationally operating participant base and pricing does not differ depending on the customer's location. From a price, margin and risk perspective, this means that it is not decisive whether sales revenue is generated from German or non-German participants.

The risks and returns from the activities of the subsidiaries operating within the economic environment of the European Monetary Union (EMU) do not differ significantly from each other on the basis of the factors to be considered in identifying information on geographical regions under IFRS 8. As a result, Deutsche Börse Group has designated the following regional segments: the eurozone, the rest of Europe, America and Asia-Pacific.

Sales revenue is allocated to the individual regions according to the customer's domicile, while investments and non-current assets are allocated according to the company's domicile and employees according to their location.

As described above, the analysis of sales is based on the direct customer's billing address. This means e.g. that sales to an American investor trading a product with an Asian underlying via a European clearing member are classified as European sales.

Information on geographical regions

	Sales revenue[1]		Investments[2]		Non-financial non-current assets[3) 4)]		Number of employees	
	2018 €m	2017 (restated) €m	2018 €m	2017 €m	2018 €m	2017[5] €m	2018	2017
Eurozone	1,477.4	1,352.5	154.7	144.6	3,636.2	3,630.4	4,425	4,224
Rest of Europe	1,120.0	1,019.5	3.7	3.6	512.7	485.1	1,154	1,063
America	198.3	169.4	1.5	0.1	213.2	122.9	184	157
Asia-Pacific	145.6	145.4	0.1	0.9	2.9	4.7	201	196
Total of all regions	**2,941.3**	**2,686.8**	**160.0**	**149.2**	**4,365.0**	**4,243.1**	**5,964**	**5,640**
Consolidation of internal net revenue	–47.4	–43.2						
Group	**2,893.9**	**2,643.6**	**160.0**	**149.2**	**4,365.0**	**4,243.1**	**5,964**	**5,640**

1) Including countries in which more than 10 per cent of sales revenue was generated: UK (2018: €887.5 million; 2017: €792.8 million) and Germany (2018: €655.0 million; 2017: €641.8 million).
2) Excluding goodwill
3) Including countries in which more than 10 per cent of non-current assets are held: Germany (2018: €3,439.2 million; 2017: €3,437.9 million) and Switzerland (2018: €425.9 million; 2017: €467.7 million).
4) These include intangible assets, property, plant and equipment, and investments in associates and joint ventures.
5) Non-financial non-current assets of Nodal Exchange group are disclosed within the "America" region; prior-year figures have been restated.

25. Financial risk management

Deutsche Börse Group presents the qualitative disclosures required by IFRS 7 in detail in the combined management report (see explanations in the risk report). These include the nature and extent of risks arising from financial instruments, as well as the objectives, strategies and methods used to manage risk.

Financial risks arise at Deutsche Börse Group mainly in the form of credit risk. To a smaller extent, the Group is exposed to market risk. Financial risks are quantified using the economic capital concept (please refer to the risk report for detailed disclosures). Required economic capital is assessed on a 99.98 per cent confidence level for a one-year holding period. It is compared with the Group's liable equity capital adjusted for intangible assets so as to test the Group's ability to absorb extreme and unexpected losses. Required economic capital (REC) for financial risk is calculated at the end of each month and amounted to €601.0 million as at 31 December 2018, whereby €517.0 million stem from credit risk and €84.0 million stem from market risk. Besides the monitoring for the regulated entities, financial risks are monitored on Group level and on the segment level. REC for financial risk in the Eurex (financial derivatives) and Clearstream (post-trading) segments amounts to €166.0 million and €285.0 million, which corresponds to 28 per cent and 47 per cent, respectively, of Deutsche Börse Group's total REC for financial risk.

The Group evaluates its financial risk situation on an ongoing basis. In the view of the Executive Board, no threat to the continued existence of the Group can be identified at this time.

Credit risk

Deutsche Börse Group is exposed to credit risk arising from the following items:

Credit risk of financial instruments (part 1)

	Segment	Note	Carrying amounts – maximum risk exposure: Amount at 31 Dec 2018 €m	Carrying amounts – maximum risk exposure: Amount at 31 Dec 2017 (restated) €m	Collateral: Amount at 31 Dec 2018 €m	Collateral: Amount at 31 Dec 2017 (restated) €m
Collateralised cash investments						
Reverse repurchase agreements	Eurex (financial derivatives)[1]		49.7	11.7	53.7[2]	11.8
	Clearstream (post-trading)	13.4	6,516.2	4,843.5	6,616.7[3][4]	4,870.2[3][4]
	Group[1]		410.0	610.0	411.0	611.3
			6,975.9	**5,465.2**	**7,081.4**	**5,493.3**
Uncollateralised cash investments						
Money market lendings – central banks	Eurex (financial derivatives)[1]		24,395.5	27,111.1	0	0
	Clearstream (post-trading)		5,974.7	5,471.6	0	0
Money market lendings – other counterparties	Clearstream (post-trading)		556.7	388.3	0	0
Balances on nostro accounts and other bank deposits	Clearstream (post-trading)		2,252.5	1,291.2	0	0
	Group[1]		6,197.5	2,952.8	0	0
Securities	Clearstream (post-trading)	13.4	1,610.0	1,817.5	0	0
	Eurex (financial derivatives)	13.4	9.4	9.5		
	Group	13.4	5.1[5]	5.0[5]	0	0
Fund assets	Group	13.9	14.6	15.1	0	0
			41,016.0	**39,062.1**	**0**	**0**
Loans for settling securities transactions						
Technical overdraft facilities	Clearstream (post-trading)	13.4	2,253.3	754.7	n.a. [6]	n.a. [6]
Automated Securities Fails Financing[7]	Clearstream (GSF)		413.2[8]	597.9[8]	448.4	658.9
ASLplus securities lending[7]	Clearstream (GSF)		42,558.3	52,121.9	42,693.7	52,603.0
			45,224.8	**53,474.5**	**43,142.1**	**53,261.9**
Total			**93,216.7**	**98,001.8**	**50,223.5**	**58,755.2**

1) Presented in the items “restricted bank balances” and “other cash and bank balances”
2) Thereof none pledged to central banks (2017: nil)
3) Thereof €162.7 million pledged to central banks (2017: nil)
4) Total of fair value of cash (2018: nil; 2017: nil) and securities collateral (2018: €6,616.7 million; 2017: €4,870.2 million) received under reverse repurchase agreements
5) The amount includes collateral totalling €5.1 million (2017: €5.0 million).
6) The portfolio of deposited collateral is not directly attributed to any utilisation but is determined by the scope of the entire business relationship and the limits granted.
7) Off-balance-sheet items
8) Meets the IFRS 9 criteria for a financial guarantee contract

Credit risk of financial instruments (part 2)

			Carrying amounts – maximum risk exposure		Collateral	
	Segment	Note	Amount at 31 Dec 2018 €m	Amount at 31 Dec 2017 (restated) €m	Amount at 31 Dec 2018 €m	Amount at 31 Dec 2017 (restated) €m
Balance brought forward			**93,216.7**	**98,001.8**	**50,223.5**	**58,755.2**
Other financial instruments						
Convertible notes	Group	13.9	2.7	1.2	0	0
Other loans	Group	13.4	0.4	0.4	0	0
Other assets	Group		23.7	23.7	0	0
Trade receivables	Group	13.4	403.2	331.8	0	0
Other receivables	Clearstream (post-trading)		57.7	144.0	0	0
	Eurex (financial derivatives)	13.4	1,608.9	112.4	0	0
	Group		14.4	14.4	0	0
Other instruments at fair value	Group	13.4	0.4	0	0	0
			2,111.4	**627.9**	**0**	**0**
Financial instruments held by central counterparties			**47,969.5**[9]	**45,087.3**[9]	**58,992.9**[10]	**54,982.8**[10]
Derivatives		13.8	**4.7**	**5.3**	**0**	**0**
Total			**143,302.3**	**143,722.3**	**109,216.4**	**113,738.0**

1) Presented in the items “restricted bank balances” and “other cash and bank balances”
2) Thereof none pledged to central banks (2017: nil)
3) Thereof €162.7 million pledged to central banks (2017: nil)
4) Total of fair value of cash (2018: nil; 2017: nil) and securities collateral (2018: €6,616.7 million; 2017: €4,870.2 million) received under reverse repurchase agreements
5) The amount includes collateral totalling €5.1 million (2017: €5.0 million).
6) The portfolio of deposited collateral is not directly attributed to any utilisation but is determined by the scope of the entire business relationship and the limits granted.
7) Off-balance-sheet items
8) Meets the IFRS 9 criteria for a financial guarantee contract
9) Net value of all margin requirements resulting from executed trades at the reporting date as well as default fund requirements: this figure represents the risk-oriented view of Eurex Clearing AG and European Commodity Clearing AG, while the carrying amount of the “financial instruments held by central counterparties” item in the balance sheet shows the gross amount of the open trades according to IAS 32.
10) Collateral value of cash and securities collateral deposited for margins, covering the net value of all margin and default fund requirements

Cash investments
Deutsche Börse Group is exposed to credit risk in connection with the investment of cash funds. Clearstream (post-trading) receives cash deposits from its customers in various currencies and invests these cash deposits in money market instruments. Eurex Clearing AG (Eurex (financial derivatives) segment) receives cash collateral from its clearing members mainly in its clearing currencies euro and Swiss francs.

The Group mitigates such risks by investing short-term funds either – to the extent possible – on a collateralised basis, e.g. via reverse repurchase agreements, or by depositing them with central banks.

According to the treasury policy, mainly highly liquid financial instruments with a minimum rating of AA– (S&P Global Ratings/Fitch) or Aa3 (Moody's) issued or guaranteed by governments or supranational institutions are eligible as collateral.

Uncollateralised cash investments are permitted only for counterparties with sound creditworthiness within the framework of defined counterparty credit limits. Counterparty credit risk is monitored on the basis of an internal rating system.

The fair value of securities received under reverse repurchase agreements was €7,081.4 million (2017: €5,493.3 million). Clearstream Banking S.A. and Eurex Clearing AG are entitled to repledge the securities received to their central banks to regain liquidity.

As at 31 December 2018, Clearstream Banking S.A. has pledged €162.7 million worth of securities for reverse repurchase agreements to central banks (2017: nil).

A portion of the securities held by Clearstream in its own portfolio is pledged to central banks to collateralise the settlement facilities obtained. The fair value of pledged securities was €1,205.7 million as at 31 December 2018 (2017: €1,195.9 million). Eurex Clearing AG has pledged no securities to central banks.

Loans for settling securities transactions
Clearstream (post-trading) grants customers technical overdraft facilities to maximise settlement efficiency. These settlement facilities are subject to internal credit review procedures. They are revocable at the option of the Clearstream subgroup and are in general fully collateralised. Technical overdraft facilities amounted to €115.2 billion as at 31 December 2018 (2017: €106.6 billion). Of this amount, €3.3 billion (2017: €3.6 billion) is unsecured and only relates to credit lines granted to selected central banks and multilateral development banks in compliance with the CSDR exemption as per article 23 of Commission Delegated Regulation (EU) 2017/390. Actual outstandings at the end of each business day generally represent a small fraction of the facilities and amounted to €2,253.3 million as at 31 December 2018 (2017: €754.7 million); see note 13.4.

Clearstream (GSF segment, collateral management) also guarantees the risk resulting from the Automated Securities Fails Financing programme it offers to its customers, where Clearstream Banking S.A. acts as an intermediary between borrower and lender. This risk is collateralised. Guarantees given under this programme amounted to €413.2 million as at 31 December 2018 (2017: €597.9 million). Collateral received by Clearstream Banking S.A. in connection with these loans amounted to €448.4 million (2017: €658.9 million).

Under the ASLplus securities lending programme, Clearstream Banking S.A. had securities borrowings from various counterparties totalling €42,558.3 million as at 31 December 2018 (2017: €52,121.9 million). These securities were fully lent to other counterparties. Collateral received by Clearstream Banking S.A. in connection with these loans amounted to €42,693.7 million (2017: €52,603.0 million). This collateral was pledged to the lender, while Clearstream Banking S.A. remains its legal owner.

In 2017 and 2018, no losses from credit transactions occurred in relation to any of the transaction types described.

Financial instruments of the central counterparties
To safeguard the Group's central counterparties against the risk of default by a clearing member, the clearing conditions require the clearing members to deposit margins in the form of cash or securities on a daily basis or an intraday basis in the amount stipulated by the respective clearing house. Additional lines of defence of the Group's central counterparties are described in detail in the risk report.

The aggregate margin calls based on the executed transactions and default fund requirements after haircuts was €47,969.5 million as at the reporting date (2017: €45,087.3 million). Collateral totalling €58,992.9 million (2017: €54,982.8 million) was actually deposited.

Composition of collateral held by central counterparties

	Collateral value at 31 Dec 2018 €m	Collateral value at 31 Dec 2017 €m
Cash collateral (cash deposits)[1) 2)]	29,240.5	28,751.5
Securities and book-entry securities collateral[3) 4)]	29,752.4	26,231.3
Total	**58,992.9**	**54,982.8**

1) The amount includes the default fund totalling €2,938.3 million (2017: €2,990.0 million).
2) The collateral value is determined on the basis of the fair value less a haircut amounting to €344.4 million (2017: €438.5 million).
3) The amount includes the default fund totalling €1,789.1 million (2017: €1,466.7 million).
4) The collateral value is determined on the basis of the fair value less a haircut amounting to €4,243.9 million (2017: €3,192.2 million).

Trade receivables and contract assets

Trading, settlement and custody fees are generally collected without delay by direct debit. Fees for other services, such as the provision of data and information, are settled mainly by transfer. Trade receivables are analysed using an expected credit loss model based on the simplified approach as outlined in IFRS 9. To measure the expected credit loss, trade receivables and contract assets have been grouped based on the days past due. The trade receivables share the main risk characteristics. The expected loss amount has been determined by applying the lifetime expected loss approach. The expected loss rates are based on the payment profiles over a period of five years and the loss profile experienced over that period. As at 31 December 2018, no contract assets were recognised by Deutsche Börse Group.

Following that approach, the loss allowance as at 31 December 2018 and as at 1 January 2018 was calculated as follows:

Loss allowances for trade receivables as at 31 December 2018

		Not more than 30 days past due	Not more than 60 days past due	Not more than 90 days past due	Not more than 120 days past due	Not more than 360 days past due	More than 360 days past due	Insolvent	Total
Expected loss rate	**%**	**0**	**0**	**0**	**1.0**	**5.0**	**82.0**	**0**	**–**
Trade receivables	€m	30.5	12.4	7.1	3.2	15.0	4.3	1.3	73.8
Loss allowance	**€m**	**0**	**0.1**	**0**	**0**	**0.8**	**3.5**	**1.3**	**5.7**

Loss allowances for trade receivables as at 1 January 2018

		Not more than 30 days past due	More than 30 days past due	More than 60 days past due	More than 90 days past due	More than 120 days past due	More than 360 days past due	Insolvent	Total
Expected loss rate	**%**	**0**	**0**	**1.0**	**1.0**	**6.0**	**74.0**	**0**	**–**
Trade receivables	€m	10.0	7.7	9.7	1.2	7.5	2.0	1.7	39.8
Loss allowance	**€m**	**0**	**0.1**	**0**	**0**	**0.4**	**1.5**	**1.7**	**3.7**

Trade receivables are written off when there is no reasonable expectation of recovery (see also note 3). In 2018, no significant receivables (31 December 2017: €0.3 million) were directly written off due to customer defaults. Moreover, €0.1 million were received in 2018 for receivables which had previously been written off (2017: nil).

Debt securities

All of the entity's debt securities measured at amortised cost are considered to have low credit risk, and the loss allowance recognised during the period was therefore limited to twelve months' expected losses. The Group considers "low credit risk" for listed bonds to be an investment grade credit rating granted by an external rating agency. The expected loss is calculated based on a loss rate approach derived from default rates provided by a rating agency.

The development of the loss allowance for debt securities is shown below.

Development of the loss allowance

The loss allowance for other financial assets at amortised cost as at 31 December 2017 reconciles to the opening loss allowance on 1 January 2018 and to the closing loss allowance as at 31 December 2018 as follows:

Development of the loss allowance

	Debt securities Stage 1 €m	Trade receivables Stage 2 €m	Trade receivables Stage 3 €m	Total
Closing loss allowance as at 31 Dec 2017 (IAS 39)	**0**	**0**	**5.2[1)]**	**5.2**
Amounts restated through opening accumulated profit on first-time adoption	0.3	0.5	–2.0	– 1.2
Opening loss allowance as at 1 Jan 2018 (IFRS 9)	**0.3**	**0.5**	**3.2**	**4.0**
Increase in the allowance recognised in profit or loss	0	0.5	1.8	2.3
Decrease in the allowance recognised in profit or loss	–0.2	–0.1	–0.2	–0.5
Closing loss allowance as at 31 Dec 2018 (IFRS 9)	**0.1**	**0.9**	**4.8**	**5.8**

1) Loss allowance according to incurred loss model (IAS 39)

Credit risk concentrations

Deutsche Börse Group's business model and the resulting business relationships mean that, as a rule, credit risk is concentrated on the financial services sector. Potential concentrations of credit risk on individual counterparties are limited by application of counterparty credit limits.

Management of credit risk concentration, including collateral concentration and so-called large exposures, is conducted in compliance with applicable regulatory requirements such as those arising from, among others, Articles 387–410 of Regulation (EU) 575/2013 (Capital Requirements Regulation, CRR), Article 47 Paragraph 8 of Regulation (EU) 648/2012 (European Market Infrastructure Regulation, EMIR) and respectively applicable national requirements (see also note 15 for an explanation of regulatory capital requirements). Requirements on concentration risks arising from Regulation (EU) 909/2014 (Central Securities Depository Regulation, CSDR) are currently being implemented as part of Deutsche Börse Group's affiliated CSDs' authorisation under Article 16 CSDR.

The required economic capital (value at risk, VaR, with a 99.98 per cent confidence level) for credit risk is calculated for each business day and amounted to €517.0 million as at 31 December 2018 (2017: €467.0 million).

Deutsche Börse Group also applies additional methods in order to detect credit concentration risks. In 2018, no significant adverse credit concentrations were assessed.

Market risk

Market risk arises from changes in interest rates, foreign-exchange rates and other market prices. Deutsche Börse Group is generally only affected to a limited extent by market risk.

The required economic capital for market risk is calculated on a monthly basis. As at 31 December 2018, the required economic capital for market risk was €84.0 million (2017: €87.0 million).

In the 2018 financial year, impairment losses amounting to €0.6 million (2017: €1.1 million) were recognised in profit or loss for strategic investments that are not included in the VaR for market risk.

Interest rate risk
Changes in market interest rates may affect Deutsche Börse Group's net profit for the period attributable to Deutsche Börse AG shareholders. This risk arises whenever interest terms on financial assets and liabilities are different.

Interest rate sensitive assets include the Group's money market and investment portfolios, while interest rate sensitive liabilities mainly consist of short-term debt instruments. Interest rate risk from long-term liabilities of Deutsche Börse AG is mitigated through the issuance of fixed-coupon bonds.

To refinance existing long-term indebtedness, in March 2018 Deutsche Börse AG successfully placed a senior fixed-coupon bond in an aggregate principal amount of €600.0 million. For more details on the outstanding bonds issued by Deutsche Börse Group, see the "Net assets" section in the combined management report.

Cash received as deposits from market participants is mainly invested via short-term reverse repurchase agreements and in the form of overnight deposits at central banks, limiting the risk of a negative impact from a change in the interest rate environment. Negative interest rates resulting from reinvestments of these cash deposits are passed on to the respective Clearstream (post-trading) customers after applying an additional margin. For Eurex Clearing AG, interest rates on cash collateral are, in principle, calculated based on a predefined benchmark rate per currency after deducting an additional spread per currency.

Group entities may furthermore invest their own capital and portions of customer cash balances in high-quality liquid bonds. The bond portfolio consists mostly of variable-rate instruments, which leads to a comparably low interest rate risk for the Group.

The risk arising from interest-earning assets and interest-bearing liabilities is monitored on a daily basis and limited by using a system which includes mismatch limits in combination with interest rate risk limits and stop-loss limits. The interest rate risk limits determine the maximum acceptable loss caused by a hypothetical adverse yield curve shift. The stop-loss limits define the fair value of a portfolio triggering an ad hoc review and risk-reducing actions.

Interest rate swaps, as well as swaptions, are used to hedge interest rate risks. As of the reporting date, there are no hedging relationships with regards to interest rate risk in place.

Foreign-exchange rate risk
Measuring and managing foreign-exchange risk is important for reducing Deutsche Börse Group's exposure to exchange rate movements. The three main types of foreign-exchange risk that Deutsche Börse Group is exposed to are cash flow-, translation- and transaction-related foreign-exchange risk. Cash flow risk reflects the risk of fluctuations in Deutsche Börse Group's present value of future operating cash flows from foreign-exchange movements. Translation risk comprises effects from the valuation of the Group's assets and liabilities in foreign currencies. Finally, transaction risk is closely related to cash flow risk; it may arise through changes in the structure of Deutsche Börse Group's asset and liabilities in foreign currencies.

The Group operates internationally and is, to a limited extent, exposed to foreign-exchange risk, primarily in US$, CHF, £ and CZK. Exchange rate fluctuations may affect the Group's profit margins and the value of assets and liabilities denominated in a currency that is not the functional currency of the relevant Group entity. Respective currency risks arise mainly from operating income and expenses denominated in a currency other than the functional currency, inter alia from that portion of the Clearstream (post-trading) segment's sales revenue and net interest income from banking business that is directly or indirectly in US$. The Clearstream (post-trading) segment generated 21 per cent of its sales revenue and net interest income (2017: 17 per cent) directly or indirectly in US$.

Currency mismatches are avoided to the maximum extent possible. All types of foreign-exchange risks are measured on a regular basis and monitored on a Group as well as single entity level. Limits are defined for cash flow and translation risk. Deutsche Börse Group's treasury policy defines risk limits which take into account historical foreign-exchange rate fluctuations. Any exposure exceeding those limits must be hedged. Foreign-exchange exposures below the defined limits may also be hedged. Management of foreign-exchange risks is principally carried out at the Group level. Hedging at a single entity level may be conducted if foreign-exchange risk threatens the viability of the single entity.

To eliminate foreign-exchange risks, Deutsche Börse Group uses financial instruments to hedge existing or highly probable forecast transactions. The Group may use foreign-exchange forwards, foreign-exchange options as well as cross-currency swaps to hedge the exposure to foreign-exchange risk. Under the Group's policy, the material terms of forwards and options must coincide with those of the hedged items.

In addition, for Clearstream (post-trading), the policy stipulates that intraperiod open net foreign-exchange positions are closed out when they exceed €15.0 million. This policy was complied with, as in the previous year; as at 31 December 2018, there were no significant net foreign-exchange positions.

Other market risks
Moreover, market risk arises from investments in bonds, funds, futures and contractual trust arrangements (CTAs), as well as from the Clearstream Pension Fund in Luxembourg. Investments in CTAs are protected by a pre-defined floor, which reduces the risk of extreme losses for Deutsche Börse Group. In addition, there are equity price risks arising from strategic equity investments.

Liquidity risk

For the Group, liquidity risk may arise from potential difficulties in renewing maturing financing, such as commercial paper as well as bilateral and syndicated credit facilities. In addition, financing required for unexpected events may result in a liquidity risk. Most of the Group's cash investments are short-term to ensure that liquidity is available, should such a financing need arise. At Eurex Clearing AG, the customer cash balances and investments – only some of which have maturities of up to one year – predominantly have matched maturities. The Clearstream subgroup may invest customer balances for up to a maximum of one year in secured money market products or high-quality securities with a remaining maturity of less than ten years, subject to strict monitoring of mismatch and interest rate limits. An exception to this is UK gilts, which can have maximum remaining duration of 30 years. Term investments can be transacted via reverse repurchase agreements against highly liquid collateral that can be deposited with the central bank and used as a liquidity buffer if required.

The companies of Deutsche Börse Group have the following credit lines, which were not being used as at the reporting date:

Contractually agreed credit lines

Company	Purpose of credit line	Currency	Amount as at 31 Dec 2018 m	Amount as at 31 Dec 2017 m
Deutsche Börse AG	working capital[1]	€	605.0	605.0
Eurex Clearing AG	settlement	€	1,170.0	1,170.0
	settlement	CHF	200.0	200.0
Clearstream Banking S.A.	working capital[1]	€	750.0	750.0
	settlement	€	500.0[2]	0.0
	settlement	US$	2,125.0[2]	750.0[2]

1) €400.0 million of Deutsche Börse AG's working capital credit lines is a sub-credit line of Clearstream Banking S.A.'s €750.0 million working capital credit line.
2) Thereof three committed repo lines for a total amount of US$1,250.0 million and three committed foreign-exchange swap lines for a total amount of €500.0 million and US$875.0 million in 2018 (2017: three committed repo lines for a total amount of US$750.0 million)

For refinancing purposes, Eurex Clearing AG and the Clearstream subgroup can pledge eligible securities with their respective central banks.

Clearstream Banking S.A. has a bank guarantee (letter of credit) in favour of Euroclear Bank S.A./N.V. issued by an international consortium to secure daily deliveries of securities between Euroclear Bank S.A./N.V. and Clearstream Banking S.A. This guarantee amounted to US$3.0 billion as at 31 December 2018 (2017: US$3.0 billion). Euroclear Bank S.A./N.V. has also issued a guarantee in favour of Clearstream Banking S.A. amounting to US$3.0 billion (2017: US$3.0 billion). Furthermore, Eurex Clearing AG holds a credit facility of US$1.6 billion (2017: US$1.6 billion) granted by Euroclear Bank S.A./N.V. in order to maximise settlement efficiency.

A commercial paper programme offers Deutsche Börse AG an opportunity for flexible, short-term financing, involving a total facility of €2.5 billion in various currencies. As at year-end, there was no commercial paper outstanding (2017: nil).

Clearstream Banking S.A. also has a commercial paper programme with a programme limit of €1.0 billion, which is used to provide additional short-term liquidity. As at 31 December 2018, commercial paper with a nominal value of €402.1 million had been issued (2017: €274.7 million).

In 2018, S&P Global Ratings (S&P) confirmed Deutsche Börse AG's AA credit rating with a stable outlook. At the end of 2018, Deutsche Börse AG was one of only two DAX-listed companies that had been given an AA rating by S&P. Deutsche Börse AG's commercial paper programme was awarded the best possible short-term rating of A–1+.

The AA rating of Clearstream Banking S.A. was confirmed with a stable outlook by the rating agencies Fitch and S&P in 2018. For further details on the rating of Deutsche Börse Group, see the "Financial position" section in the combined management report.

Maturity analysis of financial instruments (part 1)

31 Dec 2018	Contractual maturity Overnight €m	Not more than 3 months €m	More than 3 months but not more than 1 year €m	More than 1 year but not more than 5 years €m	Over 5 years €m	Reconciliation to carrying amount €m	Carrying amount €m
Non-derivative financial liabilities							
Non-current financial liabilities measured at amortised cost	0	0	0	1,335.3	1,150.0	–202.1	2,283.2
Non-current financial liabilities at fair value through profit or loss	0	0	0	0.2	0	0	0.2
Trade payables	0	195.0	0	0	0	0	195.0
Current financial liabilities measured at amortised cost	18,566.3	203.9	270.9	0	0	–16.4	19,024.7
Cash deposits by market participants	29,559.2	0	0	0	0	0	29,559.2
Total non-derivative financial liabilities (gross)	**48,125.5**	**398.9**	**270.9**	**1,335.5**	**1,150.0**	**–218.5**	**51,062.3**
Derivatives and financial instruments held by central counterparties							
Financial liabilities and derivatives held by central counterparties	26,256.3	54,796.6	13,015.4	7,347.1	2,638.3	0	104,053.7
less financial assets and derivatives held by central counterparties	–26,256.3	–55,008.6	–13,015.4	–7,347.1	–2,638.3	0	–104,265.7
Cash inflow – derivatives and hedges							
Cash flow hedges	0	0	0	0	0		
Fair value hedges	0	0	0	0	0		
Derivatives held for trading	–1,592.6	–137.1	–1,642.4	0	0		
Cash outflow – derivatives and hedges	**0**	**0**	**0**	**0**	**0**		
Cash flow hedges	0	0	0	0	0		
Fair value hedges	0	0	0	0	0		
Derivatives held for trading	1,592.4	136.9	1,662.7	0	0		
Total derivatives and hedges	**–0.2**	**–212.2**	**20.3**	**0**	**0**		
Financial guarantee contracts	0	0	0	0	0		

Maturity analysis of financial instruments (part 2)

31 Dec 2017	Contractual maturity Overnight €m	Not more than 3 months €m	More than 3 months but not more than 1 year €m	More than 1 year but not more than 5 years €m	Over 5 years €m	Reconciliation to carrying amount €m	Carrying amount €m
Non-derivative financial liabilities							
Non-current financial liabilities measured at amortised cost	0	0	0	1,339.0	524.4	–175.0	1,688.4
Non-current financial liabilities measured at fair value through profit or loss	0	0	0	0.8	0	0	0.8
Trade payables	0	150.1	0	0	0	0	150.1
Current financial liabilities measured at amortised cost	13,057.1	879.6	55.6	0	0	–16.1	13,976.2
Cash deposits by market participants	29,215.3	0	0	0	0	0	29,215.3
Total non-derivative financial liabilities (gross)	**42,272.4**	**1,029.7**	**55.6**	**1,339.8**	**524.4**	**–191.1**	**45,030.8**
Derivatives and financial instruments held by central counterparties							
Financial liabilities and derivatives held by central counterparties	22,159.3	43,973.6	12,665.7	3,771.5	1,065.7	0	83,635.8
less financial assets and derivatives held by central counterparties	–22,159.2	–44,685.7	–12,665.8	–3,771.5	–1,065.7	0	–84,347.9
Cash inflow – derivatives and hedges							
Cash flow hedges	0	19.0	56.2	0	0		
Fair value hedges	0	0	0	0	0		
Derivatives held for trading	833.4	1,652.2	2.3	0	0		
Cash outflow – derivatives and hedges							
Cash flow hedges	0	–18.8	–56.4	0	0		
Fair value hedges	0	0	0	0	0		
Derivatives held for trading	–832.2	–1,667.4	–2.2	0	0		
Total derivatives and hedges	**1.3**	**–727.1**	**–0.2**	**0**	**0**		
Financial guarantee contracts	0	0	0	0	0		

26. Financial liabilities and other risks

For the coming financial years, the Group’s expenses in connection with long-term contracts relating to maintenance contracts and other contracts (excluding rental and lease agreements, see note 27) are presented in the following:

Breakdown of future financial obligations

	31 Dec 2018 €m	31 Dec 2017 €m
Up to 1 year	37.8	41.7
1 to 5 years	21.6	27.2
More than 5 years	0	6.9
Total	**59.4**	**75.8**

Other litigation and liability risks

Contingent liabilities may result from present obligations and from possible obligations arising from events in the past. Deutsche Börse Group recognises provisions for the possible incurrence of losses only if there is a present obligation arising from a past event that is likely to result in an outflow of resources and if the Group can reliably estimate the amount of the obligation (see also note 3). In order to identify the litigation for which the possibility of incurring a loss is more than unlikely, as well as how the possible loss is estimated, Deutsche Börse Group considers a large number of factors, including the nature of the claim and the facts on which it is based, the jurisdiction and course of the individual proceedings, the experience of Deutsche Börse Group, prior settlement talks (to the extent that they already taken place) as well as expert opinions and evaluations of legal advisors. However, it is also possible that no reliable estimate for a specific litigation could be determined before the approval of the consolidated financial statements, and that – as a result – no provisions are recognised.

Peterson vs Clearstream Banking S.A., Citibank NA et al. (“Peterson I”) and Heiser vs Clearstream Banking S.A.

In its 2012 corporate report, Deutsche Börse Group disclosed information about the class action suit Peterson vs Clearstream Banking S.A. (the first Peterson proceeding), initiated by various plaintiffs seeking turnover of certain customer positions held in Clearstream Banking S.A.’s securities omnibus account with its US depository bank, Citibank NA, and asserting direct claims against Clearstream Banking S.A. for damages of US$250.0 million. That matter was settled between Clearstream Banking S.A. and the plaintiffs and the direct claims against Clearstream Banking S.A. were retracted.

In July 2013, the US court gave the order to turn over the customer positions to the plaintiffs, ruling that these were being held by Bank Markazi, the Iranian central bank. Bank Markazi appealed, and the decision was affirmed on 9 July 2014 by the Second Circuit Court of Appeals, and then by the US Supreme Court on 20 April 2016. Once the process of distribution of the funds to the plaintiffs is complete, a related case, Heiser vs Clearstream Banking S.A., which is also seeking the turnover of the same assets, should be concluded.

Peterson vs Clearstream Banking S.A. ("Peterson II")
On 30 December 2013, a number of US plaintiffs from the first Peterson case, as well as other plaintiffs, filed a complaint targeting restitution of certain assets that Clearstream Banking S.A. holds as a custodian in Luxembourg. In 2014, the defendants in this action, including Clearstream Banking S.A., moved to dismiss the case. On 19 February 2015, the US court issued a decision granting the defendants' motions and dismissing the lawsuit. The plaintiffs lodged an appeal against this ruling at the competent appeals court (Second Circuit Court of Appeals), which on 21 November 2017 confirmed extensive parts of the decision of the trial court. Regarding another aspect, the appellate court referred the case back to the court of first instance, which shall assess whether the assets held in Luxembourg are subject to enforcement in the U.S. In opposition to this point, Clearstream Banking S.A. filed a petition to the US Supreme Court on 8 May 2018.

Havlish vs Clearstream Banking S.A. ("Havlish")
On 14 October 2016, a number of US plaintiffs filed a complaint naming Clearstream Banking S.A. and other entities as defendants. The complaint in this proceeding, Havlish vs Clearstream Banking S.A., is based on similar assets and allegations as in the Peterson proceedings. The complaint seeks the turnover of certain assets that Clearstream Banking S.A. holds as a custodian in Luxembourg.
The complaint also asserts direct claims against Clearstream Banking S.A. and other defendants and purports to seek damages of up to approximately US$6.6 billion plus punitive damages and interest. The proceedings have been suspended due to the ongoing appeal to the US Supreme Court in the Peterson II proceedings.

Criminal investigations against Clearstream Banking S.A.
On 2 April 2014, Clearstream Banking S.A. was informed that the United States Attorney for the Southern District of New York has opened a grand jury investigation against Clearstream Banking S.A. due to Clearstream Banking S.A.'s conduct with respect to Iran and other countries subject to US sanction laws. Clearstream Banking S.A. is cooperating with the US attorney.

Bank Markazi vs Clearstream Banking S.A.
In the context of the ongoing disputes regarding assets of Bank Markazi, Clearstream Banking S.A. was served with a complaint filed by Bank Markazi on 17 January 2018 naming Banca UBAE S.P.A. and Clearstream Banking S.A. as defendants. The complaint filed before the Luxembourg courts primarily seeks the restitution of assets of Bank Markazi which the complaint alleges are held in accounts of Banca UBAE S.P.A. and Bank Markazi with Clearstream Banking S.A. totalling approximately US$4.9 billion plus interest. Alternatively, Bank Markazi seeks damages in the same amount. The assets sought include assets in the amount of approximately US$1.9 billion that were turned over to US plaintiffs pursuant to a 2013 binding and enforceable US court order in a proceeding to which Bank Markazi was a party. The claim also addresses customer assets of approximately US$2 billion, which include assets that are held at Clearstream Banking S.A. and which are currently subject to US and Luxembourg litigation brought by US plaintiffs. The claim also addresses assets that were previously transferred out of Clearstream Banking S.A. to Banca UBAE S.P.A.

Banca UBAE S.p.A. vs Clearstream Banking S.A.
On 15 June 2018, Banca UBAE S.p.A. filed a complaint against Clearstream Banking S.A. in front of the Luxembourg courts. The complaint is a recourse action linked to the complaint that Bank Markazi filed against Clearstream Banking S.A. and Banca UBAE S.p.A. and asks that Banca UBAE S.p.A. be indemnified and held harmless by Clearstream Banking S.A. in case Banca UBAE S.p.A. were to lose in the Bank Markazi complaint and ordered by the court to pay damages to Bank Markazi.

Levin vs Clearstream Banking S.A.
On 26 December 2018, two US plaintiffs filed a complaint against Clearstream Banking S.A. and other legal persons; the plaintiffs hold claims amounting to approximately US$28.8 million against Iran, Iranian authorities and individuals. The complaint filed in this case (Levin vs Clearstream Banking S.A.) is based on similar assets and allegations as those in the second Peterson and Havlish proceedings. The case seeks the turnover of certain assets held by Clearstream Banking S.A., as the custodian, in Luxembourg. In addition, the case also includes direct claims made against Clearstream Banking S.A. and further defendants for damages of up to around US$28.8 million (plus punitive damages and interest).

Fairfield vs Clearstream Banking S.A.
Beginning in 16 July 2010, the liquidators of two investment funds domiciled in the British Virgin Islands and named Fairfield Sentry Ltd. and Fairfield Sigma Ltd. filed complaints in the US Bankruptcy Court for the Southern District of New York, asserting claims against more than 300 financial institutions for restitution of redemption payments made to investors of the funds for the redemption of shares in such funds prior to December 2008. On 14 January 2011, the liquidators of such funds asserted claims for restitution against Clearstream Banking S.A. in an amount of US$13.5 million for redemption payments made by the funds to investors using the settlement system of Clearstream Banking S.A. The proceedings, which were stayed for multiple years, are continuing.

MBB Clean Energy AG
Legal disputes have arisen regarding a bond issued by MBB Clean Energy AG (MBB), which is held in custody by Clearstream Banking AG. MBB issued a first tranche of the bond in April 2013 and a second tranche of the bond in December 2013. The global certificates for the two tranches of the bond were delivered into Clearstream Banking AG by the paying agent of the issuer. The legal disputes relate to the non-payment of the bond and the purported lack of validity of the bond. Clearstream Banking AG’s role in the context of the purported lack of validity of the MBB bond is primarily to safekeep the global certificate as national central securities depository. Insolvency proceedings have meanwhile been opened in respect of the issuer, MBB.

Proceedings by the Public Prosecutor’s Office in Cologne
In September 2017, Clearstream Banking AG and Clearstream Banking S.A. were made aware that the Public Prosecutor’s Office in Cologne had initiated proceedings for tax evasion against an employee of Clearstream Banking AG for his alleged involvement in the settlement of transactions of market participants over dividend date (cum/ex transactions). On 22 January 2018, the Public Prosecutor’s Office in Cologne addressed to Clearstream Banking AG a notification of hearing Clearstream Banking AG and Clearstream Banking S.A. as potential secondary participants (Nebenbeteiligte). Due to the early stage of the investigations, it is not possible to predict timing, scope or consequences of a potential decision. The companies are cooperating with the competent authorities.

Lawsuit against Deutsche Börse AG
In November 2018, a customer of a trading participant of the Frankfurt Stock Exchange filed a case against Deutsche Börse AG with the District Court of Frankfurt/Main. The plaintiff is claiming damages of approximately €2.6 million from Deutsche Börse AG. The alleged damages are said to have arisen (i) on 7 July 2016, from Deutsche Börse AG's publication of an inaccurate ex-dividend date relating to a financial instrument via the Xetra system and (ii) due to the fact that a client of the plaintiff relied on this inaccurate information to conclude transactions.

Administrative offence proceedings of BaFin
On 19 December 2018, the German Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht, BaFin) sent Deutsche Börse AG a formal hearing notification in a penalty proceeding, which refers to the allegation of a supposed lack of self-liberation or, alternatively, an allegedly omitted ad hoc announcement. Specifically, in the search for a successor for Carsten Kengeter, Deutsche Börse AG had omitted to qualify as a price-relevant intermediate step the fact that a few days before the appointment of Theodor Weimer in November 2017, two suitable and interested CEO candidates had been identified, and a decision about the appointment was planned. Even after consulting with external experts, Deutsche Börse AG believes this allegation is unfounded.

Proceedings by the Public Prosecutor's Office in Frankfurt/Main
On 21 December 2018, Deutsche Börse AG informed the public that, on that same day, the District Court of Frankfurt/Main had issued a fine order against Deutsche Börse AG as an ancillary party after the termination of the preliminary investigation against its former CEO, Carsten Kengeter. The decision provides for fines of €5 million and €5.5 million against Deutsche Börse AG for an alleged breach of the insider trading ban in December 2015 and for an alleged omission of an ad hoc announcement in January 2016. Following this decision of the District Court of Frankfurt/Main, the proceedings were concluded.

The Executive Board of Deutsche Börse AG had previously decided, after detailed consultation with the Supervisory Board, not to take action against a corresponding fine decision by the District Court. The company remains firmly convinced that the allegations were unfounded. This is supported by the results of extensive audits by several independent external experts. However, after a detailed examination and weighing all relevant aspects, Deutsche Börse AG had concluded that a termination of the proceedings based on the solution found was in the best interest of the company.

In addition to the matters described above and in prior disclosures, Deutsche Börse Group is from time to time involved in various legal proceedings that arise in the ordinary course of its business. The Group recognises provisions for litigation and regulatory matters when it has a present obligation arising from a past event, an outflow of resources with economic benefit to settle the obligation is probable, and it is able to reliably estimate the amount. In such cases, there may be an exposure to loss in excess of the amounts recognised as provisions. When the conditions are not met, the Group does not recognise a provision. As a litigation or regulatory matter develops, Deutsche Börse Group evaluates on an ongoing basis whether the requirements to recognise a provision are met. The Group may not be able to predict what the eventual loss or range of loss related to such matters will be. The Group does not believe, based on currently available information, that the results of any of these various proceedings will have a material adverse effect on its financial data as a whole.

Tax risks

Due to its business activities in various countries, Deutsche Börse Group is exposed to tax risks. A process has been developed to recognise and evaluate these risks, which are initially recognised based on their probability of occurrence. These risks are then measured on the basis of their expected value. A tax provision is recognised in the event that it is more probable than not that the risks will occur. Deutsche Börse Group continuously reviews whether the conditions for recognising corresponding tax provisions are met.

27. Leases

Finance leases

There were no minimum lease payments from finance leases for Deutsche Börse Group as at 31 December 2018 or as at 31 December 2017.

Operating leases (as lessee)

Deutsche Börse Group has entered into leases to be classified as operating leases due to their economic substance, meaning that the leased asset is allocated to the lessor. These leases relate mainly to building rentals.

Minimum lease payments from operating leases[1)]

	31 Dec 2018 €m	31 Dec 2017 €m
Up to 1 year	77.7	63.4
1 to 5 years	304.1	177.2
More than 5 years	51.4	84.0
Total	**433.2**	**324.6**

1) The expected payments in US dollars were translated into euros applying the closing rate of 31 December.

In the reporting period, minimum lease payments amounting to €71.9 million (2017: €68.8 million) were recognised as expenses. For subleases or contingent rentals, no expenses were incurred in the reporting period (2017: nil).

Operating leases for buildings, some of which are subleased, have a maximum remaining term of 30 years. The lease contracts usually terminate automatically when the lease expires. The Group has options to extend some leases.

Expected rental income from subleases[1)]

	31 Dec 2018 €m	31 Dec 2017 €m
Up to 1 year	1.0	0.7
1 to 5 years	1.7	2.3
Total	**2.7**	**3.0**

1) The expected payments in US dollars were translated into euros applying the closing rate of 31 December.

28. Share-based payment

Stock Bonus Plan (SBP)

In the reporting period, the company established an additional tranche of the SBP for senior executives who are not risk bearers. In order to participate in the SBP, a beneficiary must have earned a bonus. The number of stock options is determined by the amount of the individual and performance-based SBP bonus for the financial year, divided by the average share price (Xetra closing price) of Deutsche Börse AG's shares in the fourth quarter of the financial year in question. Neither the converted SBP bonus nor the stock options are paid at the time the bonus is determined. Rather, the entitlement is generally received three years after the grant date (the "waiting period"). Within this period, beneficiaries cannot assert shareholder rights (in particular, the rights to receive dividends and attend the Annual General Meeting). Once they have met the condition of service, the beneficiaries' claims resulting from the SBP are calculated on the first trading day following the last day of the waiting period. The current market price at that date (closing auction price of Deutsche Börse shares in electronic trading on the Frankfurt Stock Exchange) is multiplied by the number of stock options. Stock options are settled in cash.

Evaluation of the SBP

The company uses an adjusted Black-Scholes model (Merton model) to calculate the fair value of the stock options.

Valuation parameters for SBP shares

		Tranche 2018	Tranche 2017	Tranche 2016	Tranche 2015
Term to		31 Mar 2022	28 Feb 2021	29 Feb 2020	31 Mar 2019
Risk-free interest rate	%	–0.44	–0.56	–0.65	–0.75
Volatility of Deutsche Börse AG shares	%	21.72	18.61	19.27	22.76
Dividend yield	%	2.33	1.56	1.17	0
Exercise price	€	0	0	0	0

The valuation model does not take into account exercise hurdles. The volatilities applied correspond to the market volatilities of comparable options with comparable maturities.

Valuation of SBP shares

Tranche	Balance at 31 Dec 2018 Number	Deutsche Börse AG share price at 31 Dec 2018 €	Intrinsic value/ option at 31 Dec 2018 €	Fair value/ option at 31 Dec 2018 €	Settlement obligation €m	Current provision at 31 Dec 2018 €m	Non-current provision at 31 Dec 2018 €m
2015[1]	13,674	104.95	104.95	98.77 to 110.65	1.3	1.3	0
2016	16,909	104.95	104.95	74.54	1.3	0	1.3
2017	13,868	104.95	104.95	47.70	0.6	0	0.6
2018[2]	12,941	104.95	104.95	22.91	0.3	0	0.3
Total	**57,392**				**3.5**	**1.3**	**2.2**

1) The number of stock options, settlement obligation, and short-term provision of the 2015 tranche includes the unsettled shares of the 2014 tranche.
2) Given that the 2018 SBP tranche stock options for senior executives will not be granted until the 2019 financial year, the number of shares applicable as at the reporting date may be adjusted during the 2019 financial year.

Average price of the exercised and forfeited share options

Tranche	Average price of the exercised share options €	Average price of the forfeited share options €
2014	109.40	–
2015	112.32	101.14
2016	111.23	72.13
2017	115.43	46.74

The stock options from the 2014 SBP tranche were exercised in the reporting period following the expiration of the waiting period. Shares of the SBP tranches 2015, 2016 and 2017 were paid to former employees as part of severance payments in the year under review.

The carrying amount of the provision for the SBP results from the measurement of the number of SBP stock options at the fair value of the closing auction price of Deutsche Börse shares in electronic trading at the Frankfurt Stock Exchange at the reporting date and its proportionate recognition over the waiting period.

Provisions for the SBP amounting to €3.5 million were recognised at the reporting date of 31 December 2018 (31 December 2017: €3.9 million). The total expense for the stock options in the reporting period was €2.1 million (2017: €2.9 million).

Change in number of SBP shares allocated

	Balance at 31 Dec 2017	Disposals Tranche 2015	Disposals Tranche 2016	Disposals Tranche 2017	Additions Tranche 2018	Fully settled cash options	Options forfeited	Balance at 31 Dec 2018
To other senior executives	69,298	–1,257	–2,055	–1,864	12,941	–17,920	–1,751	57,392

Long-term Sustainable Instrument (LSI) and Restricted Stock Units (RSU)

In 2014, Deutsche Börse Group introduced the Long-Term Sustainable Instrument (LSI) plan in order to provide share-based remuneration in line with regulatory requirements. This programme was extended in 2016 with the Restricted Stock Units (RSU) plan. The following disclosures relate to both plans.

The LSI remuneration model requires at least half of a part of the variable remuneration to be settled in cash and half in phantom shares of Deutsche Börse AG (LSI shares). A portion of the variable remuneration is paid in the subsequent year and another portion over a further period of three or four years. Moreover, a portion of the variable remuneration shall be converted into RSU, subject to a three-year retention period after grant and a one-year waiting period (RSU shares).

The number of LSI and RSU shares for the 2014 to 2017 tranches is calculated by dividing the proportionate LSI or RSU bonus, respectively, for the year in question by the average closing price of Deutsche Börse AG shares in the last month of a financial year. The number of LSI and RSU shares for the 2018 tranche is based on the closing auction price of Deutsche Börse shares as at the disbursement date of the upfront cash component of the 2018 tranche in 2019 or on the closing price as at the following trading day on the Frankfurt Stock Exchange. This results in individual LSI tranches for the LSI bonus, which have maturities of between one and five years. The RSU bonus is used as a basis for another four-year tranche. Payment of each tranche is made after a waiting period of one year. Neither remuneration system stipulates any condition of service. Following the expiry of the waiting period, both the LSI and the RSU shares of the 2014 to 2017 tranches are measured on the basis of the average closing price of Deutsche Börse AG shares in the last month preceding the end of the waiting period. The LSI and RSU shares of the 2018 tranche are measured at the closing auction price as at the first trading day in February of the year in which the holding period ends. Settlement is generally made in cash, although the employer has the right to settle by delivering Deutsche Börse AG shares for the 2014 tranche.

Evaluation of the LSI and the RSU

The company uses an adjusted Black-Scholes model (Merton model) to calculate the fair value of the LSI and RSU stock options.

Valuation parameters for LSI and RSU shares

		Tranche 2018	Tranche 2017	Tranche 2016	Tranche 2015	Tranche 2014
Term to		31 Dec 2019 to 31 Dec 2023	31 Dec 2018 to 31 Dec 2022	31 Dec 2018 to 31 Dec 2021	31 Dec 2018 to 31 Dec 2020	31 Dec 2018 to 31 Dec 2019
Risk-free interest rate	%	–0.7 to –0.31	–0.75 to –0.44	–0.75 to –0.56	–0.75 to –0.65	–0.75 to –0.7
Volatility of Deutsche Börse AG shares	%	18.5 to 22.47	0 to 22.47	0 to 20.52	0 to 19.69	0 to 19.69
Dividend yield	%	2.33	0 to 2.33	0 to 2.33	0 to 2.33	0 to 2.33
Exercise price	€	0	0	0	0	0

The valuation model does not take into account exercise hurdles. The volatilities applied correspond to the market volatilities of comparable options with comparable maturities.

Valuation of LSI and RSU shares

Tranche	Balance as at 31 Dec 2018	Deutsche Börse AG share price as at 31 Dec 2018	Intrinsic value/ option as at 31 Dec 2018	Fair value/ option as at 31 Dec 2018	Settlement obligation	Current provision as at 31 Dec 2018	Non-current provision as at 31 Dec 2018
	Number	€	€	€	€m	€m	€m
2014	7,657	104.95	104.95	102.55 – 104.95	0.8	0.6	0.2
2015	15,229	104.95	104.95	100.21 – 104.95	1.6	0.8	0.8
2016	70,639	104.95	104.95	97.92 – 104.95	7.2	1.0	6.2
2017	79,813	104.95	104.95	95.69 – 104.95	7.9	1.9	6.0
2018	91,872	104.95	104.95	93.50 – 102.55	9.0	0	9.0
Total	**265,210**				**26.5**	**4.3**	**22.2**

The carrying amount of the provisions for the LSI and the RSU results from the measurement of the number of LSI and RSU stock options at the fair value of the closing auction price of Deutsche Börse shares in electronic trading at the Frankfurt Stock Exchange as at the reporting date.

Provisions amounting to €26.5 million were recognised as at 31 December 2018 (31 December 2017: €20.7 million). The total expense for LSI stock options in the reporting period amounted to €10.1 million (31 December 2017: €9.7 million).

Change in number of LSI and RSU shares allocated

	Balance as at 31 Dec 2017	Disposals Tranche 2014	Disposals Tranche 2015	Disposals Tranche 2016	Disposals Tranche 2017	Additions Tranche 2018	Fully settled cash options	Options forfeited	Balance as at 31 Dec 2018
To other senior executives	224,652	– 231	– 939	– 2,185	– 3,962	91,872	– 43,997	0	265,210
Total	**224,652**	**– 231**	**– 939**	**– 2,185**	**– 3,962**	**91,872**	**– 43,997**	**0**	**265,210**

Co-Performance Investment Plan (CPIP) and Performance Share Plan (PSP)

In financial year 2015, a new remuneration programme (Co-Performance Investment Plan, CPIP) was introduced, and the former CEO of Deutsche Börse AG, Carsten Kengeter, was offered a one-time participation. The appropriate number of phantom shares was calculated based on the number of shares granted and the increase of Deutsche Börse AG’s net profit for the period attributable to shareholders of Deutsche Börse AG, as well as on the relative performance of the total shareholder return (TSR) on Deutsche Börse AG’s shares compared with the total shareholder return of the STOXX Europe 600 Financials Index entities. The performance period for the measurement of the performance criteria commenced on 1 January 2015 and ends on 31 December 2019. The shares are subject to a performance period of five years and a vesting period until 31 December 2019. The subsequent payment of the stock bonus will be settled in cash by 31 March 2021.

On 1 January 2016, the Group launched a share-based remuneration programme, the Performance Share Plan (PSP), for the Executive Board of Deutsche Börse AG as well as selected executives and employees of Deutsche Börse AG and participating subsidiaries. The 100 per cent stock bonus target was calculated in euros for each Executive Board member. The 100 per cent stock bonus target for selected executives and employees of Deutsche Börse AG and participating subsidiaries is defined by the responsible decision-making bodies.

Based on the PSP 100 per cent stock bonus target, the corresponding number of phantom shares for each beneficiary is calculated by dividing the stock bonus target by the average share price (Xetra closing price) of Deutsche Börse AG’s shares in the last calendar month preceding the performance period. Any right to payment of a PSP stock bonus vests only at the end of a five-year performance period.

The final number of performance shares is calculated by multiplying the original number of performance shares with the level of overall target achievement. The PSP level of overall target achievement is based on two performance factors during the performance period: firstly, on the relative performance of the total shareholder return (TSR) on Deutsche Börse AG’s shares compared with the total shareholder return of the STOXX Europe 600 Financials Index; and secondly, on the increase of Deutsche Börse AG’s net profit for the period attributable to shareholders of Deutsche Börse AG. The two performance factors contribute 50 per cent each to calculate overall target achievement.

The payout amount is calculated by multiplying the final number of performance shares with the average share price (Xetra closing price) of Deutsche Börse AG's shares in the last calendar month preceding the performance period, plus the total of dividend payments made during the performance period based on the final number of performance shares. The plans are settled in cash.

Evaluation of the CPIP and the PSP
The company uses an adjusted Black-Scholes model (Merton model) to calculate the fair value of the CPIP and PSP stock options.

Valuation parameters for CPIP and PSP shares

		Tranche 2019	Tranche 2018	Tranche 2017	Tranche 2016	Tranche 2015
Term to		31 Dec 2023	31 Dec 2022	31 Dec 2021	31 Dec 2020	31 Dec 2019
Risk-free interest rate	%	–0.31	–0.44	–0.56	–0.65	–0.70
Volatility of Deutsche Börse AG shares	%	0	22.47	20.52	18.50	18.70
Dividend yield	%	0	0	0	0	0
Exercise price	€	0	0	0	0	0
Relative total shareholder return	%	200.00	200.00	200.00	200.00	200.00
Net profit for the period attributable to Deutsche Börse AG shareholders	%	200.00	210.00	192.00; 203.00	202.00; 213.00	185.00

The valuation model does not take into account exercise hurdles. The volatilities applied correspond to the market volatilities of comparable options with comparable maturities.

Valuation of CPIP and PSP shares

Tranche	Balance as at 31 Dec 2018 Number	Deutsche Börse AG share price as at 31 Dec 2018 €	Intrinsic value/ option as at 31 Dec 2018 €	Fair value/ option as at 31 Dec 2018 €	Settlement obligation €m	Current provision as at 31 Dec 2018 €m	Non-current provision as at 31 Dec 2018 €m
2015	132,882	104.95	104.95	72.20	9.6	0	9.6
2016	131,285	104.95	104.95	67.31	12.5	0	12.5
2017	138,066	104.95	104.95	43.94	10.9	0	10.9
2018	122,322	104.95	104.95	21.49	5.8	0	5.8
2019[1)]	12,506	104.95	104.95	107.42	1.3	0	1.3
Total	**537,061**				**40.1**	**0**	**40.1**

1) The stock options of the 2019 tranche were granted as part of severance agreements.

Provisions for the CPIP and the PSP amounting to €40.1 million were recognised at the reporting date of 31 December 2018 (31 December 2017: €17.5 million). Of the provisions, €15.9 million were attributable to members of the Executive Board (2017: €14.8 million). The total expense for CPIP and PSP stock options in the reporting period was €23.3 million (2017: €12.3 million). Of that amount, an expense of €13.1 million was attributable to members of the Executive Board (2017: €10.2 million).

Change in number of CPIP and PSP shares allocated

	Balance at 31 Dec 2017	Additions Tranche 2015	Additions Tranche 2016	Additions/ (disposals) Tranche 2017	Additions Tranche 2018	Additions Tranche 2019	Fully settled cash options	Options forfeited	Balance at 31 Dec 2018
To the Executive Board	269,370	7,925	36,918	6,996	96,682	12,506[1)]	0	0	430,397
To other senior executives	93,307	0	4,360	–16,643	25,640	0	0	0	106,664
Total	**362,677**	**7,925**	**41,278**	**–9,647**	**122,322**	**12,506**	**0**	**0**	**537,061**

1) The stock options of the 2019 tranche were granted as part of severance agreements.

For further information on the number of stock options granted to Executive Board members and on the remuneration system for Executive Board members, please refer to the remuneration report.

Group Share Plan (GSP)

Employees of Deutsche Börse Group who are not members of the Executive Board or senior executives have the opportunity to subscribe for shares of Deutsche Börse AG at a discount of 30 or 40 per cent to the issue price under the Group Share Plan (GSP). This discount is based on the employee's length of service. Under the 2018 GSP tranche, eligible employees were able to buy up to 100 shares in the company. The purchased shares must be held for at least two years.

In the reporting period, an expense totalling €4.0 million (2017: €3.6 million) was recognised in staff expense for the GSP.

29. Executive bodies

The members of the company's executive bodies are listed in the "The Executive Board" and "The Supervisory Board" chapters of this annual report.

30. Corporate governance

On 6 December 2018, the Executive and Supervisory Boards issued the latest version of the declaration of conformity in accordance with section 161 of the Aktiengesetz (AktG, the German Stock Corporation Act) and made it permanently available to shareholders on the company's website (see also the combined corporate governance declaration statement and corporate governance report).

31. Related party disclosures

Related parties as defined by IAS 24 are members of the executive bodies of Deutsche Börse AG as well as the companies classified as associates of Deutsche Börse AG, investors and investees, and companies that are controlled or significantly influenced by members of the executive bodies.

The remuneration of the individual members of the Executive and Supervisory Boards is presented in the remuneration report.

Executive Board

In 2018, the fixed and variable remuneration of the members of the Executive Board, including non-cash benefits, amounted to a total of €21.0 million (2017: €15.3 million).

During the year under review, expenses of €11.8 million (2017: €10.2 million) were recognised in connection with share-based payments to Executive Board members.

The actuarial present value of the pension obligations to Executive Board members was €28.8 million as at 31 December 2018 (2017: €21.2 million). Expenses of €3.1 million (2017: €1.8 million) were recognised as additions to pension provisions.

Former members of the Executive Board or their surviving dependants

The remuneration paid to former members of the Executive Board or their surviving dependants amounted to €4.4 million in 2018 (2017: €4.3 million). The actuarial present value of the pension obligations was €67.5 million as at 31 December 2018 (2017: €69.9 million).

Termination benefits

Expenses of €5.2 million were recognised in connection with the termination of Executive Board appointments. €4.0 million thereof are attributable to share-based payments to former Executive Board members.

Supervisory Board

The aggregate remuneration paid to members of the Supervisory Board in financial year 2018 was €2.2 million (2017: €1.8 million).

In financial year 2018, the employee representatives on Deutsche Börse AG’s Supervisory Board received remuneration (excluding Supervisory Board remuneration) amounting to €0.7 million (2017: €0.5 million). The total consists of the fixed and variable salary components for those employee representatives.

Business relationships with related parties and key management personnel

Business relationships with related parties

The following table shows transactions entered into within the scope of business relationships with non-consolidated companies of Deutsche Börse AG during the 2018 financial year. All transactions were concluded at prevailing market terms.

Transactions with related entities

	Amount of the transactions: revenues		Amount of the transactions: expenses		Outstanding balances: receivables		Outstanding balances: liabilities	
	2018 €m	2017 €m	2018 €m	2017 €m	31 Dec 2018 €m	31 Dec 2017 €m	31 Dec 2018 €m	31 Dec 2017 €m
Associates	11.2	12.6	–19.1	–18.5	1.2	2.9	–1.0	–1.5
Other shareholdings	0	0	0	0	0	0	0	0
Total sum of business transactions	**11.2**	**12.6**	**–19.1**	**–18.5**	**1.2**	**2.9**	**–1.0**	**–1.5**

Monetary business relationships with key management personnel

Key management personnel are persons who directly or indirectly have authority and responsibility for planning, directing and controlling the activities of Deutsche Börse Group. The Group defines the members of the Executive Board and the Supervisory Board as key management personnel for the purposes of IAS 24.

European Commodity Clearing Luxembourg S. à r.l., Luxembourg, (ECC Luxembourg) – a subsidiary of European Commodity Clearing AG and therefore a member of the EEX group – entered into a managing director agreement with IDS Lux S. à r.l., Luxembourg. The subject of the agreement is to provide a natural person for the function of managing director in the management of ECC Luxembourg. In addition to this position as managing director of ECC Luxembourg, this person is also a member of the key management personnel at IDS Lux S. à r.l. In the financial year 2018, ECC Luxembourg made payments in the amount of approximately €14.0 thousand for these management services.

A member of the board of directors of STOXX Ltd., Zug, Switzerland, also holds a key management position within the law firm Lenz & Staehelin, Geneva, Switzerland. Deutsche Börse Group reported expenses to this law firm of approximately €779.9 thousand in the 2018 financial year. As at 31 December 2018, liabilities amounted to €33.9 thousand.

On the board of directors of Powernext SAS, Paris, France – one of the subsidiaries of European Energy Exchange AG, Leipzig, Germany – there are representatives of GRTgaz, Bois-Colombes, France, the parent company of 3GRT, Tarascon, France, and EDEV S.A., Courbevoie, France. During the 2018 financial year, Powernext SAS rendered development and maintenance services for customised software solutions in the area of market coupling and balancing, as well as in connection with an electronic trading platform for 3GRT. In this context, the Group generated revenue of €790.6 thousand in 2018. As at 31 December 2018, receivables amounted to €180.4 thousand.

The Board of Directors of LuxCSD S.A., Luxembourg, an associate from Deutsche Börse Group's perspective, comprises two members of management of fully consolidated subsidiaries who are maintaining a key position within these subsidiaries of Deutsche Börse Group. There were business transactions with Clearstream Banking S.A., Luxembourg, Clearstream Services S.A., Luxembourg, Clearstream International S.A., Luxembourg, Clearstream Banking AG, Frankfurt/Main, Germany, and Deutsche Börse AG, Frankfurt/Main, Germany, to LuxCSD S.A. Overall, revenue of €2,327.3 thousand as well as expenses of €1,271.3 thousand were recognised for such contracts during the 2018 financial year.

Furthermore, an Executive Board member of Clearstream Banking AG concurrently holds an executive position within Deutsche Börse Commodities GmbH, Frankfurt/Main, Germany, an associate of Deutsche Börse Group. During the 2018 financial year, Deutsche Börse Group realised revenue of €3,746.8 thousand and incurred expenses of €16,629.7 thousand based on the business relationship with Deutsche Börse Commodities GmbH.

Two Executive Board members of Deutsche Börse AG are members of the Supervisory Board of China Europe International AG, Frankfurt/Main, Germany, (CEINEX). This stock corporation is a jointly established company of Shanghai Stock Exchange Ltd., Shanghai, China; China Financial Futures Exchange, Shanghai, China; and Deutsche Börse AG. During the 2018 financial year, Deutsche Börse Group realised revenue of €73.6 thousand and incurred expenses of €100.6 thousand based on the business relationship with CEINEX.

A member of the Executive Board of Eurex Frankfurt AG holds a key position on the Supervisory Board of PHINEO gAG, a non-profit entity based in Berlin, Germany, which was an associate from Deutsche Börse Group's perspective until 4 July 2018. In the financial year 2018, expenses of €250.0 thousand were incurred, representing a donation to this non-profit entity for the year 2017.

Other business relationships with key management personnel
Selected executives of Deutsche Börse Group companies also hold a key management position within the Clearstream Pension Fund, an "association d'épargne pension" (ASSEP) under Luxembourg law. By means of cash contributions to this ASSEP, Clearstream International S.A., Clearstream Banking S.A., as well as Clearstream Services S.A., fund the defined benefit plan established in favour of their Luxembourg employees.

32. Employees

Employees

	2018	2017
Average number of employees during the year	5,800	5,567
Employed at the reporting date	5,964	5,640
Employees (average annual FTEs)	5,397	5,183

Of the average number of employees during the year, 30 (2017: 31) were classified as Managing Directors (excluding Executive Board members), 333 (2017: 335) as senior executives and 5,437 (2017: 5,201) as employees.

There was an average of 5,397 full-time equivalent (FTE) employees during the year (2017: 5,183). Please also refer to the "Employees" section in the combined management report.

33. Events after the end of the reporting period

There have been no material events after the balance sheet date.

34. Date of approval for publication

Deutsche Börse AG's Executive Board approved the consolidated financial statements for submission to the Supervisory Board on 5 March 2019. The Supervisory Board is responsible for examining the consolidated financial statements and stating whether it endorses them.

Responsibility statement by the Executive Board

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

Frankfurt/Main, 8 March 2019
Deutsche Börse AG

Theodor Weimer | Christoph Böhm | Thomas Book

Stephan Leithner | Gregor Pottmeyer | Hauke Stars

Independent Auditor's Report

To Deutsche Börse Aktiengesellschaft, Frankfurt am Main

Report on the Audit of the Consolidated Financial Statements and Combined Management Report

Opinions

We have audited the consolidated financial statements of Deutsche Börse Aktiengesellschaft, Frankfurt am Main, and its subsidiaries (the Group), which comprise the consolidated balance sheet as of 31 December 2018, the consolidated income statement, the consolidated statement of comprehensive income, the consolidated cash flow statement and the consolidated statement of changes in equity for the financial year from 1 January to 31 December 2018, and notes to the consolidated financial statements, including a summary of significant accounting policies. In addition, we have audited the combined management report of Deutsche Börse Aktiengesellschaft, Frankfurt am Main, for the financial year from 1 January 2018 to 31 December 2018. In accordance with the German legal requirements we have not audited the content of the combined corporate governance statement, which is included in section "Combined corporate governance statement and corporate governance report" in the combined management report.

In our opinion, on the basis of the knowledge obtained in the audit,

- the accompanying consolidated financial statements comply in all material respects with the IFRSs as adopted by the EU and the additional requirements of German commercial law pursuant to Section 315e(1) HGB [Handelsgesetzbuch: German Commercial Code] and, in compliance with these requirements, give a true and fair view of the assets, liabilities, and financial position of the Group as of 31 December 2018 and of its financial performance for the financial year from 1 January to 31 December 2018, and
- the accompanying combined management report as a whole provides an appropriate view of the Group's position. In all material respects, the combined management report is consistent with the consolidated financial statements, complies with German legal requirements and appropriately presents the opportunities and risks of future development. Our opinion on the combined management report does not cover the content of the combined corporate governance statement mentioned above.

Pursuant to Section 322(3) sentence 1 HGB, we declare that our audit has not led to any reservations relating to the legal compliance of the consolidated financial statements and of the combined management report.

Basis for the Opinions

We conducted our audit of the consolidated financial statements and combined management report in accordance with Section 317 HGB and the EU Audit Regulation No 537/2014 (referred to subsequently as 'EU Audit Regulation') and in compliance with German Generally Accepted Standards for Financial Statement Audits promulgated by the Institut der Wirtschaftsprüfer [Institute of Public Auditors in Germany] (IDW). Our responsibilities under those requirements and principles are further described in the 'Auditor's Responsibilities for the Audit of the Consolidated Financial Statements and Combined Management Report' section of our auditor's report. We are independent of the group entities in accordance with the requirements of European law and German commercial and professional law, and we have fulfilled our other German professional responsibilities in accordance with these requirements. In addition, in accordance with Article 10(2) point (f) of the EU Audit Regulation, we declare that we have not provided non-audit services prohibited under Article 5(1) of the EU Audit Regulation. We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our opinions on the consolidated financial statements and on the combined management report.

Key Audit Matters in the Audit of the Consolidated Financial Statements

Key audit matters are those matters that, in our professional judgement, were of most significance in our audit of the consolidated financial statements for the financial year from 1 January to 31 December 2018. These matters were addressed in the context of our audit of the consolidated financial statements as a whole, and in forming our opinion thereon, we do not provide a separate opinion on these matters.

Impairment of the goodwill
For the accounting policies applied as well as the assumptions used, please refer to note 3 (Summary of key accounting policies) and note 11 (Intangible assets) in the notes to the consolidated financial statements.

THE FINANCIAL STATEMENT RISK
At 31 December 2018, goodwill amounted to EUR 2,865.6 million (previous year: EUR 2,770.9 million). The goodwill thus represents 1,8 per cent of the assets of the Group at 31 December 2018.

Goodwill is subjected to an impairment test by the company at least once a year and also on an ad hoc basis, if appropriate. For this purpose, the carrying amount is compared with the recoverable amount of the cash-generating unit (CGU). Deutsche Börse AG determines the recoverable amounts of the cash-generating units either on the basis of the value in use or on the basis of the fair value less costs of disposal. If the carrying amount is higher than the recoverable amount, there is a need for impairment.

The result of these valuations is highly dependent on assumptions concerning the future cash inflows based on the corporate planning as well as the defined parameters. As a result, the valuations are subject to discretion. Any need for impairment that may result can have material impacts on the statement of the assets, liabilities and financial performance of Deutsche Börse AG. Therefore, the correct determination of any need for impairment is of particular significance for the financial statements.

OUR AUDIT APPROACH

With the support of our valuation experts, we have assessed the valuation models used by the company as well as the appropriateness of the significant assumptions relating to valuation parameters. We assessed the appropriateness of the assumptions used in the determination of the discount rates by comparing them with market- and industry-specific reference values; we additionally verified the calculation method used to determine the discount rates. We compared the expected cash inflows and outflows used for the calculations with the current budget plan approved by management. In order to assess the appropriateness of the assumptions used when the budget plan was drawn up, we first discussed these in meetings with management. Then we compared the assumptions used with relevant peer group companies, and evaluated analyst reports on the market segments. We furthermore appraised the reliability of the forecasts in previous years based on whether they occurred or not. Within the scope of our own sensitivity analyses, we determined whether there would be a need for impairment in the event of possible changes in the assumptions in realistic ranges.

OUR OBSERVATIONS

The calculation method used by the company is appropriate and consistent with the relevant valuation principles. The underlying assumptions about the valuation-relevant parameters have been calculated in a balanced way and are within acceptable ranges.

Impairment of the other intangible assets

For the accounting policies applied as well as the assumptions used, please refer to note 3 (Summary of key accounting policies) and note 11 (Intangible assets) in the notes to the consolidated financial statements.

THE FINANCIAL STATEMENT RISK

The other intangible assets amounted to EUR 952.7 million (previous year: EUR 911.2 million) at 31 December 2018. The other intangible assets thus represent 0.6 per cent of the assets of the Group at 31 December 2018.

The other intangible assets with indefinite useful lives are subject to an impairment test by the company at least once a year and also on an ad hoc basis, if appropriate. For this purpose, Deutsche Börse AG determines the recoverable amounts of the intangible asset or cash-generating units, in case no independent cash flows can be allocated to that specific intangible asset, either on the basis of the value in use or on the basis of the fair value less costs of disposal. The result of these valuations is highly dependent on assumptions concerning the future cash inflows based on the corporate planning as well as the defined parameters. As a result, the valuations are subject to discretion. Any need for impairment that may result can have material impacts on the statement of the assets, liabilities and financial performance of Deutsche Börse AG. Therefore, the correct determination of any need for impairment is of particular significance for the financial statements.

OUR AUDIT APPROACH

With the support of our valuation experts, we have assessed the valuation models used by the company as well as the appropriateness of the significant assumptions relating to valuation parameters. We assessed the appropriateness of the assumptions used in the determination of the discount rates by comparing them with market- and industry-specific reference values; we additionally verified the calculation method used to determine the discount rates. We compared the expected cash inflows and outflows used for the calculations with the current budget plan approved by management. In order to assess the appropriateness of the assumptions used when the budget plan was drawn up, we first discussed these in meetings with management. Then we compared the assumptions used with relevant peer group companies, and evaluated analyst reports on the market segments. We furthermore appraised the reliability of the forecasts in previous years based on whether they occurred or not. Within the scope of our own sensitivity analyses, we determined whether there would be a need for impairment in the event of possible changes in the assumptions in realistic ranges.

OUR OBSERVATIONS

The calculation method used by the company is appropriate and consistent with the relevant valuation principles. The underlying assumptions about the valuation-relevant parameters have been calculated in a balanced way and are within acceptable ranges.

The valuation of provisions for tax risks

For the accounting policies applied as well as the assumptions used, please refer to note 3 (Summary of key accounting policies) and note 10 (Income tax expense) in the notes to the consolidated financial statements. Information on the tax provisions and risks can be found in note 26 (Financial liabilities and other risks).

THE FINANCIAL STATEMENT RISK

Deutsche Börse AG operates in a variety of jurisdictions with different legal systems. The provisions for tax risks amounted to EUR 334.8 million at 31 December 2018.

The application of the local and international tax regulations and of tax relief is complex and associated with risks. The calculation of tax provisions requires the company to exercise judgement in the assessment of tax issues and to make estimates concerning tax risks. The result of these assessments is dependent to a large extent on assumptions concerning the future interpretation of tax situations in the course of tax audits and also on decisions of the tax authorities and courts on similar tax situations and is therefore subject to discretion. Any additional tax expenses can have material impacts on the statement of assets, liabilities and financial performance of Deutsche Börse AG. Therefore, the identification and correct allocation of provisions for tax risks is of particular significance for the consolidated financial statements.

Deutsche Börse AG occasionally commissions external experts to assess tax matters.

OUR AUDIT APPROACH

With the support of our employees specialising in local and international tax law, we appraised the tax calculation, including the risk assessment, of Deutsche Börse AG. Where available, we have also acknowledged the assessment of external experts engaged by the company. We held meetings with the management as well as staff from the tax department in order to gain an understanding of the existing tax risks. We have assessed the competence and the objectivity of external experts and evaluated the documents they have produced.

Furthermore, we evaluated the correspondence with the competent tax authorities and assessed the assumptions used to determine the tax provisions on the basis of our knowledge and experience of the current application of the relevant legal regulations by the authorities and the courts.

OUR OBSERVATIONS

The assumptions for determining the tax provisions are appropriate.

Other Information

Management is responsible for the other information. The other information comprises:

- the combined corporate governance statement and
- the remaining parts of the corporate report, with the exception of the audited consolidated financial statements and combined management report and our auditor's report.

Our opinions on the consolidated financial statements and on the combined management report do not cover the other information, and consequently we do not express an opinion or any other form of assurance conclusion thereon.

In connection with our audit, our responsibility is to read the other information and, in so doing, to consider whether the other information is

- materially inconsistent with the consolidated financial statements, with the combined management report or our knowledge obtained in the audit, or
- otherwise appears to be materially misstated.

Responsibilities of Management and the Supervisory Board for the Consolidated Financial Statements and Combined Management Report

Management is responsible for the preparation of the consolidated financial statements that comply, in all material respects, with IFRSs as adopted by the EU, and the additional requirements of German commercial law pursuant to Section 315e (1) HGB, and that the consolidated financial statements, in compliance with these requirements, give a true and fair view of the assets, liabilities, financial position and financial performance of the Group. In addition, management is responsible for such internal control as they have determined necessary to enable the preparation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the consolidated financial statements, management is responsible for assessing the Group's ability to continue as a going concern. They also have the responsibility for disclosing, as applicable, matters related to going concern. In addition, they are responsible for financial reporting based on the going concern basis of accounting unless there is an intention to liquidate the Group or to cease operations, or there is no realistic alternative but to do so.

Furthermore, management is responsible for the preparation of the combined management report that, as a whole, provides an appropriate view of the Group's position and is, in all material respects, consistent with the consolidated financial statements, complies with German legal requirements and appropriately presents the opportunities and risks of future development. In addition, management is responsible for such arrangements and measures (systems) as they have considered necessary to enable the preparation of the combined management report that is in accordance with the applicable German legal requirements and to be able to provide sufficient appropriate evidence for the assertions in the combined management report.

The supervisory board is responsible for overseeing the Group's financial reporting process for the preparation of the consolidated financial statements and of the combined management report.

Auditor's Responsibilities for the Audit of the Consolidated Financial Statements and the Combined Management Report

Our objectives are to obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error, and whether the combined management report as a whole provides an appropriate view of the Group's position and, in all material respects, is consistent with the consolidated financial statements and the knowledge obtained in the audit, complies with the German legal requirements, and appropriately presents the opportunities and risks of future development, as well as to issue an auditor's report that includes our opinions on the consolidated financial statements and on the combined management report.

Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Section 317 HGB and the EU Audit Regulation and in compliance with German Generally Accepted Standards for Financial Statement Audits promulgated by the Institut der Wirtschaftsprüfer (IDW) will always detect a material misstatement. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated financial statements and this combined management report.

We exercise professional judgement and maintain professional scepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the consolidated financial statements and the combined management report, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinions. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of the internal control system relevant to the audit of the consolidated financial statements, and of arrangements and measures (systems) relevant to the audit of the combined management report, in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of these systems.
- Evaluate the appropriateness of accounting policies used by management and the reasonableness of estimates made by management and related disclosures.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Group's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in the auditor's report to the related disclosures in the consolidated financial statements and in the combined management report or, if such disclosures are inadequate, to modify our respective opinions. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Group to cease to be able to continue as a going concern.
- Evaluate the overall presentation, structure and content of the consolidated financial statements, including the disclosures, and whether the consolidated financial statements present the underlying transactions and events in a manner that the consolidated financial statements give a true and fair view of the assets, liabilities, financial position, and financial performance of the Group in compliance with IFRSs as adopted by the EU and the additional requirements of German commercial law pursuant to Section 315e (1) HGB.
- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Group to express opinions on the consolidated financial statements and on the combined management report. We are responsible for the direction, supervision and performance of the group audit. We remain solely responsible for our opinions.
- Evaluate the consistency of the combined management report with the consolidated financial statements, its conformity with German law, and the view of the Group's position it provides.
- Perform audit procedures on the prospective information presented by management in the combined management report. On the basis of sufficient appropriate audit evidence, we evaluate, in particular the significant assumptions used by management as a basis for the prospective information, and evaluate the proper derivation of the prospective information from these assumptions. We do not express a separate opinion on the prospective information and on the assumptions used as a basis. There is a substantial unavoidable risk that future events will differ materially from the prospective information.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

We also provide those charged with governance with a statement that we have complied with the relevant independence requirements, and communicate with them all relationships and other matters that may reasonably be thought to bear on our independence and, where applicable, the related safeguards.

From the matters communicated with those charged with governance, we determine those matters that were of most significance in the audit of the consolidated financial statements of the current period and are therefore the key audit matters. We describe these matters in our auditor's report unless law or regulation precludes public disclosure about the matter.

Other Legal and Regulatory Requirements

Further information pursuant to Article 10 of the EU Audit Regulation

We were elected as group auditors by the annual general meeting held on 16 May 2018. We were engaged by the audit committee of the Supervisory Board on 4 September 2018. In compliance with the transitional provisions of Article 41 Section 2 of the EU Audit Regulations, we have been engaged as auditors of the consolidated financial statements of Deutsche Börse AG without interruption since the 2001 financial year.

We declare that the opinions expressed in this auditor's report are consistent with the additional report to the audit committee pursuant to Article 11 of the EU Audit Regulation (long form audit report).

In addition to the consolidated financial statements, we audited the annual financial statements of Deutsche Börse AG and carried out various annual audits of subsidiaries. The audits included reviews of interim financial statements and project-related audits for the implementation of new accounting standards. Other certification services relate to ISAE 3402 and ISAE 3000 reports, Comfort Letters and statutory or contractual audits such as audits under the WpHG, KWG and other contractually agreed assurance services.

Tax services include assistance in the preparation of tax returns, tax appraisals and advice on individual matters, and tax advice related to the external audit. In addition, we have supported the implementation of regulatory requirements with quality assurance.

German Public Auditor Responsible for the Engagement

The German Public Auditor responsible for the engagement is Klaus-Ulrich Pfeiffer.

Frankfurt am Main, 8 March 2019
KPMG AG
Wirtschaftsprüfungsgesellschaft
[Original German version signed by:]

Leitz	Pfeiffer
Wirtschaftsprüfer	Wirtschaftsprüfer
[German Public Auditor]	[German Public Auditor]

Acknowledgement

Published by
Deutsche Börse AG
60485 Frankfurt/Main
Germany
www.deutsche-boerse.com

Concept and layout
Deutsche Börse AG, Frankfurt/Main
HGB Hamburger Geschäftsberichte GmbH & Co, Hamburg

Photographs
Thorsten Jansen (Portraits Joachim Faber and Theodor Weimer, group picture Executive Board)
Jörg Baumann (Title)

Financial reporting system
Combined management report, consolidated financial statements and notes produced in-house using firesys and SmartNotes.

Publication date
15 March 2019

The German version of this report is legally binding.
The company cannot be held responsible for any misunderstanding or misinterpretation arising from this translation.

We would like to thank all colleagues and service providers who participated in the compilation of this report for their friendly support.

Publications service
The annual report 2018 is both available in German and English.

Order numbers
1000–4833 (German annual report)
1010–4834 (English annual report)

The annual report 2018 of Deutsche Börse Group is available as pdf on the internet:
www.deutsche-boerse.com/annual_report

Contact

Investor Relations
E-mail ir@deutsche-boerse.com
Phone +49-(0) 69–2 11–1 16 70
Fax +49-(0) 69–2 11–1 46 08
www.deutsche-boerse.com/ir_e

Group Sustainability
E-mail group-sustainability@deutsche-boerse.com
Phone +49-(0) 69–2 11–1 42 26
Fax +49-(0) 69–2 11–61 42 26
www.deutsche-boerse.com/sustainability

Group Communications & Marketing
E-mail corporate.report@deutsche-boerse.com
Phone +49-(0) 69–2 11–1 49 84
Fax +49-(0) 69–2 11–61 49 84

Registered trademarks