Deutsche Börse Group

Annual report 2020

Excerpt: Notes

Notes to the consolidated financial statements Basis of preparation

1. General principles

Company information

Deutsche Börse AG is the parent company of Deutsche Börse Group. Deutsche Börse AG (the "company") has its registered office in Frankfurt/Main, Germany, and is registered in the commercial register B of the Frankfurt/Main Local Court (Amtsgericht Frankfurt am Main) under HRB 32232. 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 information distributed. Moreover, certain subsidiaries of Deutsche Börse AG own a banking license and offer banking services to customers. For details regarding internal organisation and reporting, see Fundamental information about the Group.

Basis of reporting

The 2020 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 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 the 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 income statement is structured using the nature of expense method.

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, actual amounts may differ from unrounded or disclosed figures. This may cause slight deviations from the figures disclosed in the previous year.

Disclosures on capital mangement are included in the risk report section of the combined management report and are are an integral part of the consolidated financial statements. These audited disclosures are color-coded int the risk report with a gray background.

All accounting policies, estimates, measurement uncertainties and discretionary judgements referring to a specific subject matter are described in the corresponding note. Such disclosures are focused on applicable accounting options under IFRSs. Deutsche Börse Group does not present the underlying published IFRS guidelines, unless this is considered crucial to enhance transparency. 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.

The listing of the composition of items of assets and liabilities and items of the consolidated statement of comprehensive income is based on materiality. Deutsche Börse Group defines materiality as a share of approximately 10 percent of the relevant total.

New accounting standards – implemented in the year under review

In the 2020 reporting period, the following standards and interpretations issued by the IASB and adopted by the European Commission were applied to Deutsche Börse Group for the first time. They were not applied earlier than required.

Standard/Amendment/Interpretation

		Application date	Effects at Deutsche Börse Group
IAS 1, IAS 8	Amendment: Definition of Material	1 Jan 2020	none-material
IFRS 3	Amendment: Definition of a Business	1 Jan 2020	none
IFRS 9, IAS 39, IFRS 7	IBOR Reform 1: amendments of IFRS 9, IAS 39 and IFRS 7	1 Jan 2020	none
IFRS 16	Amendment: COVID-19-related to rent concessions	1 June 2020	none
	Revised Framework	1 Jan 2020	none-material

New accounting standards – not yet implemented

The IASB issued the following new or amended Standards and Interpretations, which were not applied in the consolidated financial statements, because endorsement by the EU was still pending or the application was not mandatory. The new or amended Standards and Interpretations must be applied for financial years beginning on or after the effective date. Even though early application may be permitted for some standards, Deutsche Börse Group does usually not use any early application options.

Standard/Amendment/Interpretation

		Application date	Effects at Deutsche Börse Group
IAS 1	Amend-ments in clas-si-fi-ca-tion of li-a-bil-i-ties as current or non-current	1 Jan 2023	See notes under this table
IFRS 3	Amendments to IFRS 3 relate to a reference to the Conceptual Framework	1 Jan 2022	non
IFRS 4	Amendment to IFRS 4: Extension of the temporary exemption from applying IFRS 9	1 Jan 2021	none
IFRS 9, IAS 39, IFRS 7, and others	IBOR REFORM 2: Amendment of IFRS 9, IAS 39 and IFRS 7 and other standards	1 Jan 2021	See notes under this table
IAS 16	Amendments to IAS 16: Clarifications	1 Jan 2022	none
IFRS 17	Insurance Contracts	1 Jan 2023	See notes under this table
IAS 37	Amendments to IAS 37: Onerous contracts - Cost of Fulfilling a Contract	1 Jan 2022	none
Annual Improvement Cycle 2018 - 2020	The annual improvements resulted in amendments to IFRS 1, IFRS 9, IAS 41 and IFRS 16	1 Jan 2022	none

Amendment to IAS 1 Classification of Liabilities as Current or Non-current

The amendments only relate to the presentation of liabilities in the statement of financial position – not the amount or the timing of recognition of assets, liabilities, income and expenses or disclosure made by entities about these items. The amendments clarify that liabilities must be classified as current or non-current on the basis of the rights that are in existence at the reporting date. The potential effects of amendments to the presentation of consolidated financial statements of Deutsche Börse Group are currently being examined.

Amendment of IFRS 9, IAS 39 and IFRS 7 and other standards – IBOR Reform Phase 2

IBOR Reform Phase 2 relates to matters that may have an effect on financial reporting when a reference interest rate is replaced by an alternative interest rate. The amendments concern exemptions for the presentation and recognition of contractual modifications to financial instruments. The change in contractual cash flows is not to be shown in the result of the modification; the subsequent measurement is rather to be made on the basis of the updated effective interest rate, so capturing the effect on earnings over the remaining term. This expedient affects Deutsche Börse Group in terms of the recognition and presentation of floating-rate financial instruments, to the extent that old reference interest rates have to be replaced due to the reform. The practical expedient also states that hedging relationships are not discontinued solely because of such adjustments. This amendment has no effect on the consolidated financial statements of Deutsche Börse Group, because it does not use interest rate hedges. There are also additional disclosure obligations that particularly affect the presentation of risk management by Deutsche Börse Group.

IFRS 17 “Insurance Contracts”

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. According to the standard, insurance liabilities shall be measured at the current fulfilment cash flows instead of historical costs. Furthermore, the objective is to form a uniform basis regarding the recognition, measurement and presentation of insurance contracts, including the notes. The effective date was deferred and is now applicable in the EU for financial years beginning on or after 1 January 2023 The standard has not yet been endorsed by the EU. On the basis of our analysis we are not expecting any effect on the financial position and financial performance of Deutsche Börse Group.

2. Consolidation principles

Intra-Group assets and liabilities are eliminated. Income arising from intra-Group transactions is netted against the corresponding expenses. Intercompany 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” at cost.

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. By contrast, non-monetary balance sheet items measured at fair value are translated at the exchange rate prevailing at the valuation date. Exchange rate differences for monetary balance sheet items are recognised either as other operating income or expenses, or as the treasury result from banking business or as result from financial investments in the period in which they arise, unless the underlying transactions are hedged. Exchange rate differences for non-monetary balance sheet items at fair value are recognised in other comprehensive income. Gains and losses from a monetary item that forms part of a net investment in a foreign operation are recognised directly in “retained earnings”.

The balance sheet items 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, equity is translated at historical rates and 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 “retained earnings”. 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 2020	Average rate 2019	Closing price as at 31 Dec 2020	Closing price as at 31 Dec 2019
Swiss francs	CHF (Fr.)	1.0713	1.1112	1.0832	1.0857
US dollars	USD (US$)	1.1477	1.1195	1.2299	1.1212
Czech koruna	CZK (Kč)	26.5249	25.6700	26.2698	25.4068
Singapore dollar	SGD (S$)	1.5791	1.5256	1.6254	1.5090
British pound	GBP (£)	0.8908	0.8767	0.8999	0.8537

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.

Net investments in a foreign operation
Translation differences arising from a monetary item that is part of a net investment in a foreign operation of Deutsche Börse Group are initially recognized in other comprehensive income and reclassified from equity to profit or loss on disposal of the net investment.

Subsidiaries and business combinations

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.

Deutsche Börse AG’s equity interests in subsidiaries, associates and joint ventures as at 31 December 2020 included in the consolidated financial statements are presented in the list of shareholdings in note 33.

Acquisitions

Fondcenter AG, Zurich, Switzerland (Fondcenter)
In the third quarter of 2020 Clearstream Holding AG, Frankfurt, Germany (a wholly-owned subsdiary of Deutsche Börse AG) completed the acquisition of 51.2 per cent of the shares in Fondcenter AG Zurich, Switzerland (since renamed Clearstream Fund Centre AG) for a purchase price of CHF 392.5 million (1st tranche). Clearstream Holding AG will acquire the remaining 48.8 per cent of the shares in the course of a second transaction (2nd tranche). The acquisition of the 2nd tranche is expected to take place in the second quarter of 2022. Deutsche Börse Group recognised the related purchase price liability of CHF 433.4 million in the category “Financial liabilities measured at amortised cost” when the 1st tranche was consolidated as of 30 September 2020 and so does not present an “Equalisation item for non-controlling interests”. This liability is measured at the expected settlement amount using the effective interest method.

The new entity will be the centre of excellence for fund distribution services within the Deutsche Börse Group and is presented in the IFS segment. Combining it with the existing services from Clearstream Fund Desk (formerly Swisscanto Funds) creates a leading provider of fund services, with great benefits for the customers of UBS and Clearstream.

Deutsche Börse Group expects the transaction to deliver considerable synergies both in terms of revenue and cost effects. Such synergies are reflected in particular by the goodwill resulting from the transaction. The purchase price allocation – preliminary as at the reporting date – yielded the following effects:

Goodwill resulting from the business combination with Fondcenter AG

	Preliminary goodwill calculation 30 Sep 2020 €m
Consideration transferred	
Purchase price in cash	363.3
Effective part of the cashflow hedge	3.1
Put options	401.5
Acquired bank balances	– 3.8
Total consideration	**764.1**
Acquired assets and liabilities	
Customer relationships	240.6
Software	5.6
Other non-current assets	2.0
Current assets	120.8
Deferred tax assets	34.7
Pension provisions (less plan assets)	– 3.6
Other non-current liabilities	– 1.3
Current liabilities	– 119.6
Total assets and liabilities acquired	**279.2**
Goodwill (not tax-dedutcible)	**484.9**

The full consolidation of Fondscenter resulted in an increase in net revenue of €14.1 million as well as an increase in earnings after tax amounting to €8.1 million. If the company had been fully consolidated as at 1 January 2020, this would have resulted in an increase in net revenue of €46.2 million as well as an increase in income after tax amounting to €11.1 million.

Quantitative Brokers, LLC, New York, USA (Quantitative Brokers)
In the fourth quarter 2020 Deutsche Boerse Systems Inc., Chicago, USA (a wholly-owned subsidiary of Deutsche Börse AG) completed the acquisition of 72.8 per cent of the shares in Quantitive Brokers, LLC, New York, USA, for a purchase price of US$ 108.9 million. The parties also agreed on reciprocal options that may over time lead to a complete acquisition of the shares in Quantitative Brokers. Since Deutsche Börse Group can choose to fulfil these options with treasury shares, the shares are classified as equity and no financial liability is recognised.

Quantitative Brokers is an independent provider of sophisticated execution algorithms and data-based analytics applications for global futures, option and interest rate markets. The transaction is allocated to the Eurex segment. Deutsche Börse Group is expecting significant synergies from the transaction, particularly in revenue, which is reflected in the goodwill resulting from the transaction. The purchase price allocation – preliminary as at the reporting date – yielded the following effects:

Goodwill resulting from the business combination with Quantitative Brokers, LLC

	Preliminary goodwill calculation 1 Dec 2020 €m
Consideration transferred	
Purchase price in cash	90.5
Cash-Flow Hedge	0.5
Acquired bank balances	– 8.1
Total consideration	**82.9**
Acquired assets and liabilities	
Customer relationships	29.5
Software	10.2
Property, Plant & Equipment	1.7
Current assets	3.0
Non-current liabilities	– 1.4
Current liabilities	– 8.4
Deferred tax liabilities on temporary differences	– 4.1
Non-controlling interests	– 11.7
Total assets and liabilities acquired	**18.8**
Goodwill (bot tax-deductible)	**64.1**

The full consolidation of Quantitative Brokers resulted in an increase in net revenue of €1.3 million as well as a reduction of earnings after tax amounting to €– 0.2 million. If the company had been fully consolidated as at 1 January 2020, this would have resulted in an increase in net revenue of €18.8 million as well as a reduction of income after tax amounting to €– 3.3 million.

Axioma Inc, New York, USA (Axioma)
In the context of the acquisition of Axioma Inc, New York, USA (Axioma) on 13 September 2019 there was an adjustment to the opening balance sheet with an effect on the preliminary goodwill within the 12-month period. This adjustment resulted in a reduction of current financial assets and a corresponding increase in goodwill of €4.3 million.

The final purchase price allocation is as follows:

Goodwill resulting from the business combination with Axioma Inc.

	Preliminary goodwill calculation 13 Sep 2019 €m
Consideration transferred	
Purchase price in cash	648.3
Non-controlling interests	84.0
Acquired bank balances	– 1.9
Total consideration	**730.3**
Acquired assets and liabilities	
Customer relationships	36.3
Trade names	65.0
Software	90.3
Software in development	15.2
Other non-current assets	15.2
Other current assets (without cash)	37.2
Deferred tax liabilities	– 36.8
Other non-current and current liabilities	– 71.5
Contract liabilties	– 21.5
Total assets and liabilities acquired	**129.4**
Goodwill (not tax-deductible)	**600.9**

Institutional Shareholder Services Inc., Rockville, USA (ISS)
Deutsche Börse AG announced on 17 November 2020 that it had signed binding contracts for the acquisition of Institutional Shareholder Services, Inc. (ISS), a leading provider of governance solutions, ESG data and analytics.

Deutsche Börse will hold a majority share of approximately 81 per cent of ISS. The transaction is based on a valuation of US$ 2,275 million cash and debt-free for 100 per cent of ISS. Deutsche Börse financed €1 billion of the transaction with debt and the remainder with cash.

The expertise of ISS in ESG and data will enable Deutsche Börse to become a leading global provider of ESG data. The two companies' business is largely complementary and enables revenue synergies along the entire value chain of Deutsche Börse Group.

When the transaction is complete ISS will continue to operate with the same independence as before with regard to its data and research services. The current management team around CEO Gary Retelny will co-invest in the transaction and continue to manage the ISS business after the transaction.

The transaction was closed on 25 February 2021 and ISS will be reported in Deutsche Börse Group's financial statements as a separate operating segment from that date.

Associates

Investments in associates and joint ventures are measured at cost on initial recognition and accounted for using the equity method upon subsequent measurement. 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 through the Group's representation on the supervisory board or the board of directors.

3. Adjustments

Deutsche Börse Group modified its segment reporting with effect from the first quarter of 2020 to better emphasise the Group's growth areas. The former GSF (collateral management) segment has been allocated in full to the Clearstream (post-trading) segment. The former Data (data business) segment is now reported within the Xetra (securities trading) and Eurex (financial derivatives) segments. In this context the existing goodwill for the previous segments is also allocated to the cash-generating units (CGU).

Deutsche Börse Group adjusted the structure of the consolidated income statement in 2020 to enable greater transparency concerning the Group's financial performance. The former item "Net interest income from banking business" has been renamed "Treasury result from banking business". "Net income from strategic investments" was renamed "Result from financial investments", since this is a more accurate description.

For all adjustments, there was no impact on the consolidated statement of comprehensive income, consolidated balance sheet, consolidated statement of changes in equity, consolidated statement of cash flows and earnings per share.

Notes on the consolidated income statement

4. Net revenues

Recognition of income and expenses

Overall, Deutsche Börse Group's net revenue comprised the following items:

- Revenue,
- Treasury result from banking business,
- Other operating income, and
- Volume-related costs.

Revenue recognition
This section comprises details on revenue from contracts with customers. This includes in particular: revenue recognition, trade receivables as well as contract liabilities (see note 19 concerning the balances of contractual liabilities). Revenue is recognised in Deutsche Börse Group's segments as follows:

Eurex (financial derivatives)
Revenue in the derivatives business is generated primarily from equity index derivatives, interest rate derivatives and equity derivatives, fees that are charged for transactions with regard to the matching/registration, administration and regulation of order book and off-book transactions on Eurex Germany. Fees, as well as any reductions 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. 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. Transaction fees are invoiced on a monthly basis and are payable when invoiced. Since discounts are generally granted on a monthly basis, the recognition of a contractual liability is not necessary. Payments are generally debited directly from the clearing member immediately after invoicing.

Fees are also collected for clearing and settlement services provided for off-exchange (over-the-counter, OTC) transactions, mainly comprising posting and administration fees. Fees for these transactions and the related discounts 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 over time 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.

In addition, infrastructure fees are charged for the technical connections to the trading and clearing systems of Deutsche Börse Group. 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 percentage of completion equals 100 per cent. The infrastructure revenue generated from this is usually realised monthly with invoicing.

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.

EEX (commodities)

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. Infrastructure fees are accounted for in the same way as described in the section "Eurex (financial derivatives)".

360T (foreign exchange)

360T is a provider of optimised services covering the entire trading process of foreign-exchange products and generates commission income from trading fees. In addition, 360T generates other fees in the form of access fees to use the trading platform, 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 (securities trading)

As a general rule, securities intended for trading on the regulated market of Fankfurter Wertpapierbörse (FWB, the Frankfurt Stock Exchange) are subject to the admission and 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 the percentage of completion of the performance obligation on the basis of projected useful lives is considered appropriate within the meaning of IFRS 15. Invoicing is made on a quarterly basis, and receivables are payable upon receipt of invoice.

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. This revenue is presented under "Listing revenue".

Contracts for trading and clearing cash market products, contracts for trading data and market signals and contracts for infrastructure services in the Xetra (securities trading) segment are accounted for in the same way as described in the section "Eurex (financial derivatives)".

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.

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 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.

In addition, infrastructure fees are charged for the technical connections to the custody and clearing systems of Deutsche Börse Group. They are accounted for in the same way as described in the section "Eurex (financial derivatives)".

IFS (investment fund services)

The IFS 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. With the acquisiton of Fondcenter AG (now Clearstream Fund Centre AG), IFS expands its range of services to include the distribution and placement of domestic and foreign collective investments schemes. Services and distribution agreements are concluded with fund providers and asset managers. The so-called Trailer Fee In is incurred; these fees are presented in "Funds Distribution". The trailer fee margin, which is the difference between the trailer fees paid by the fund providers for the distribution of their funds and the trailer fees ultimately paid by the Fund Centre to the distribution partners, is included in the Net Revenue. In addition, service fees are recognised for the administration of the distribution agreements and for granting access to the fund platform. 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.

Qontigo (index and analytics business)

The Qontigo segment comprises the index and analytics business. The index 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. In its analytics business Qontigo offers its clients risk-analytics and portfolio-construction tools.

Customers in the index business simultaneously receive and consume all of the benefits provided 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.

Customers of the analytics business either receive the right to access the intellectual property, or receive the right to use the intellectual property. The intellectual property licences are granted for software products, which are subsequently referred to as “SaaS Front Office” and “SaaS Middle Office”. Revenue generated with SaaS Front Office fees is recognised at a specific point in time because all contractual obligations are fulfilled, and the customer obtains control of the asset, as soon as the licence key is transferred to the customer. SaaS Middle Office fees are recognised over time, i.e. the contractual term. Fees are also charged for the maintenance and servicing (summarized as "Main-tenance") of the software products, which are realized over the contract term. For this purpose, the transaction price for maintenance is calculated and allocated according to the "expected cost plus a margin" approach. This revenue is presented under “Axioma”.

Treasury result from banking business

The treasury result from banking business stems mainly from investing surplus liquidity and from the fair value measurement of foreign exchange transactions. It also includes income from exchange rate differences resulting from finance instruments in the banking business. Given the currently prevailing interest rate anomaly, Deutsche Börse Group also generates interest income from customer balances held at Deutsche Börse Group (in a negative interest rate environment). Furthermore, this item comprises interest payments made on customer balances (positive interest rate environment) as well as cash investments (negative interest rate environment) and fees for providing customer credit lines. Interest income and interest expenses are calculated, allocated, and realised when due, with the applicable effective interest rate on a daily basis.

Other operating income

Other operating income is income not attributable to the typical business model of Deutsche Börse Group; it is therefore not disclosed as part of revenue. Other operating income is usually realised when all chances and risks have been transferred. Other operating income comprises, for instance, income from subleasing property, income from exchange rate differences in non-banking business as well as the reversal of impairments recognised on trade receivables.

Volume-related costs

The “Volume-related costs” item comprises expenses that are directly related to revenue and are directly dependent on the following items in particular:

- The number of certain trade or settlement transaction,
- The custody volume or the Global Security Financing volume,
- The volume of market data acquired,
- The sales commission for the distribution of investments to the distribution partner,
- “Revenue-Sharing” agreements or “maker-taker” pricing models.

Volume-related costs are not incurrend if the corresponding revenue is no longer generated.

Composition of net revenue (part 1)

	Sales revenue		Treasury result from banking business	
	2020 €m	2019[1] €m	2020 €m	2019 €m
Eurex (financial derivatives)				
Equity index derivatives	600.3	534.6	0	0
Interest rate derivatives	203.4	214.0	0	0
Equity derivatives	56.9	58.4	0	0
OTC Clearing	50.0	41.8	0	0
Margin fees	22.6	17.0	83.4	46.3
Infrastructure	84.2	76.7	0	0
Eurex Data	62.1	62.7	0	0
Other	33.5	30.2	0	0
	1,113.0	**1,035.4**	**83.4**	**46.3**
EEX (commodities)				
Power derivatives	128.0	113.3	1.4	7.7
Power spot	72.7	72.6	0	0
Gas	54.5	55.1	0	0
Annual fees	17.0	17.0	0	0
Technical connection fees	10.2	10.2	0	0
Market Data Services	7.7	6.9	0	0
Other	35.6	32.9	3.8	3.7
	325.7	**308.0**	**5.2**	**11.4**
360T (foreign exchange)				
Trading	86.7	82.8	0	0
Other	20.8	15.1	0	0
	107.5	**97.9**	**0**	**0**
Xetra (cash equities)				
Trading and clearing	237.3	169.7	0	0
Listing	18.0	19.3	0	0
Xetra Data	113.6	119.8	0	0
Regulatory Services	12.7	14.6	0	0
Xetra Infrastructure	43.9	46.3	0	0
	425.5	**369.7**	**0**	**0**

1) Previous year adjusted.

Composition of net revenue (part 2)

	Other operating income		Volume-related costs		Net revenue	
	2020 €m	2019[1] €m	2020 €m	2019[1] €m	2020 €m	2019[1] €m
Eurex (financial derivatives)						
Equity index derivatives	0.1	0.2	– 59.9	– 50.8	540.5	484.0
Interest rate derivatives	0.1	0.1	– 3.4	– 3.2	200.1	210.9
Equity derivatives	0.1	0.1	– 8.6	– 7.4	48.4	51.1
OTC Clearing	22.3	11.7	– 17.4	– 12.3	54.9	41.2
margin fees	– 20.6	– 11.0	0	0	85.4	52.3
Infrastructure	0	0	– 0.2	– 0.2	84.0	76.5
Eurex Data	8.7	8.8	– 11.0	– 10.7	59.8	60.8
Other	7.3	6.4	– 3.6	– 4.1	37.2	32.5
	18.0	**16.3**	**– 104.1**	**– 88.7**	**1,110.3**	**1,009.3**
EEX (commodities)						
Power derivatives	0.5	0	– 14.1	– 15.9	115.8	105.1
Power spot	0	0	– 0.6	– 1.7	72.1	70.9
Gas	0	0	– 11.5	– 12.3	43.0	42.8
Annual fees	0	0	0	0	17.0	17.0
Technical connection fees	0	0	0	0	10.2	10.2
Market Data Services	0	0	0	0	7.7	6.9
Other	1.6	1.3	– 4.6	– 1.5	36.4	36.4
	2.1	**1.3**	**– 30.8**	**– 31.4**	**302.2**	**289.3**
360T (foreign exchange)						
Trading	0	0	– 4.8	– 5.9	81.9	76.9
Other	0.4	0.1	– 1.6	0	19.6	15.2
	0.4	**0.1**	**– 6.4**	**– 5.9**	**101.5**	**92.1**
Xetra (cash equities)						
Trading and clearing	1.0	0.7	– 35.0	– 19.0	203.3	151.4
Listing	1.7	1.5	– 0.8	– 0.9	18.9	19.9
Xetra Data	6.9	5.4	– 27.0	– 27.2	93.5	98.0
Regulatory Services	20.4	0	– 0.9	– 0.9	32.2	13.7
Xetra Infrastructure	0	0	– 0.1	0	43.8	46.3
	30.0	**7.6**	**– 63.8**	**– 48.0**	**391.7**	**329.3**

1) Previous year adjusted.

Composition of net revenue (part 3)

	Sales revenue		Treasury result from banking business	
	2020 €m	2019[1)] €m	2020 €m	2019[1)] €m
Clearstream (post-trading)				
Custody	565.6	532.3	0	0
Settlement	180.8	130.7	0	0
Net interest income from banking business	0	0	100.8	188.2
Third-party services	23.9	24.6	0	0
GSF Lending services	54.3	62.5	0	0
GSF Collateral management	52.9	49.9	0	0
Connectivity ICSD	74.4	65.9	0	0
Other	47.9	39.0	7.3	1.7
	999.8	**904.9**	**108.1**	**189.9**
IFS (investment fund services)				
Custody	92.1	80.0	0	0
Settlement	78.6	58.6	0	0
Connectivity	26.0	19.0	0	0
Funds distribution	101.2	0	0	0
Other	36.7	37.1	– 0.1	0.1
	334.6	**194.7**	**– 0.1**	**0.1**
Qontigo (index and analytics business)				
ETF licenses	39.6	43.0	0	0
Exchange licenses	37.8	34.4	0	0
Other licenses	114.8	101.9	0	0
Axioma	85.7	27.4	0	0
	277.9	**206.7**	**0**	**0**
Total	**3,584.0**	**3,117.3**	**196.6**	**247.7**
Consolidation of internal revenue	**– 64.7**	**– 63.1**	**0**	**0**
Group	**3,519.3**	**3,054.2**	**196.6**	**247.7**

1) Previous year adjusted.

Composition of net revenue (part 4)

	Other operating income		Volume-related costs		Net revenue	
	2020 €m	2019[1] €m	2020 €m	2019[1] €m	2020 €m	2019[1] €m
Clearstream (post-trading)						
Custody	0.2	0.2	– 148.3	– 140.8	417.5	391.7
Settlement	0.6	0	– 66.6	– 48.5	114.8	82.2
Net interest income from banking business	0	0	– 0.3	0	100.5	188.2
Third Parties	0	0	– 0.1	– 0.3	23.8	24.3
GSF Lending services	0	0	– 29.0	– 33.4	25.3	29.1
GSF Collateral management	0	0	– 1.3	– 1.0	51.6	48.9
Connectivity ICSD	0	0	– 5.3	– 5.7	69.1	60.2
Other	0.8	1.3	– 31.4	– 23.9	24.6	18.1
	1.6	**1.5**	**– 282.3**	**– 253.6**	**827.2**	**842.7**
IFS (investment fund services)						
Custody	0	0	– 4.7	– 3.3	87.4	76.7
Settlement	0	0	– 6.6	– 5.0	72.0	53.6
Connectivity	0	0	– 1.4	– 1.1	24.6	17.9
Funds distribution	0.3	0	– 87.1	0	14.4	0
Other	0.1	0	– 2.3	– 2.3	34.4	34.9
	0.4	**0**	**– 102.1**	**– 11.7**	**232.8**	**183.1**
Qontigo (index and analytics business)						
ETF licenses	0	0	– 4.9	– 4.3	34.7	38.7
Exchange licenses	0	0	– 3.1	– 2.9	34.7	31.5
Other licenses	0	0.3	– 9.2	– 8.0	105.6	94.2
Axioma	1.7	0.1	– 14.3	– 1.7	73.1	25.8
	1.7	**0.4**	**– 31.5**	**– 16.9**	**248.1**	**190.2**
Total	**54.2**	**27.2**	**– 621.0**	**– 456.2**	**3,213.8**	**2,936.0**
Consolidation of internal revenue	**– 13.7**	**– 13.7**	**78.4**	**76.8**	**0**	**0**
Group	**40.5**	**13.5**	**– 542.6**	**– 379.4**	**3,213.8**	**2,936.0**

1) Previous year adjusted.

Composition of treasury result from banking business

	2020 €m	2019[1] €m
Interest income from positive interest environment		
Debt financial assets measured at amortised cost	64.9	207.7
Interest expenses from positive interest environment		
Financial liabilities measured at amortised cost	– 31.3	– 71.7
Interest income from negative interest environment		
Debt financial assets measured at amortised cost	378.2	242.6
Interest expenses from negative interest environment		
Financial liabilities measured at amortised cost	– 256.0	– 186.8
Net interest income	**155.8**	**191.8**
Result from fair value valuation of foreign currency derivatives	33.4	54.4
Other currency result	7.6	1.6
Other result from securities	– 0.3	0
Total	**196.6**	**247.7**

1) Previous year adjusted.

Other operating income

Other operating income of €40.5 million (2019: €13.5 million) mainly comprises income from exchange rate differences of€ 6.0 million (2019: €4.6 million), income from services of €1.3 million (2019: €1.2 million), income from written-off receivables of €1.2 million (2019: €– 0.1 million) and rental income from subleases (income from operating leases) of €0.7 million (2019: €1.0 million). There was additional income of €19.8 million from the disposal of the Regulatory Reporting Hub in 2020.

5. Staff costs

Composition of staff costs

	2020 €m	2019 €m
Wages and salaries	682.2	622.1
Social security contributions, retirement and other benefits	140.7	125.7
Total	**822.9**	**747.8**

Wages and salaries comprise costs associated with the efficiency programme of €36.4 million (2019: €42.1 million).

6. Other operating expenses

Composition of other operating expenses

	2020 €m	2019 €m
Costs for IT service providers and other consulting services	248.2	226.4
IT costs	139.3	125.4
Non-recoverable input tax	40.0	37.8
Premises expenses	31.8	32.3
Insurance premiums, contributions and fees	21.6	13.3
Advertising and marketing costs	15.6	21.9
Travel, entertainment and corporate hospitality expenses	5.8	24.6
Cost of exchange rate differences	5.7	5.7
Voluntary social benefits	4.4	6.4
Supervisory Board remuneration	4.1	4.1
Short-term leases	3.0	2.0
Miscellaneous	26.2	16.7
Total	**545.8**	**516.6**

Composition of fees paid to the auditor

	2020		2019	
	Total €m	Germany €m	Total €m	Germany €m
Statutory audit services	6.1	4.2	4.5[1]	2.6
Other assurance or valuation services[2]	0.6	0.3	0.4	0.1
Tax advisory services	0.8	0.3	0.5	0.3
Other services	0.2	0.1	0.2	0.1
Total	**7.7**	**4.9**	**5.6**	**3.1**

1) Thereof €– 0.2 million for 2018.
2) Service according to ISAE 3402 and ISAE 3000.

Fees paid for “statutory audit services” rendered by KPMG AG Wirtschaftsprüfungsgesellschaft mainly comprise the audit of the consolidated financial statements 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. This item also includes statutory additions to the audit scope as well as key points of the audit agreed with the Supervisory Board. Services rendered during the reporting year also included reviews of the half-yearly financial statement and quarterly statements.

7. Result from financial investments

"Net income from strategic investments" was renamed "Result from financial investments", since this is a more accurate description. The item comprises measurement effects, dividend payments, distributions, foreign currency translation effects and write-downs on financial investments. Gains and losses on financial investments at FVPL are recognised on a net basis in the period in which they arise. Distributions from funds and dividends are recognised in profit or loss when the Group's right to receive payments is established and when such dividends are not capital repayments.

Composition of result from financial investments

	2020 €m	2019 €m
Result of the equity method measurement of associates	21.5	0.2
Result of strategic investments measured at fair value through other comprehensive income (dividends)	0.3	0.8
Result of financial investments measured at amortised cost	– 5.3	0
Result of financial investments measured at fair value through profit or loss	2.9	5.7
Result of derivatives	5.2	0
Result of hedge accounting	– 0.2	0
Total	**24.3**	**6.7**

In addition to the result of the equity valuation the net income from associates also includes impairment losses. No impairment loss was recognised in the reporting year (2019: €0.0 million). The increase is mainly due to the at-equity valuation of Tradegate AG Wertpapierhandelsbank which is based on the positive business performance in the reporting year.

For changes in financial investments see note 12.

8. Financial result

The financial result comprises interest income and expenses which are not attributable to the banking business of Deutsche Börse Group, and are therefore not recognised in net revenue. 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.

Composition of financial income

	2020 €m	2019 €m
Interest income from financial assets measured at fair value through other comprehensive income	0.1	0
Interest income from financial assets measured at amortised cost	0.4	1.3
Interest income from financial assets measured at fair value through profit or loss	0.1	0.3
Interest income on tax refunds	25.3	7.0
Other interest income and similar income	0.1	2.1
Total	**26.0**	**10.7**

Composition of financial expense

	2020 €m	2019 €m
Interest expense from financial assets measured at amortised cost	3.9	2.8
Interest expense from financial liabilities measured at amortised cost	49.7	48.2
Transaction cost of financial liabilities measured at amortised cost	3.4	2.2
Interest expense on taxes	35.8	3.1
Interest expense on lease liabilities	5.5	5.2
Expense of the unwinding of the discount on pension provisions	1.8	2.8
Other interest expense	2.8	0.2
Total	**102.9**	**64.4**

9. Income tax expense

Deutsche Börse Group is subject to the tax laws of those countries in which it operates and generates income. If it is probable that the tax authorities will not accept the disclosed amounts or the legal assessments on which the Group's tax declarations are based (uncertain tax positions), tax liabilities are recognised based on the best possible estimate of expected cash outflows. Tax assets are recognised if it is considered likely that they will be realised. The discretion in assessing uncertain tax positions is reexercised if there is a change in the underlying facts or their legal assessment (e.g. change in case law).

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. These differences are used to calculate deferred tax assets or liabilities.

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.

Composition of income tax expense

	2020 €m	2019 €m
Current income tax expense/(-income)	**414.5**	**378.0**
for the current year	425.5	384.4
for previous years	– 11.0	– 6.4
Deferred income tax expense/(-income)	**– 11.9**	**– 15.4**
due to temporary differences	– 25.2	– 22.7
due to tax loss carryforwards	0.3	– 0.4
due to changes in tax legislation and/or tax rates	0	7.7
for previous years	13.0	0
Total	**402.6**	**362.6**

Allocation of income tax expense to Germany and foreign jurisdictions

	2020 €m	2019 €m
Current income tax expense/(-income)	**414.5**	**378.0**
Germany	310.4	245.4
Foreign jurisdictions	104.1	132.6
Deferred income tax expense/(-income)	**– 11.9**	**– 15.4**
Germany	– 9.9	– 6.4
Foreign jurisdictions	– 2.0	– 9.0
Total	**402.6**	**362.6**

Tax rates of 27.4 to 31.9 per cent (2019: 27.4 to 31.9 per cent) were used in the reporting period to calculate income taxes for the German Group companies. These reflect trade income tax at rates of 11.6 to 16.1 per cent (2019: 11.6 to 16.1 per cent), corporation tax of 15 per cent (2019: 15 per cent) and the 5.5 per cent solidarity surcharge (2019: 5.5 per cent) on corporation tax.

A tax rate of 24.9 per cent (2019: 24.9 per cent) was used for the Group companies in Luxembourg. This includes trade tax at a rate of 6.7 per cent (2019: 6.7 per cent) and corporation tax at 18.2 per cent (2019: 18.2 per cent).

Tax rates of 10.0 to 34.6 per cent (2019: 10.0 to 34.6 per cent) were applied to the Group companies in the remaining countries; see note 33.

Current income tax expense was reduced by €0.3 million in the reporting year by utilization of previously unrecognised tax loss carryforwards (2019: nil). Deferred tax income of €2.4 million resulted from previously unrecognised tax losses (2019: nil). As in the previous year, there were no effects resulting from changes of the impairment of deductible temporary differences.

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	
	31.12.2020 €m	31.12.2019 €m	31.12.2020 €m	31.12.2019 €m
Intangible assets	**86.0**	**63.8**	**– 254.1**	**– 265.8**
Internally developed software	30.0	47.4	– 32.5	– 32.9
Other	56.0	16.4	– 221.6	– 232.9
Financial assets	1.7	1.2	– 13.8	– 5.2
Other assets	7.4	3.1	– 16.3	– 8.4
Provisions for pensions and other employee benefits	88.1	78.6	– 17.7	– 15.1
Other provisions	18.1	14.7	– 0.1	– 0.1
Liabilities	40.8	18.3	– 10.7	– 2.9
Tax loss carryforwards	15.6	15.9	0	0
Deferred taxes (before netting)	**257.7**	**195.6**	**– 312.7**	**– 297.5**
thereof recognised in profit and loss	190.4	135.4	– 303.4	– 295.6
thereof recognised in other comprehensive income[1)]	67.3	60.2	– 9.3	– 1.9
Deferred taxes set off	– 96.0	– 71.2	96.0	71.2
Total	**161.7**	**124.4**	**– 216.7**	**– 226.3**

1) See note 14 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 for which no deferred tax assets were recognised amounted to €27.2 million (2019: €39.5m). These unused tax loss carryforwards are entirely attributed to other jurisdictions (2019: Germany €4.6 Mio. €, other jurisdictions €34.9m).

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 (2019: nil).

Reconciliation from expected to reported tax expense

	2020 €m	2019[1] €m
Earnings before tax (EBT)	1,528.2	1,398.4
Expected tax expense	397.3	363.6
Effects of different tax rates	– 15.2	– 12.3
Effects of non-deductible expenses	15.5	10.4
Effects of tax-exempt income	– 1.3	– 1.8
Tax effects from loss carryforwards	0.9	0.3
Effects from changes in tax rates	0	7.7
Effects from intra-group restructuring	1.5	– 5.0
Other	2.0	6.1
Income tax expense arising from current year	**400.7**	**369.0**
Income taxes for previous years	1.9	– 6.4
Income tax expense	**402.6**	**362.6**

1) For a more accurate presentation, tax income of €10.0 million has been reclassified from „effects of tax-exempt income“ to „other“.

To determine the expected tax expense, earnings before tax have been multiplied by the composite tax rate of 26 per cent assumed for 2020 (2019: 26 per cent).

As at 31 December, the reported tax rate was 26.3 per cent (2019: 25.9 per cent).

Notes on the consolidated statement of financial position

10. Intangible assets

Recognition and measurement

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 upgrades to these systems.

Purchased software is generally amortised based on the projected useful life. 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.

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. Depending on the relevant acquisition transaction, the expected useful life is 5 years for trade names with finite useful lives, 4 to 24 years for participant and customer relationships, and 2 to 20 years for other intangible assets.

Exchange licences as well as certain trade names have no finite useful lives, and, in addition, there is an intention to maintain the exchange licences as part of the general business strategy; therefore, an indefinite useful life is assumed.

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

Impairment tests

At each reporting date, the Group assesses whether there are any indications that an intangible asset may be impaired. If this is the case, the carrying amount is compared with the recoverable amount (the higher of the 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. Impairment tests for (groups of) CGUs with allocated goodwill are carried out on 30 September every financial 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.

Additional impairment testing was carried out for intangible assets as of 30 June 2020 in response to the Covid-19 pandemic. It did not identify any impairment. At the acquisition date, goodwill is allocated to the CGU, or groups of CGUs, that is/are expected to create synergies from the relevant acquisition. If changes arise in the structure of CGUs, for example through a new segmentation, goodwill is allocated taking into account the relative fair values of the newly defined CGUs. 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 CGU, or groups of CGUs, 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.

The recoverable amount of the (groups of) CGUs was determined based on the fair value less costs to sell. The value in use was only determined if the fair value less costs to sell did not exceed the carrying amount. 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. 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 value in use, the projections are adjusted for the effects of future restructurings and performance investments, if appropriate.

At each reporting date, the Group assesses whether there are any indications that an impairment recognised for non-current assets in previous years (except goodwill) 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 previous periods. Deutsche Börse Group does not reverse any goodwill impairments.

Intangible assets

	Purchased software €m	Internally developed software €m	Goodwill €m	Payments on account and construction in progress €m	Other intangible assets €m	Total €m
Historical cost as at 1 Jan 2019	**188.9**	**1,076.1**	**2,865.6**	**60.5**	**1,079.1**	**5,270.2**
Acquisitions from business combinations	95.5	0	609.3	15.2	110.4	830.4
Additions	15.7	53.0	0	44.6	9.7	123.0
Disposals	– 2.3	0	0	0	0	– 2.3
Reclassifications	0	17.9	0	– 17.9	– 0.1	– 0.1
Exchange rate differences	– 1.0	0.2	– 4.4	0	0.7	– 4.5
Historical cost as at 31 Dec 2019	**296.8**	**1,147.2**	**3,470.5**	**102.4**	**1,199.8**	**6,216.7**
Acquisitions through business combinations	15.8	0	550.2	0	271.2	837.2
Adjustment of previous year Goodwill	0	0	4.3	0	0	4.3
Additions	13.9	54.8	0	64.8	0.8	134.3
Disposals	– 3.3	– 0.1	0	– 0.2	0	– 3.6
Reclassifications	1.1	23.1	0	– 23.8	– 0.1	0.3
Exchange rate differences	– 8.6	– 1.9	– 67.4	– 1.4	– 19.4	– 98.7
Historical cost as at 31 Dec 2020	**315.7**	**1,223.1**	**3,957.6**	**141.8**	**1,452.3**	**7,090.5**
Amortisation and impairment losses as at 1 Jan 2019	**153.1**	**790.9**	**0**	**8.2**	**126.4**	**1,078.6**
Amortisation	20.3	77.7	0	0	32.5	130.5
Impairment losses	0	0	0	1.8	0	1.8
Disposals	– 2.3	0	0	0	0	– 2.3
Reclassifications	0	0	0	0	0	0
Exchange rate differences	– 0.2	0	0	– 0.1	0	– 0.3
Amortisation and impairment losses as at 31 Dec 2019	**170.9**	**868.6**	**0**	**9.9**	**158.9**	**1,208.3**
Amortisation	30.5	86.3	0	0	38.5	155.3
Impairment losses	0	2.6	0	5.6	0	8.2
Disposals	– 2.2	0	0	0	0	– 2.2
Reclassifications	0	0	0	0	0	0
Exchange rate differences	– 1.2	– 0.5	0	0	– 0.5	– 2.2
Amortisation and impairment losses as at 31 Dec 2020	**198.0**	**957.0**	**0**	**15.5**	**196.9**	**1,367.4**
Carrying amount as at 31 Dec 2019	125.9	278.6	3,470.5	92.5	1,040.9	5,008.4
Carrying amount as at 31 Dec 2020	**117.7**	**266.1**	**3,957.6**	**126.3**	**1,255.4**	**5,723.2**

Material intangible assets

	Carrying amount as of		Remaining amortisation period as at	
	31 Dec 2020 €m	31 Dec 2019 €m	31 Dec 2020 years	31 Dec 2019 years
Customer Relationship Clearstream Funds Centre	237.1	n/a	19.8	n/a
Customer Relationship 360T	179.7	189.8	17.8	18.8

Software, payments on account and software in development

Deutsche Börse Group recognises research costs as expenses in the period in which they are incurred. Development costs for internally developed intangible assets are only capitalised when the definition and recognition criteria for intangible assets according to IAS 38 are met, and development costs can be separated from research costs.

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 through profit or loss in the reporting period.

Total development costs came to €158.2 million in 2020 (2019: €142.2 million), of which €104.0 million was capitalised (2019: €97.5 million).

The impairments tests carried out at Deutsche Börse Group in 2020 resulted in impairment losses totalling €8.2 million (2020: €1.8 million). They are shown in the item “Depreciation, amortisation and impairment losses” and relate to the following assets:

- An impairment loss of €2.6 million (recoverable amount: negative) in the fourth quarter 2020 relates to the SecLending system for clearing CCP securities lending transactions. Upcoming technological investments exceed the expected revenues. The providing of clearing services for securities lending transactions is being discontinued as a result.
- Another impairment loss of €1.0 million (recoverable amount: negative) in the fourth quarter 2020 was recognised on C7 software and relates to a decision that Eurex Crypto Futures were not introduced in 2020.
- Another impairment loss in the fourth quarter of €0.4 million (recoverable amount: negative) relates to capitalised development costs for planned new asset class from Cascade, which was intended to offer the settlement of Cascade-registered shares in the investment funds business, too. The impairment loss is the result of investigations which showed that there is a smaller market need for this product due to regulatory changes.
- After Regulatory Services was carved out, Regulatory Services GmbH was sold to Trax NL B.V. (a wholly owned subsidiary of MarketAxess Holdings Inc.) on 30 November 2020. The disposal of Regulatory Services GmbH and the loss of its clients was the reason for the impairment loss of €4.2 million on the IT platform RRH 2.0 (recoverable amount: negative).

The recoverable amount was measured at fair value less costs to sell, using a discounted cash flow model (level 3 inputs).

Goodwill and other intangible assets from business combinations

Changes in goodwill classified by (groups of) CGUs

	Eurex €m	Clear-stream €m	Qontigo €m	IFS €m	360T €m	EEX €m	Xetra €m	GSF €m	Data €m	Total €m
Balance as at 1 Jan 2019	**1,293.5**	**969.1**	**18.5**	**56.6**	**244.1**	**115.6**	**6.7**	**142.1**	**19.4**	**2,865.6**
Acquisitions through business combinations	0	0	596.4	10.0	0	2.9	0	0	0	**609.3**
Exchange rate differences	0.1	– 0.1	– 6.3	– 0.3	1.1	1.0	0	0	0.1	**– 4.4**
Balance as at 31 Dec 2019	**1,293.6**	**969.0**	**608.6**	**66.3**	**245.2**	**119.5**	**6.7**	**142.1**	**19.5**	**3,470.5**
Reallocation due to change in reporting structure	17.0	142.1	0	0	0	0	2.5	– 142.1	– 19.5	**0**
Acquisitions through business combinations	64.1	0	0	484.9	0	1.2	0	0	0	**550.2**
Adjustment of previous year Goodwill	0	0	4.3	0	0	0	0	0	0	**4.3**
Exchange rate differences	– 2.3	0	– 53.6	– 1.5	– 5.0	– 4.9	– 0.1	0	0	**– 67.4**
Balance as at 31 Dec 2020	**1,372.4**	**1,111.1**	**559.3**	**549.7**	**240.2**	**115.8**	**9.1**	**0**	**0**	**3,957.6**

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 2019	**24.0**	**460.0**	**464.7**	**4.0**	**952.7**
Acquisitions through business combinations	0	65.4	44.0	1.0	110.4
Additions	0	0	8.5	1.2	9.7
Amortisation	0	– 0.1	– 31.2	– 1.2	– 32.5
Exchange rate differences	0.5	– 0.6	0.8	0	0.7
Reclassifications	0	0	0	– 0.1	– 0.1
Balance as at 31 Dec 2019	**24.5**	**524.7**	**486.8**	**4.9**	**1,040.9**
Acquisitions through business combinations	0	0	270.3	0.9	271.2
Additions	0	0	0.3	0.5	0.8
Amortisation	0	– 0.4	– 36.5	– 1.6	– 38.5
Exchange rate differences	– 2.1	– 6.2	– 10.5	– 0.1	– 19.0
Reclassifications	0	0	0	0	0
Balance as at 31 Dec 2020	**22.4**	**518.1**	**710.4**	**4.6**	**1,255.4**

Key assumptions used for impairment tests in 2020

(Group of) CGUs	Allocated book value Mio. €	Risk-free interest rate %	Market risk premium %	Discount rate %	Perpetuity growth rate %	CAGR[1] Net revenue %	CAGR[1] Operating costs %
Goodwill							
Eurex[2]	1,310.0	– 0.2	7.8	6.2	1.5	3.9	1.4
Clearstream[2]	1,111.1	– 0.2	7.8	7.6	1.0	2.7	1.9
Qontigo	585.5	– 0.2	7.8	7.5	1.5	12.6	6.9
360T	551.8	– 0.2	7.8	7.5	1.5	10.4	2.8
EEX	242.7	– 0.2	7.8	7.7	2.0	9.7	5.0
IFS	118.2	– 0.2	7.8	7.1	1.5	6.9	2.1
Xetra	9.1	– 0.2	7.8	7.5	1.0	5.6	8.4
Trade names and exchange licences							
STOXX	420.0	– 0.3	7.8	7.4	1.5	7.9	5.9
Axioma	58.7	1.4	6.3	7.8	2.5	15.8	4.7
Nodal	26.1	1.4	6.3	7.6	1.5	23.8	6.8
360T	19.9	– 0.3	7.8	7.7	2.0	8.7	7.1
EEX	13.5	– 0.3	7.8	7.0	1.5	6.0	4.3
360TGTX	1.6	0.9	6.3	7.7	2.0	17.8	11.0
Structured Products	0.2	– 0.3	7.8	7.4	1.0	– 2.5	1.5

1) CAGR = compound annual growth rate
2) The CGU Data was allocated to Eurex and Xetra / The CGU GSF was allocated to Clearstream

Key assumptions used for impairment tests in 2019

	Book value Mio. €	Risk-free interest rate %	Market risk premium %	Discount rate %	Perpetuity growth rate %	CAGR[1] Net revenue %	CAGR[1] Operating costs %
Goodwill							
Eurex	1,293.6	– 0.2	7.5	5.8	1.0	4.9	3.9
Clearstream	969.0	– 0.2	7.5	7.0	1.0	3.1	3.3
Qontigo	608.5	– 0.2	7.5	7.4	1.5	13.2	20.7
360T	245.2	– 0.2	7.5	7.3	2.0	11.1	6.7
GSF	142.1	– 0.2	7.5	8.1	1.5	4.6	2.6
EEX	119.5	– 0.2	7.5	6.7	1.5	8.0	6.0
IFS	66.3	– 0.2	7.5	7.8	1.5	9.9	5.5
Data	19.5	– 0.2	7.5	7.6	1.5	3.6	5.5
Xetra	6.7	– 0.2	7.5	6.2	1.0	2.8	3.1
Trade names and exchange licences							
STOXX	420.0	0.2	7.5	7.8	1.5	8.3	3.4
Axioma	64.3	2.3	6.0	8.5	1.5	26.6	16.9
Nodal	28.6	2.3	6.0	8.0	1.5	9.0	7.2
360T Core	19.9	0.2	7.5	7.7	2.0	8.7	4.5
EEX Core	14.3	0.2	7.5	7.0	1.5	5.6	4.5
360TGTX	1.7	2.3	6.0	8.6	2.0	21.3	12.0
Structured Products	0.2	0.2	7.5	7.0	1.0	2.9	2.5

1) CAGR = compound annual growth rate

Even in case of a reasonably possible change of the parameters, none of the above-mentioned CGUs, or groups of CGUs, would be impaired.

11. Property, plant and equipment

Measurement of purchased 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. The carrying amount is immediately written down to its recoverable amount if the carrying amount is higher than its recoverable amount. 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 and in the previous year as they could not be directly allocated to any particular development project. 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. Repair and maintenance costs are expensed as incurred.

Useful life of property, plant and equipment

	Depreciation period
IT hardware	3 to 5 years
Operating and office equipment	5 to 25 years
Leasehold improvements	Based on lease term

Measurement of right-of-use assets

Deutsche Börse Group leases a large number of different assets. This includes mainly buildings and passenger vehicles. Right-of-use assets are measured at cost. Any accumulated depreciation and impairment amounts are deducted from the cost of right-of-use assets as part of subsequent measurement. This does not apply to short-term leases with a term of not more than twelve months and leases for low-value assets. Expenses in the reporting year resulting from the above-mentioned short-term and low-value assets are reported in other operating expenses.

Useful life of property, plant and equipment

	Depreciation period
Right-of-use – land and buildings	Based on lease term
Right-of-use – IT hardware, operating and office equipment as well as carpool	Based on lease term

As a lessor in the case of an operating lease, the Group presents the leased asset as an item of property, plant and equipment and measures such asset at amortised cost. The lease instalments received during the period are shown under other operating income.

Property, plant and equipment (incl. Right-of-use assets)

	Land and buildings (right-of-use)	Fixtures and fittings	IT hardware, operating and office equipment as well as carpool			Advance payments made and construction in progress	Total
			Right-of-use	Purchased	Total		
	€m	€m	€m	€m	€m	€m	€m
Historical costs as at 1 Jan 2019	**258.3**	**83.5**	**4.5**	**271.1**	**275.6**	**14.8**	**632.2**
Acquisitions through business combinations	10.2	1.5	3.0	0.8	3.8	0	15.5
Additions	120.7	9.7	2.3	44.0	46.3	8.1	184.8
Disposals	0	– 24.5	0	– 12.6	– 12.6	– 0.3	– 37.4
Reclassifications	0	7.1	0	– 0.2	– 0.2	– 6.8	0.1
Exchange rate differences	– 0.1	0.2	0	0.1	0.1	0	0.2
Historical costs as at 31 Dec 2019	**389.1**	**77.5**	**9.8**	**303.2**	**313.0**	**15.8**	**795.4**
Acquisitions through business combinations	3.1	0	0	0.3	0.3	0.5	3.9
Additions	70.3	13.1	3.0	43.4	46.4	4.7	134.5
Disposals	– 0.7	– 3.1	0	– 6.3	– 6.3	– 0.9	– 11.0
Reclassifications	0	9.7	0	3.1	3.1	– 13.1	– 0.3
Exchange rate differences	– 2.3	– 0.6	– 0.2	– 0.5	– 0.7	0	– 3.6
Historical costs as at 31 Dec 2020	**459.5**	**96.6**	**12.6**	**343.2**	**355.8**	**7.0**	**918.9**
Depreciation and impairment losses as at 1 Jan 2019	**0**	**52.2**	**0**	**186.3**	**186.3**	**0**	**238.5**
Amortisation	42.5	7.8	2.7	40.9	43.6	0	93.9
Disposals	0	– 22.5	0	– 12.3	– 12.3	0	– 34.8
Exchange rate differences	0.1	0.2	0.1	– 0.6	– 0.5	0	– 0.2
Depreciation and impairment losses as at 31 Dec 2019	**42.6**	**37.7**	**2.8**	**214.3**	**217.1**	**0**	**297.4**
Amortisation	48.5	9.2	4.2	39.0	43.2	0	100.9
Disposals	– 0.4	– 2.5	0	– 5.8	– 5.8	0	– 8.7
Exchange rate differences	– 0.4	– 0.3	– 0.1	– 0.3	– 0.4	0	– 1.1
Depreciation and impairment losses as at 31 Dec 2020	**90.3**	**44.1**	**6.9**	**247.2**	**254.1**	**0**	**388.5**
Carrying amount as at 31 Dec 2019	**346.5**	**39.8**	**7.0**	**88.9**	**95.9**	**15.8**	**498.0**
Carrying amount as at 31 Dec 2020	**369.2**	**52.5**	**5.7**	**96.0**	**101.7**	**7.0**	**530.4**

The average remaining term of leases is 16.9 years.

The remaining term of the material sub-lease is two years; it is then renewed automatically for an indefinite period. Both parties can terminate the lease at the end of the remaining term by giving notice of six months.

For details regarding the corresponding lease liabilities, please see note 12.

12. Financial instruments

Financial assets

Recognition and derecognition
Financial assets are recognised when the Group or one of its companies becomes 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 and is an intermediate between lender and borrower without becoming a contracting party from an economic perspective. Consequently, these transactions are not recognised in the consolidated balance sheet.

Initial measurement and classification
Financial assets are first recognised at fair value. For financial assets not measured at fair value through profit or loss the recognised amount also includes transaction costs that can be allocated directly to the acquisition of this asset. Transaction costs of financial assets at fair value through profit or loss are expensed.

Financial assets are classified at the acquisition date, from which subsequent measurement is derived. Deutsche Börse Group allocates its financial assets to the following measurement categories:

- At fair value (either at "fair value through other comprehensive income" (FVOCI) or "fair value through profit or loss" (FVPL))
- At amortised cost (aAC)

Debt instruments are allocated on the basis of the business model for managing the financial assets and the contractual cash flow characteristics. Debt instruments are only reclassified if the business model for managing them is changed. Deutsche Börse Group does not make use of the option to designate debt instruments as at fair value through profit or loss on initial recognition (fair value option).

The allocation of investments in equity securities held for trading depends on whether the option of designating the corresponding financial instruments as at fair value through other comprehensive income (FVOCI option) is used on initial recognition. Each individual equity instrument can be allocated separately and may not be changed in subsequent periods.

Subsequent measurement of debt instruments
Deutsche Börse Group allocates each debt instrument to one of the following categories:

- **Amortised cost (aAC):** Assets allocated to the "hold" business model and whose cash flows consist of solely payments of principal and interest are measured at amortised cost. Interest income from these financial assets is measured using the effective interest method. Gains and losses from derecognition, impairment and exchange rate movements are recognised through profit or loss. Measurement effects are shown in banking business or non-banking business depending on how the financial assets are allocated. For financial assets from banking business all measurement effects are shown in the treasury result from banking business. Interest income from the non-banking business are shown in the financial result. All other effects of non-banking business are presented in result from financial investments. All effects relating to the measurement of trade receivables are shown in other operating income and expenses.
- **Fair value through other comprehensive income (FVOCI):** Investments in debt instruments allocated to the "hold and sell" business model and whose cash flows consist solely of payments of principal and interest are measured at fair value through other comprehensive income. Impairments on these debt instruments are recognised in profit or loss in the result from financial investments. On disposal of these debt instruments the cumulative gains or losses in the revaluation reserve are recycled to profit or loss in the result from financial investments. Interest income from fixed income securities in this category are shown in the financial result.
- **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 and their measurement effects are shown in result from financial investments. Distributions from fund interests are also shown in result from financial investments. Interest income from fixed income securities in this category are shown in the financial result.

Subsequent measurement of equity instruments
Equity instruments are always subsequently measured at fair value. Since Deutsche Börse Group has used the irrevocable FVOCI option for all equity instruments as of the reporting date, gains and losses are recognised in other comprehensive income. When the item is derecognised the gains and losses are not recycled through profit or loss, but reclassified to retained earnings. Dividends from these financial investments are shown in net income from financial investments.

Impairment
As a rule, any impairment for expected credit losses for debt instruments reported at amortised cost and at fair value through other comprehensive income is determined using the three-stage impairment model in IFRS 9. The losses represent a forward-looking measurement of future losses that are generally subject to estimates.

Stage 1: The impairment upon initial recognition is measured on the basis of the expected losses for the next twelve months.
Stage 2: If a financial asset's credit risk has increased significantly, the expected credit loss is determined over the entire term. A significant increase in credit risk is determined individually using internal ratings.
Stage 3: Credit-impaired financial assets are allocated to Stage 3 and the impairment is based on the ful lifetime expected credit losses. This is the case if there are observable data of significant financial difficulties and there is a high risk of default, even if the definition of a default has not yet been met.

If the credit risk for debt instruments at amortised cost and at fair value through profit or loss is low in absolute terms as at the reporting date, they remain in Stage 1 even if the default risk has increased.

Deutsche Börse Group has identified the following two triggers to identify an event of default and which cause a transfer to stage 3 accordingly:

Legal default event: a contractual partner is unable to fulfil its contractual obligation according to an agreement with Deutsche Börse Group due to insolvency/bankruptcy.
Contractual default event: 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.

Within Deutsche Börse Group, the expected credit losses for trade receivables are measured based on the simplified approach, which requires lifetime expected losses to be recognised from initial recognition of a receivable. For trade receivables, a default is assumed for amounts which are overdue for more than 360 days.

Financial Liabilities

Recognition and derecognition
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. Financial liabilities are derecognised when the contractual obligation has been extinguished because it has been discharged or cancelled or has expired.

Financial liabilities measured at amortised cost
Financial liabilities not held for trading are generally accounted for 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 using the effective interest method. Liabilities to non-controlling shareholders for the acquisition of non-controlling shares settled in cash or another financial asset are recognised at the present value of the future purchase price. Subsequent measurement recognises through profit or loss the effect on present value of accrued interest on the financial obligation and all

measurement changes in the obligations. 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.

Financial liabilities measured at fair value through profit or loss
Contingent purchase payments recognised by the purchaser of a business combination in accordance with IFRS 3 are not measured at amortised cost. The resulting financial liabilities are recognised at fair value through other profit or loss. With a contingent purchase price component the purchaser is obliged to transfer additional assets or shares to the seller if certain conditions are met. Subsequent measurement is at fair value through profit or loss.

Deutsche Börse Group does not make use of the option to designate financial liabilities at fair value through profit or loss upon initial recognition (fair value option).

Deutsche Börse Group's exposure to various risks associated with the financial instruments is discussed in note 23. 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.

Presentation and netting of financial assets and liabilities

Financial assets and liabilities in the statement of financial position are divided into non-current and current. They are presented as non-current assets if the remaining term is more than twelve months as at the reporting date. They are presented as current assets if the remaining term is less than twelve months.

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 offset the recognised amounts and intends either to settle on a net basis or to realise the asset and settle the liability simultaneously.

Derivative financial instruments and hedge accounting

Derivatives are initially recognised at fair value at the time of the derivative contract. They are only used for hedging and not as a speculative investment. Where derivatives do not meet the hedge accounting criteria, they are classified as “held for trading” for accounting purposes and are remeasured at the end of each reporting period at fair value through profit or loss. Gains and losses from the subsequent measurement are either recognised in the treasury result from banking business or in result from financial investments.

Deutsche Börse Group uses foreign exchange derivatives as hedging instruments to hedge existing or expected transactions against foreign exchange risks. When a hedging transaction takes place the economic relationship between the hedging instrument and the hedged item is documented in accordance with the statutory requirements.

Cash flow hedges that qualify for hedge accounting

The effective portion of changes in the fair value of derivatives designated as cash flow hedges is shown in the reserve for cash flow hedges as part of other comprehensive income; it is limited to the cumulative change in the fair value of the hedged item on the basis of its present value since the hedging transaction. Gains or losses on the ineffective portion are recognised directly through profit or loss, either in the treasury result from banking business or in the result from financial investments. If forward contracts are used to hedge planned transactions the Deutsche Börse Group designates the entire change in the fair value of the forward, including the forward component, as a hedging instrument. In this case the gains or losses from the effective portion of the change in fair value for the entire future transaction are recognised in the reserve for cash flow hedges as a component of equity. If the Group uses futures to hedge existing receivables and liabilities, only the spot component of the future is designated. Gains or losses from the effective portion of the change in the spot component of the future are shown in the reserve for cash flow hedges. Changes in the forward component of the hedging instrument that relates to the hedged item are considered to be hedging costs and shown separately in the reserve for hedging costs in other comprehensive income. The fair value of the forward component not included in the hedging relationship at the time it is designated is written off pro rata temporis over the period of the hedging relationship. The amount written down is recycled from the reserve for hedging costs to profit or loss.

Cumulative amounts in the reserve for cash flow hedges are reclassified according to the following methodology:

- If the cash flow hedge serves to hedge plannend transactions, the amount from the hedging instrument that has accumulated in other comprehensive income up to the acquisition date is derecognised from the reserve and treated as part of the acquisition costs.
- For cash flow hedges of existing receivables and liabilities, the amount that has accumulated in the reserve for cash flow hedges is reclassified to profit or loss in the periods in which there are changes in the hedged future cash flows recognised through profit or loss.
- If this amount is a loss, however, and the assumption is that all or part of this loss cannot be recouped in future periods, then this amount is recognised immediately through profit or loss.

The effectiveness of the hedging relationship is assessed at the beginning and over the entire duration of the hedging relationship to ensure that there is an economic relationship between the hedging instrument and the hedged item. To hedge foreign currency risks, hedging relationships are established in which all relevant contractual parameters of the hedging transaction match exactly with those of the hedged item. Ineffectiveness may arise in the hedging of foreign currency transactions if the timing of the planned transaction changes compared with the original estimate. Ineffectiveness due to changes in the default risk of Deutsche Börse Group or the counterparty to the hedging transaction is deemed to be negligible. Effectiveness is measured regularly as at the reporting dates. The Group uses the hypothetical derivative method for this purpose.

When a hedging instrument expires or is sold or terminated, or when a hedge no longer meets the criteria for hedge accounting, hedge accounting is discontinued. 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.

Financial assets measured at fair value through other comprehensive income

The item “Equity investments at fair value through other comprehensive income” was renamed “Financial assets at fair value through other comprehensive income”, because equity instruments and debt instruments are now presented together in this category. This item comprises strategic investments which Deutsche Börse Group has irrevocably elected to recognise at fair value through other comprehensive income in this category at initial recognition. The Group believes that this classification is more meaningful. In addition fixed-income securities allocated to the “Hold and sell” business model are also presented at fair value through other comprehensive income.

Composition of financial assets measured at fair value through other comprehensive income

	2020 €m	2019 €m
Strategic investments	**107.0**	**66.3**
Listed securities	0	12.5
Unlisted securities	107.0	53.8
Listed debt instruments	**4.9**	**0**
Total	**111.9**	**66.3**

None of the financial assets have been pledged as collateral by Deutsche Börse Group. Debt securities amounting to €0.5 million expired in 2020. Debt securities amounting to €0.5 million are classified as current as at 31 December 2020; total impairments came to less than €0.1 million.

Amounts recognised in profit or loss and other comprehensive income

	2020 €m	2019 €m
Gains/(losses) recognised in other comprehensive income		
Strategic investments	25.5	– 10.4
Debt instruments	0.3[1)]	0
Total	**25.8**	**– 10.4**
Gains/(losses) recognised in profit or loss		
Dividends related to investments derecognised during the period	0.3	0
Dividends related to investments held at the end of the reporting period	0	1.3
Total	**0.3**	**1.3**

1) Of which €0.1 million (2019: nil) are attributable to non-controlling interests.

The disposal of one strategic investment resulted in a gain of €0.1 million (2019: €10.5 million), recognised outside profit or loss in retained earnings.

Financial assets and liabilities measured at amortised cost

Composition of financial assets at amortised cost

	31 Dec 2020			31 Dec 2019		
	Non-current €m	Current €m	Total €m	Non-current €m	Current €m	Total €m
Trade receivables	**0**	**616.6**	**616.6**	**0**	**447.3**	**447.3**
of which expected losses	0	– 9.2	– 9.2	0	– 7.1	– 7.1
Other financial assets measured at amortised costs	**997.5**	**16,225.1**	**17,222.6**	**698.7**	**15,381.6**	**16,080.3**
Fixed income securities	992.1	206.0	1,198.0	693.0	592.1	1,285.1
Reverse repo transactions	0	6,176.7	6,176.7	0	6,394.3	6,394.3
Balances on nostro accounts	0	2,252.4	2,252.4	0	1,596.2	1,596.2
Money market lendings	0	6,440.0	6,440.0	0	6,435.8	6,435.8
Customer overdrafts from settlement business	0	267.7	267.7	0	231.7	231.7
Receivables from CCP balances	0	675.6	675.6	0	48.4	48.4
Margin calls	0	156.6	156.6	0	8.0	8.0
Other	5.4	50.0	55.5	5.7	75.1	80.8
of which expected losses	– 0.3	– 0.0	– 0.3	– 0.0	0.0	– 0.0
Restricted bank balances	**0**	**38,420.1**	**38,420.1**	**0**	**29,988.7**	**29,988.7**
Cash and other bank balances	**0**	**1,467.3**	**1,467.3**	**0**	**888.1**	**888.1**
Total	**997.5**	**56,729.1**	**57,726.6**	**698.7**	**46,705.7**	**47,404.4**

In 2020 fixed income securities in the amount of €609.6 million (2019: €596.0 million) expired.

Amounts reported separately under liabilities as cash deposits by market participants are restricted. Such amounts are invested mainly via bilateral or triparty reverse repurchase agreements and in the form of overnight deposits at central banks and banks and shown as 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.

Composition of financial liabilities at amortised cost

	31 Dec 2020			31 Dec 2019		
	Non-current €m	Current €m	Total €m	Non-current €m	Current €m	Total €m
Trade payables	**0**	**388.6**	**388.6**	**0**	**206.7**	**206.7**
Other iabilities at amortised costs	**3,474.4**	**14,630.0**	**18,104.4**	**2,627.2**	**14,225.4**	**16,852.6**
Bonds issued	2,637.1	0	2,637.1	2,286.2	0	2,286.2
Deposits from securities settlement business	0	12,191.6	12,191.6	0	13,725.6	13,725.6
Money market borrowings	0	1,176.2	1,176.2	0	19.2	19.2
Purchase price liabilities from business combinations	479.5	0	479.5	0	0	0
Commercial Papers issued	0	546.4	546.4	0	311.9	311.9
Liabilities from CCP balances	0	565.3	565.3	0	49.9	49.9
Leasing liabilities	357.8	51.1	408.9	341.0	41.5	382.5
Bank overdrafts	0	27.8	27.8	0	5.2	5.2
Other	0	71.7	71.7	0	72.0	72.0
Cash deposits from market participants	**0**	**38,188.8**	**38,188.8**	**0**	**29,755.8**	**29,755.8**
Total	**3,474.4**	**53,207.4**	**56,681.8**	**2,627.2**	**44,187.9**	**46,815.1**

Deutsche Börse AG made the investors in a bond a redemption offer in the second quarter of 2020. In the course of this redemption offer €284.9 million was redeemed at a purchase price of 101.0 per cent. In the fourth quarter of 2020 the remaining tranche of the same bond was repaid at its nominal value of €315.1 million as at the termination date. The entire redemption of the bond gave rise to a negative effect of €3.9 million recognised through profit or loss in the reporting year. To refinance this bond a new hybrid bond with a nominal volume of €600.0 million was issued. This hybrid bond has a maturity of 27 years with a redemption option after seven years. It bears interest at 1.25 per cent.

Clearstream Banking AG issued a bond with a nominal volume of €350.0 million and an interest coupon of 0.0 per cent in the fourth quarter 2020. The bond has a maturity of five years.

The financial liabilities recognised on the balance sheet were not secured by liens or similar rights as at 31 December 2020 or as at 31 December 2019.

Cash deposits by market participants

Composition of cash deposits by market participants

	31 Dec 2020 €m	31 Dec 2019 €m
Liabilities from margin payments		
Liabilities from margin payments to Eurex Clearing AG by clearing members	31,750.3	25,461.9
Liabilities from margin payments to European Commodity Clearing AG by clearing members	5,964.8	3,794.7
Liabilities from margin payments to Nodal Clear, LLC by clearing members	473.3	494.2
Liabilities from margin payments to European Energy Exchange AG by clearing members	0.4	0.3
Liabilities from cash deposits by participants in equity trading	0	4.7
Total	**38,188.8**	**29,755.8**

Financial assets and liabilities measured at fair value through profit or loss

Financial instruments of the central counterparties
Eurex Clearing AG, European Commodity Clearing AG and Nodal Clear, LLC act as central counterparties:

- Eurex Clearing AG guarantees the settlement of all transactions involving futures and options on Eurex Germany. 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, as part of the Nodal Exchange Group, 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. 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 derivatives), 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.

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.

Composition of financial instruments held by central counterparties

	31 Dec 2020 €m	31 Dec 2019 €m
Repo transactions	58,020.6	60,352.2
Options	29,677.1	23,126.6
Others	5.0	57.0
Total	**87,702.7**	**83,535.8**
thereof non-current	6,934.7	5,234.2
thereof current	80,768.1	78,301.5

Receivables and liabilities that may be offset against a clearing member are reported on a net basis. Financial liabilities of €95.0 million (31 December 2019: €890.0 million) were eliminated because of intra-Group GC Pooling transactions.

Other financial assets and liabilities measured at fair value through profit or loss

For greater clarity “Derivatives” are now presented in the item “Other financial assets measured at fair value through profit or loss” or “Other financial liabilities measured at fair value through profit or loss”. These positions of Deutsche Börse are made up as follows:

Other financial assets and liabilities measured at fair value through profit or loss

	Carrying amount 31.12.2020			Carrying amount 31.12.2019		
	Non-current €m	Current €m	Total €m	Non-current €m	Current €m	Total €m
Derivatives	**0.2**	**8.1**	**8.4**	**0**	**1.4**	**1.4**
Forward exchange transactions designated as cash flow hedges	0.2	0	0.2	0	0	0
Foreign currency derivatives not designated as hedges	0	8.1	8.1	0	1.4	1.4
Other financial assets	**42.2**	**7.6**	**49.8**	**28.4**	**0.4**	**28.8**
Fund units and debt securities	42.2	0	42.2	28.4	0	28.4
Contingent consideration	0	7.6	7.6	0	0	0
Other	0	0	0	0	0.4	0.4
Total assets	**42.4**	**15.8**	**58.2**	**28.4**	**1.7**	**30.2**
Derivatives	**1.5**	**172.6**	**174.1**	**0**	**25.9**	**25.9**
Forward exchange transactions designated as cash flow hedges	1,5	39.9	41.4	0	0	0
Foreign currency derivatives not designated as hedges	0	132.7	132.7	0	25.9	25.9
Other financial liabilities	**0**	**1.5**	**1.5**	**84.3**	**3.6**	**87.9**
Contingent consideration	0	1.5	1.5	84.3	3.6	87.9
Total liabilities	**1.5**	**174.1**	**175.6**	**84.3**	**29.5**	**113.8**

As of 31 December 2020 there were foreign currency derivatives not designated in hedges with a term of less than eight months with a nominal amount of €2,524.2 million (31 December 2019: €2,965.6 million with a term of less than seven months). Thereof €510.3 million (31 December 2019: €827 million) is attributable to derivatives with a positive fair value and thereof €2,013.9 million (31 December 2019: €2,138.6 million) is attributable to derivatives with a negative fair value. These foreign currency derivatives were entered into mainly in order to convert USD amounts received into euros for liquidity management purposes on the one hand and as an alternative to unsecured deposits and loans on the other hand with the aim of hedging the unsecured counterparty risk as well as liquidity risk in daily liquidity management.

Amounts recognised in profit or loss

	2020 €m	2019 €m
Net gain/(loss) from derivatives not designated as hedges	38.6	54.4
Net gain/(loss) from cash flow hedges	– 0.2	0
Net gain/(loss) from other financial assets measured at fair value through profit or loss	9.4	6.3
Distributions from fund units	0.8	0.3
Net gain/(loss) from other financial liabilities measured at fair value through profit or loss	1.8	– 3.5
Total	**50.4**	**57.5**

Cash flow hedges that qualify for hedge accounting

Deutsche Börse AG entered into cash flow hedges in various currencies in 2020 to hedge existing or forcast transactions. The effects of foreign currency hedging instruments on the financial position and financial performance is as follows:

Forward exchange transactions

	2020	2019
Spot components from forward exchange transactions in CHF		
Carrying amount in €m (non-current financial assets measured at fair value through profit and loss)	0.2	n/a
Nominal amount in Fr.m	56.3	n/a
Due date	31.12.2022	n/a
Hedge ratio	100.0%	n/a
Change in fair value of the hedging instrument in €m	0.2	n/a
Change in value of the hedged item used to measure the ineffectiveness of the hedging relationship in €m	– 0.2	n/a
Weighted average hedge rate for hedging instruments (including forward points) in Fr./€	1.1	n/a
Spot components from forward exchange transactions in CHF		
Carrying amount in €m (non-current financial liabilities measured at fair value through profit and loss)	1.1	n/a
Nominal amount in Fr.m	380.0	n/a
Due date	29.04.2022	n/a
Hedge ratio	100.0%	n/a
Change in fair value of the hedging instrument in €m	– 1.1	n/a
Change in value of the hedged item used to measure the ineffectiveness of the hedging relationship in €m	1.1	n/a
Weighted average hedge rate for hedging instruments (including forward points) in Fr./€	1.1	n/a
Forward exchange transactions USD		
Carrying amount in €m (current financial liabilities measured at fair value through profit and loss)	39.9	n/a
Nominal amount US$m	1,421.8	n/a
Due date	31.03.2021	n/a
Hedge ratio	67.0%	n/a
Change in fair value of the hedging instrument in €m	– 39.9	n/a
Change in value of the hedged item used to measure the ineffectiveness of the hedging relationship in €m	39.9	n/a
Weighted average hedge rate for hedging instruments (including forward points) in US$/€	1.2	n/a

The forward contracts are in the same currency as the highly probable future transactions so the hedging ratio is 1:1.

The revaluation surplus for cash shown in other comprehensive income relates to the following hedging instruments:

Cash flow hedge reserve

	Cost of hedging reserve €m	Reserve for cash flow hedges forward exchange transactions €m	Reserve for cash flow hedges foreign currency swaps €m	Total €m
Balance as at 1 Jan 2019	**0**	**0**	**0**	**0**
Change in fair value of hedging instruments recognised in OCI	0	0	0.2	0
Hedging costs deferred and recognised in other comprehensive income	0	0	0	0
Reclassification to profit or loss	0	0	0	0
Settlement	0	0	0	0
Balance as at 31 Dec 2019	**0**	**0**	**0.2**	**0.2**
Change in fair value of hedging instruments recognised in OCI	0	– 41.3	0	**– 41.3**
Hedging costs deferred and recognised in other comprehensive income	– 0.3	0	0	**– 0.3**
Reclassification to profit or loss	0.2	1.3	0	**1.5**
Settlement	0	0	– 0.2	**– 0.2**
Balance as at 31 Dec 2020	**– 0.1**	**– 39.9**	**0**	**– 40.1**

The separate amount in the hedging reserve comprises the forward component of forward contracts. The separated costs relate to over-time hedged items in the form of existing purchase price obligations from business combinations.

Fair value hierarchy

The financial assets measured at fair value includes financial assets and liabilities of the following three hierarchy levels:

- **Level 1:** Financial instruments with a quoted price for identical assets and liabilities in an active market
- **Level 2:** Financial instruments with no quoted prices for identical instruments on an active market and whose fair value is determined using valuation methods based on observable market parameters
- **Level 3:** Financial instruments where the fair value is determined using one or more unobservable significant inputs. This does not apply to listed equity instruments

There were no transfers between levels for recurring fair value measurements during the year under review.

Fair value hierarchy

	Fair value as at 31 Dec 2020 €m	thereof attributable to: Level 1 €m	Level 2 €m	Level 3 €m
Financial assets measured at fair value through other comprehensive income (FVOCI)				
Strategic investments	107.0	0	0	107.0
Debt instruments	4.9	4.9	0	0
Total	**111.9**	**4.9**	**0**	**107.0**
Financial assets measured at fair value through profit or loss (FVPL)				
Non-current financial instruments held by central counterparties	6,934.7	0	6,934.7	0
Non-current derivatives	0.2	0	0.2	0
Other non-current financial assets at FVPL	42.2	15.8	0	26.4
Current financial instruments held by central counterparties	80,768.1	0	80,768.1	0
Current derivatives	8.1	0	8.1	0
Other current financial assets at FVPL	7.6	0	0	7.6
Total	**87,760.9**	**15.8**	**87,711.1**	**34.0**
Total assets	**87,872.8**	**20.7**	**87,711.1**	**141.0**
Financial liabilities measured at fair value through profit or loss (FVPL)				
Non-current financial instruments held by central counterparties	6,934.7	0	6,934.7	0
Non-current derivates	1.5	0	1.5	0
Current financial instruments held by central counterparties	80,673.1	0	80,673.1	0
Current derivatives	172.6	0	172.6	0
Other current financial liabilities at FVPL	1.5	0	0	1.5
Total liabilities	**87,783.4**	**0**	**87,781.9**	**1.5**

Fair value hierarchy previous year

	Fair value as at 31 Dec 2019	thereof attributable to:		
	€m	Level 1 €m	Level 2 €m	Level 3 €m
Financial assets measured at fair value through other comprehensive income (FVOCI)				
Strategic investments	66.3	12.5	0	53.8
Total	**66.3**	**12.5**	**0**	**53.8**
Financial assets measured at fair value through profit or loss (FVPL)				
Non-current financial instruments held by central counterparties	5,234.2	0	5,234.2	0
Other non-current financial assets at FVPL	28.4	11.3	0	17.1
Current financial instruments held by central counterparties	78,301.5	0	78,301.5	0
Current derivatives	1.4	0	1.4	0
Other current financial assets at FVPL	0.4	0	0	0.4
Total	**83,565.9**	**11.3**	**83,537.2**	**17.5**
Total assets	**83,632.2**	**23.8**	**83,537.2**	**71.3**
Financial liabilities measured at fair value through profit or loss (FVPL)				
Non-current financial instruments held by central counterparties	5,234.2	0	5,234.2	0
Other non-current financial liabilities at FVPL	84.3	0	0	84.3
Current financial instruments held by central counterparties	77,411.5	0	77,411.5	0
Current derivatives	25.9	0	25.9	0
Other current financial liabilities at FVPL	3.6	0	0	3.6
Total liabilities	**82,759.5**	**0**	**82,671.6**	**87.9**

The derivatives listed in Level 2 include foreign currency forwards. The basis for measuring the market value of the foreign currency forwards is the forward rate at the reporting date for the remaining term. They are based on observable market prices. The basis for measuring the market value of financial instruments held by central counterparties are market transactions for identical or similar assets on non-active markets and option pricing models based on observable prices.

Changes in level 3 financial instruments

	Assets		Liabilities	Total
	Strategic investments €m	Financial assets measured at fair value through profit or loss €m	Financial liabilities measured at fair value through profit or loss €m	€m
Balance as at 1 Jan 2019	**89.7**	**9.1**	**– 0.2**	**98.6**
Acquisitions from business combinations	0	0	– 84.0	– 84.0
Additions	0.9	7.9	– 0.3	8.5
Disposals	– 42.7	– 0.3	0	– 43.0
Reclassifications	3.3	– 3.3	0	0
Unrealised capital gains/(losses) recognised in profit or loss	0	4.1	– 3.5	0.6
Other operating income	0	0	0.1	0.1
Result from financial investments	0	4.1	0	4.1
Staff cost	0	0	– 3.6	– 3.6
Changes recognised in the revaluation surplus	1.9	0	0	1.9
Unrealised gains/(losses) from currency translation recognised in equity	0.6	0	0	0.6
Balance as at 31 Dec 2019	**53.8**	**17.5**	**– 87.9**	**– 16.7**
Acquisitions from business combinations	0	0	0	0
Additions	25.0	14.5	– 3.3	36.2
Disposals	0	– 0.9	0	– 0.9
Reclassifications	5.2	– 6.7	87.8	86.3
Realised capital gains/(losses) recognised in profit or loss	0	0	2.2	2.2
Other operating income	0	0	2.2	2.2
Unrealised capital gains/(losses) recognised in profit or loss	0	9.6	– 0.3	9.3
Other operating income	0	7.6	– 0.3	7.3
Other operating expenses	0	– 0.3	0	– 0.3
Result from financial investments	0	2.3	0	2.3
Changes recognised in the revaluation surplus	26.6	0	0	26.6
Unrealised gains/(losses) from currency translation recognised in equity	– 3.6	0	0	– 3.6
Balance as at 31 Dec 2020	**107.0**	**34.0**	**– 1.5**	**139.4**

The fair value measurement of Level 3 strategic investments is determined on a quarterly basis using internal valuation models.

The fair value of fund units included in financial assets at FVPL is based on the net asset value determined by the issuer. This position also includes a contingent consideration whose valuation is based on internal discounted cash flow models that discount the expected future payment to the valuation date using risk-adjusted discount rates.

Financial liabilities at fair value mainly consist of contingent considerations which are also valued on the basis of discounted cash flow models in which the present value of obligations was determined using risk-adjusted discount rates. There were no further material changes in the reporting year regarding financial assets and liabilities allocated to Level 3. A change in the parameters observable on the market, taking into account realistic alternative assumptions, would not have any material effects on the carrying amounts of the unlisted equity securities measured at fair value through profit or loss as at the reporting date.

Debt securities held by Deutsche Börse Group which are disclosed under financial assets measured at amortised cost have a fair value of €1,205.0 million (31 December 2019: €1,360.1million). The fair value of the debt securities was determined by reference to published price quotations in an active market. The securities were allocated to Level 1.

The bonds issued by Deutsche Börse Group have a fair value of €2,784.0 million (31 December 2019: €2,451.1 million) and are disclosed under financial 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. The financial instrument's carrying amount for all other items represents a reasonable approximation of the fair value.

Offsetting financial instruments

Gross presentation of offset financial instruments held by central counterparties

	Gross amount of financial instruments		Gross amount of offset financial instruments		Net amount of financial instruments	
	31 Dec 2020 €m	31 Dec 2019 €m	31 Dec 2020 €m	31 Dec 2019 €m	31 Dec 2020 €m	31 Dec 2019 €m
Financial assets from repo transactions	81,173.2	104,334.5	– 23,152.6	– 43,982.3	58,020.6	60,352.2
Financial liabilities from repo transactions	– 81,078.2	– 103,444.5	23,152.6	43,982.3	– 57,925.6	– 59,462.2
Financial assets from options	78,104.7	78,171.1	– 48,427.6	– 55,044.5	29,677.1	23,126.5
Financial liabilities from options	– 78,104.7	– 78,171.1	48,427.6	55,044.5	– 29,677.1	– 23,126.6

Cash or securities held as collateral 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.

The aggregate margin calls based on the executed transactions and default fund requirements after haircuts was €62,467.3 million as at the reporting date (2019: €52,889.4 million). Collateral totalling €79,747.6 million (2019: €61,711.0 million) was actually deposited.

Composition of collateral held by central counterparties

	31 Dec 2020 €m	31 Dec 2019 €m
Cash collateral (cash deposits)[1)3)]	38,193.0	26,489.6
Securities and book-entry securities collateral[2)3)]	41,554.6	35,221.4
Total	**79,747.6**	**61,711.0**

1) The amount includes the clearing fund totalling €4,600,8 million (2019: € 2,914.5million).
2) The amount includes the clearing fund totalling €2,294.1 million (2019: € 2,055.2 million).
3) The collateral value is determined on the basis of the fair value less a haircut

13. Other current assets

Composition of other current assets

	31 Dec 2020 €m	31 Dec 2019 €m
Other receivables from CCP transactions (commodities)	414.3	208.7
Prepaid expenses	67.6	66.5
Tax receivables (excluding income taxes)	28.9	39.7
Interest receivables on taxes	26.6	19.3
Miscellaneous	10.7	6.7
Total	**548.1**	**340.9**

14. Equity

Changes in equity are presented in the consolidated statement of changes in equity. As at 31 December 2020, the number of no-par value registered shares of Deutsche Börse AG in issue was 190,000,000 (31 December 2019: 190,000,000).

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

	Number shares	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[2]	19,000,000	19 May 2020	18 May 2025	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[2]	19,000,000	19 May 2024	18 May 2024	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.
2) 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 10 per cent of the issued share capital.

Contingent capital

By resolution of the Annual General Meeting of 8 May 2019, the Executive Board is authorised, subject to the consent of the Supervisory Board, to issue in the period until 7 May 2024 on one or several occasions convertible bonds and/or warrant-linked bonds or a combination of such instruments with a total principal amount of up to €5,000,000,000 with or without a limited term and to grant holders or creditors of such bonds conversion or option rights, respectively, to acquire new no-par value registered shares in Deutsche Börse AG representing a notional interest in the share capital of up to €17,800,000, as stipulated in the terms and conditions of convertible bonds or the terms and conditions of the warrants attaching to the warrant-linked bonds.

The Executive Board is authorised, subject to the consent of the Supervisory Board, to exclude the subscription rights of the shareholders in relation to bonds with conversion or option rights to acquire shares in Deutsche Börse AG in the following cases: 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 15 ff. of the Aktiengesetz (AktG, German Stock Corporation Act). Accordingly, the share capital was contingently increased by up to €17,800,000 (contingent capital 2019). 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 2020 or 31 December 2019.

Revaluation surplus

Revaluation surplus

	Recognition of hidden reserves from fair value measurement €m	Equity investments measured at FVOCI €m	Cash flow hedges €m	Defined benefit obligations €m	Other €m	Total €m
Balance as at 1 Jan 2019 (gross)	**103.7**	**16.5**	**0**	**– 177.1**	**– 0.3**	**– 57.2**
Changes from defined benefit obligations	0	0	0	– 42.1	– 0.9	– 43.0
Fair value measurement	0	– 10.4	0.2	0	0	– 10.2
Balance as at 31 Dec 2019 (gross)	**103.7**	**6.1**	**0.2**	**– 219.2**	**– 1.2**	**– 110.4**
Changes from defined benefit obligations	0	0	0	– 25.2	– 0.4	– 25.6
Fair value measurement	0	25.7	– 40.3	0	0	– 14.6
Balance as at 31 Dec 2020 (gross)	**103.7**	**31.8**	**– 40.1**	**– 244.4**	**– 1.6**	**– 150.6**
Deferred taxes						
Balance as at 1 Jan 2019	**0**	**– 1.9**	**0**	**48.8**	**0.1**	**47.0**
Additions	0	0.1	**0**	**11.1**	**0.2**	11.4
Reversals	0	0	– 0.1	0	0	– 0.1
Balance as at 31 Dec 2019	**0**	**– 1.8**	**– 0.1**	**59.9**	**0.3**	**58.3**
Additions	0	0	0.2	6.9	0.1	7.2
Reversals	0	– 7.5	0	0	0	– 7.5
Balance as at 31 Dec 2020	**0**	**– 9.3**	**0.1**	**66.8**	**0.4**	**58.0**
Balance as at 1 Jan 2019 (net)	**103.7**	**14.6**	**0**	**– 128.3**	**– 0.2**	**– 10.2**
Balance as at 31 Dec 2019 (net)	**103.7**	**4.3**	**0.1**	**– 159.3**	**– 0.9**	**– 52.1**
Balance as at 31 Dec 2020 (net)	**103.7**	**22.5**	**– 40.0**	**– 177.6**	**– 1.2**	**– 92.6**

Retained earnings

The “retained earnings” item includes exchange rate differences amounting to €– 98.3 million (2019: € –8.2 million). In the reporting year €86.1 million (2019: €2.1 million) was transferred from currency translation for foreign subsidiaries and €2.9 million (2019: €0.7 million) in connection with the hedging of foreign exchange risks.

15. 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 2020 in accordance with the provisions of the Handelsgesetzbuch (HGB, German Commercial Code), report net profit for the period of €1,161.9m (2019: €825.9m) and equity of €3,511.8m (2019: €2,867.5m). In 2020, Deutsche Börse AG distributed €531.9 Mio. € (€2.90 per share) from distributable profit for the previous year.

Proposal on the appropriation of the unappropriated surplus

	31 Dec 2020 €m
Net profit for the period	1,161.9
Appropriation to other retained earnings in the annual financial statements	– 571.9
Unappropriated surplus	**590.0**
Proposal by the Executive Board:	
Distribution of a regular dividend to the shareholders of €3.00 per share for 183,521,257 no-par value shares carrying dividend rights	550.6
Appropriation to retained earnings	39.4

No-par value shares carrying dividend rights

	31 Dec 2020 Number	31 Dec 2019 Number
Number of shares issued as at 31 December	190,000,000	190,000,000
Number of treasury shares as at the reporting date	– 6,478,743	– 6,570,965
Number of shares outstanding as at 31 December	**183,521,257**	**183,429,035**

The proposal on the appropriation of distributable profit 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 €3.00 per eligible share, an amended resolution for the appropriation of distributable profit will be proposed to the Annual General Meeting.

16. Provisions for pensions and other employee benefits

Defined benefit pension plans

Provisions for pensions and similar obligations are measured using the projected unit credit method on the basis of actuarial reports in accordance with IAS 19. 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.

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 DBRS) 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 which is determined according to the Towers Watson "GlobalRate:Link" methodology updated in line with the current market trend.

The actuarial gains or losses and the difference between the expected and the actual return or loss on plan assets are recognised in other comprehensive income in the revaluation surplus. They result from changes in expectations with regard to life expectancy, pension trends, salary trends and the discount rate.

Other long-term benefits for employees and members of executive boards (total disability pension, transitional payments) 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.

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. 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 2020 €m	Total 31 Dec 2019 €m
Present value of defined benefit obligations that are at least partially funded	536.1	89.1	41.5	666.7	616.5
Fair value of plan assets	– 374.3	– 58.4	– 31.7	– 464.4	– 428.2
Funded status	**161.8**	**30.7**	**9.8**	**202.3**	**188.3**
Present value of unfunded obligations	4.7	0.7	0.1	5.5	5.1
Net liability of defined benefit obligations	**166.5**	**31.4**	**9.9**	**207.8**	**193.4**
Impact of minimum funding requirement/asset ceiling	0	0	0	0	0
Amount recognised in the balance sheet	**166.5**	**31.4**	**9.9**	**207.8**	**193.4**

The defined benefit plans comprise a total of 2,882 beneficiaries (2019: 2,772). 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 2020 €m	Total 31 Dec 2019 €m
Eligible current employees	225.8	82.0	39.2	347.0	319.7
Former employees with vested entitlements	199.3	7.1	0.4	206.8	192.1
Pensioners or surviving dependants	115.7	0.7	2.0	118.4	109.8
Total	**540.8**	**89.8**	**41.6**	**672.2**	**621.6**

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 per-centage 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 is an employee-funded deferred compensation plan for employees of certain Deutsche Börse Group companies in Germany who joined prior to 1 January 2019. Under this plan, it is possible to convert portions of future remuneration entitlements into benefit assets of equal value which bear interest of 6 per cent p.a. The benefits consist of a capital payment made in equal annual instalments over a period of three years upon the reaching the age of 65 or at an earlier date due to disability or death.

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. The participating companies provide an amount corresponding to a specific percentage of this eligible income every year. 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. For executives affected, whose contracts allowed for the inclusion of only the income received and the variable remuneration above the upper limit of the contribution assessment as pensionable income, the pensionable income was determined on the basis of income received from the year 2016. This is adjusted annually to account for the increase of the cost of living according to the consumer price index for Germany as issued by the 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 defined benefit pension plan in favour of Luxembourg employees 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. Contributions to the ASSEP are funded in full by the participating companies. The contributions are determined annually on the basis of actuarial opinions in accordance with Luxembourg law.

Changes in net defined benefit obligations

	Present value of obligations		Fair value of plan assets		Total	
	2020 €m	2019 €m	2020 €m	2019 €m	2020 €m	2019 €m
Balance as at 1 Jan	**621.6**	**536.2**	**– 428.2**	**– 372.1**	**193.4**	**164.1**
Changes through business combinations	0	0.1	0	0	0	0.1
Current service cost	26.2	26.1	0	0	26.2	26.1
Interest expense/(income)	6.0	9.2	– 4.1	– 6.5	1.9	2.7
Past service cost and gains and losses on settlements	0.3	0	0	0	0.3	0
	32.5	**35.3**	**– 4.1**	**– 6.5**	**28.4**	**28.8**
Remeasurements						
Return on plan assets, excluding amounts already recognised in interest income	0	0	6.0	– 22.5	6.0	– 22.5
Adjustments to demographic assumptions	0	0	0	0	0	0
Adjustments to financial assumptions	25.1	70.3	0	0	25.1	70.3
Experience adjustments	– 5.8	– 5.6	0	0	– 5.8	– 5.6
Effect of exchange rate differences	0	0	0	0	0	0
	19.3	**64.7**	**6.0**	**– 22.5**	**25.3**[1]	**42.2**
Effect of exchange rate differences	0.1	0.6	0	– 0.5	0.1	0.1
Contributions:						
Employers	0	0	– 43.6	– 42.5	– 43.6	– 42.5
Plan participants	0.9	0.8	– 0.9	– 0.8	0	0
Benefit payments	– 13.5	– 15.2	13.5	15.2	0	0
Settlements	0	0	0	0	0	0
Tax and administration costs	– 0.8	– 0.9	1.4	1.5	0.6	0.6
Changes in the basis of consolidation	12.1	0	– 8.5	0	3.6	0
Balance as at 31 Dec	**672.2**	**621.6**	**– 464.4**	**– 428.2**	**207.8**	**193.4**

1) Thereof €– 0.2 million (2019: €– 0.2 million) in the offsetting item for non-controlling interests

The basis for determining the discount rate was refined in the financial year. A modified bond selection for the relevant portfolios of high-quality corporate bonds, which is used as the basis for determining the discount rate, resulted in a discount rate of 0.7 percent as of 31 December 2020. Without this change, the discount rate would have been 0.4 percent. This would have led to an increase in the present value of the defined benefit obligation of €29.5 million and, as a result of the adjustments to the financial assumptions, to a corresponding actuarial loss before tax in other comprehensive income.

In 2020, employees converted a total of €4.8 million of their variable remuneration into deferred compensation benefits (2019: €6.4 million).

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 2020		31 Dec 2019	
	Germany %	Luxembourg %	Germany %	Luxembourg %
Discount rate	0.70	0.70	1.00	1.00
Salary growth	3.00	3.30	3.50	3.30
Pension growth	1.90	1.80	2.00	1.80
Staff turnover rate[1)]	2.00	2.00	2.00	2.00

1) Up to the age of 50, afterwards 0 per cent

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

Sensitivity analysis

The sensitivity analysis presented in the following considers the change in one assumption of the main plans in Germany and Luxembourg 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 of defined benefit obligation to change in the weighted principal assumptions

	Change in actuarial assumption	Effect on defined benefit obligation			
		2020 defined benefit obligation €m	Change %	2019 defined benefit obligation €m	Change %
Present value of the obligation[1)]		630.6	–	596.0	–
Discount rate	Increase by 1.0 percentage point	537,8	– 14.7	508.1	– 14.7
	Reduction by 1.0 percentage point	746,9	18.4	707.8	18.8
Salary growth	Increase by 0.5 percentage points	642.1	1.8	609.3	2.2
	Reduction by 0.5 percentage points	619,3	– 1.8	585.1	– 1.8
Pension growth	Increase by 0.5 percentage points	643.8	2.1	609.6	2.3
	Reduction by 0.5 percentage points	617,2	– 2.1	583.7	– 2.1
Life expectancy	Increase by one year	650,1	3.1	614.4	3.1
	Reduction by one year	609.9	– 3.3	577.7	– 3.1

1) Prior year adjusted and includes only the main plans in Germany and Luxembourg.

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.

Composition of plan assets

	31 Dec 2020		31 Dec 2019	
	€m	%	€m	%
Bonds	**349.9**	**75.3**	**352.1**	**82.2**
Government bonds	211.5		246.9	
Multilateral development banks	0		0	
Corporate bonds	138.4		105.2	
Derivatives	**3.0**	**0.6**	**– 0.4**	**– 0.1**
Stock index futures	2.9		0.4	
Interest rate futures	0.1		– 0.8	
Investment funds	**28.1**	**6.1**	**26.1**	**6.1**
Total listed	**381.0**	**82.0**	**377.8**	**88.2**
Qualifying insurance policies	31.8	6.8	21.0	4.9
Cash	51.6	11.1	29.4	6.9
Total not listed	**83.4**	**18.0**	**50.4**	**11.8**
Total plan assets	**464.4**	**100.0**	**428.2**	**100.0**

As at 31 December 2020, the plan assets did not include any financial instruments of the Group (2019: zero). Neither did they include any properties or other assets used by companies in Deutsche Börse Group.

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. 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.

Duration and expected maturities of the pension obligations

The weighted duration of the pension obligations as at 31 December 2020 is 16.6 years (2019: 16.7 years).

Expected maturities of undiscounted pension payments

	Expected pension payments[1]	
	31 Dec 2020 €m	31 Dec 2019 €m
Less than 1 year	15,7	14,9
Between 1 and 2 years	15,6	13,8
Between 2 and 5 years	50.1	48.0
More than 5 years up to 10 years	144,6	126,8
Total	**226,0**	**203,5**

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 (excluding service cost for deferred compensation) amount to approximately €17.7 million for the 2021 financial year, including net interest expense.

Defined contribution pension plans and multi-employer plans

Defined contribution plans

There are defined contribution plans as part of the occupational pension system using pension funds and similar pension institutions. 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 member institutions of BVV Versicherungsverein des Bankgewerbes a.G., a pension insurance provider with registered office in Berlin. Employees and employers make regular contributions, which are used to provide guaranteed pension plans, and a potential surplus. The contributions to be made are derived from contribution rates applied to active employees' monthly gross salaries, taking into account specific financial thresholds. Member institutions have a subsidiary liability for the fulfilment of BVV's agreed pension benefits. However, we consider the risk that this liability will be invoked as remote. Given that BVV membership is governed by several Works Council Agreements, membership termination is subject to certain conditions. Deutsche Börse Group considers BVV pension obligations as multi-employer defined benefit pension plans. However, we currently lack information regarding the allocation of BVV assets to individual member institutions and the respective beneficiaries. Moreover, we do not know Deutsche Börse Group's actual share in BVV's total obligations. This plan is therefore shown in the Group's financial reporting as a defined contribution plan. On the basis of current information published by BVV there is no shortfall that could affect the future contributions payable by the Group.

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. Since the allocation of assets to member institutions and beneficiaries is not possible, this pension plan can also be presented only as a defined contribution plan.

During the reporting period, the costs associated with defined contribution plans, and designated multi-employer plans, amounted to €47.0 million (2019: €42.8 million). In 2021, Deutsche Börse Group expects to make contributions to multi-employer plans amounting to around €10.6 million.

Composition of other current liabilities

Other long-term employee benefits

	31 Dec 2020 €m	31 Dec 2019 €m
Pensions obligations (IHK)	8.5	8.7
Jubilee	6.2	6.0
Total	**14.6**	**14.7**

17. Share-based payment

Deutsche Börse Group operates the Group Share Plan (GSP), the Stock Bonus Plan (SBP), the Co-Performance Investment Plan (CPIP), the Performance Share Plan (PSP) and the Management Incentive Programme (MIP) 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.

Stock Bonus Plan (SBP)

The SBP is open to senior executives of Deutsche Börse AG and its participating subsidiaries. It 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. In the reporting period, the company established an additional tranche of the SBP for senior executives who are not risk takers. In order to participate in the SBP, a beneficiary must have earned a bonus. The awards are settled in cash and the SBP shares are measured 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.

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 2020[2]	Tranche 2019	Tranche 2018	Tranche 2017	Tranche 2016[1]
Term to		31.03.2024	31.03.2023	28.02.2022	28.02.2021	31.03.2020
Risk-free interest rate	%	– 0.77	– 0.77	– 0.75	– 0.75	– 0.75
Volatility of Deutsche Börse AG shares	%	25.38	27.92	33.31	25.90	0.0
Dividend yield	%	2.08	2.08	2.08	2.08	2.08
Exercise price	€	0	0	0	0	0

1) The number of stock options, settlement obligation, and short-term provision of the 2016 tranche includes the unsettled shares of the 2015 tranche.
2) Given that the 2020 SBP tranche stock options for senior executives will not be granted until the **2021** financial year, the number of shares applicable as at the reporting date may be adjusted during the **2021** financial year.

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

Valuation of SBP shares

Tranche	Balance at 31 Dec 2020 Number	Deutsche Börse AG share price at 31 Dec 2020 €	Intrinsic value/ option at 31 Dec 2020 €	Fair value/ option at 31 Dec 2020 €	Settlement obligation €m	Current provision at 31 Dec 2020 €m	Non-current provision at 31 Dec 2020 €m
2016	147	139,25	139,25	115.30	0.0	0.0	0
2017	11,915	139,25	139,25	133.21	1.6	1.6	0.0
2018	11,151	139,25	139,25	95.79	1.1	0	1.0
2019	6,825	139,25	139,25	62.55	0.4	0	0.4
2020	8,187	139,25	139,25	30.64	0.3	0	0.3
Total	**38,225**				**3.4**	**1.6**	**1.7**

Average price of the exercised and forfeited share options

Tranche	Average price of the exercised share options €	Average price of the forfeited share options €
2016	117.78	134.53
2017	136.87	126.72
2018	141.65	88.92
2019	121.40	59.17

The stock options from the 2016 SBP tranche were exercised in the reporting period following the expiration of the waiting period. Shares of the SBP tranches 2017, 2018 and 2019 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 € 3.4 million were recognised at the reporting date of 31 December 2020 (31 December 2019: € 4.3 million). The total expense for LSI stock options in the reporting period amounted to € 3.4 million (2019: € 2.6 million).

Change in number of SBP shares allocated

	Balance at 31 Dec 2019	Additions/ (disposals) Tranche 2016	Additions/ (disposals) Tranche 2017	Additions/ (disposals) Tranche 2018	Additions/ (disposals) Tranche 2019	Additions/ (disposals) Tranche 2020	Fully settled cash options	Options forfeited	Balance at 31 Dec 2020
To other senior executives	48,062	620	352	275	– 1,326	8,187	– 16,412	– 1,533	38,225
Total	**48,062**	**620**	**352**	**275**	**– 1,326**	**8,187**	**– 16,412**	**– 1,533**	**38,225**

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.

Long-term Sustainable Instrument (LSI)
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). All tranches will be settled in cash. 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). 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.

The number of LSI and RSU shares for the 2015 to 2019 2019 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 2020 tranche is based on the closing auction price of Deutsche Börse shares as at the disbursement date of the cash component of the 2020 tranche in 2021, 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 2015 to 2019 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 2020 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.

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.

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 2020	Tranche 2019	Tranche 2018	Tranche 2017	Tranche 2016	Tranche 2015
Term to		31.12.2020 to 31.12.2024	31.12.2019 to 31.12.2023	31.12.2018 to 31.12.2022	31.12.2018 to 31.12.2021	31.12.2018 to 31.12.2020	31.12.2016 to 31.12.2020
Risk-free interest rate	%	– 0,77 to – 0,64	– 0,77 to – 0,68	– 0,77 to – 0,73	– 0,75 to – 0,73	– 0,75 to – 0,73	– 0.75
Volatility of Deutsche Börse AG shares	%	23,49 to 36,25	23,90 to 36,25	24,13 to 36,25	28,69 to 36,25	36,25	0
Dividend yield	%	2.08	2.08	0 to 2,08	0 to 2,08	0 to 2,08	0 to 2,08
Exercise price	€	0	0	0	0	0	0

The valuation model does not take into account hurdle rates. 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 2020 Number	Deutsche Börse AG share price as at 31 Dec 2020 €	Intrinsic value/ option as at 31 Dec 2020 €	Fair value/ option as at 31 Dec 2020 €	Settlement obligation €m	Current provision as at 31 Dec 2020 €m	Non-current provision as at 31 Dec 2020 €m
2015	1,626	139.25	139.25	0.00	0.2	0.2	0.0
2016	49,096	139.25	139.25	137.49	6.8	0.9	5.9
2017	49,762	139.25	139.25	134,89 - 137,49	6.6	0.7	5.9
2018	56,490	139.25	139.25	132,34 - 137,49	7.6	0.8	6.8
2019	49,363	139.25	139.25	129,84 - 137,49	6.6	1.6	5.0
2020	40,899	139.25	139.25	120,30 - 137,49	5.5	0.0	5.5
Total	**247,236**				**33.3**	**4.2**	**29.1**

Provisions amounting to € 33.3 million were recognised as at 31 December 2020 (31 December 2019: € 33.1 million). The total expense for LSI stock options in the reporting period amounted to € 5.9 million (31 December 2019: € 10.9 million).

Change in number of LSI and RSU shares allocated

	Balance at 31 Dec 2019	Additions/ (disposals) Tranche 2015	Additions/ (disposals) Tranche 2016	Additions/ (disposals) Tranche 2017	Additions/ (disposals) Tranche 2018	Additions/ (disposals) Tranche 2019	Additions/ (disposals) Tranche 2020	Fully settled cash options	Balance at 31 Dec 2020
To other senior executives	244,904	4	– 1,118	– 582	– 408	6,893	40,899	– 43,356	247,236
Total	**244,904**	**4**	**– 1,118**	**– 582**	**– 408**	**6,893**	**40,899**	**– 43,356**	**247,236**

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

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.

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 was 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 vested only at the end of a five-year performance period.

The final number of Performance Shares was calculated by multiplying the original number of Performance Shares with the level of overall target achievement. The PSP level of overall target achievement was 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 as the peer group; and secondly, on the increase of Deutsche Börse AG's net profit for the period attributable to shareholders of the parent company. 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.

Co-Performance Investment Plan (CPIP)

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 waiting period until 31 December 2019. The subsequent payment of the stock bonus will be settled in cash, by 31 March 2021.

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 2020	Tranche 2019	Tranche 2018	Tranche 2017	Tranche 2016	Tranche 2015
Term to		31.12.2024	31.12.2023	31.12.2022	31.12.2021	31.12.2020	31.12.2019
Risk-free interest rate	%	– 0.77	– 0.77	– 0.75	– 0.73	– 0.75	– 0.75
Volatility of Deutsche Börse AG shares	%	24.13	25.78	28.69	36.25	29.91	29.91
Dividend yield	%	0	0	0	0	0	0
Exercise price	€	0	0	0	0	0	0
Relative total shareholder return	%	160.00	170.00	250.00	250.00	250.00	250.00
Net profit for the period attributable to Deutsche Börse AG shareholders	%	117.00	118.00	142.00	137,00 – 147,00	171,00 – 181,00	172.00

The valuation model does not take into account hurdle rates. 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 2020 Number	Deutsche Börse AG share price as at 31 Dec 2020 €	Intrinsic value/ option as at 31 Dec 2020 €	Fair value/ option as at 31 Dec 2020 €	Settlement obligation €m	Current provision as at 31 Dec 2020 €m	Non-current provision as at 31 Dec 2020 €m
2015	87,574	139.25	139.25	150.33	5.5	0	5.5
2016	141,727	139.25	139.25	152.18	21.9	21.9	0.0
2017	138,051	139.25	139.25	119.94	18.9	0	18.9
2018	139,292	139.25	139.25	88.53	15.6	0	15.6
2019[1]	80,292	139.25	139.25	58.02	5.4	0	5.4
2020	54,084	139.25	139.25	28.45	1.5	0	1.5
Total	**641,020**				**68.8**	**21.9**	**46.9**

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

Provisions for the CPIP and the PSP amounting to € 68.8 million were recognised at the reporting date 31 December 2020 (31 December 2019: € 63.9 million). Of the provisions, € 17.4 million were attributable to members of the Executive Board (2019: €11.3 million). The total expense for CPIP and PSP stock options in the reporting period was € 8.5 million (2019: € 23.9 million). Of that amount, an expense of €6.0 millionwas attributable to members of the Executive Board (2019: €6.9 million).

Change in number of CPIP and PSP shares allocated

	Balance at 31 Dec 2019	Additions/ (disposals) Tranche 2016	Additions/ (disposals) Tranche 2017	Additions/ (disposals) Tranche 2018	Additions/ (disposals) Tranche 2019	Additions/ (disposals) Tranche 2020	Balance at 31 Dec 2020
To the Executive Board	460,848	– 1,962	– 3,745	– 4,377	2,999	42,280	496,043
To other senior executives	128,630	3,658	2,115	1,238	– 2,468	11,804	144,977
Total	**589,478**	**1,696**	**– 1,630**	**– 3,139**	**531**	**54,084**	**641,020**

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 acquire shares of Deutsche Börse AG at a discount under the Group Share Plan (GSP). Under the GSP tranche for the year 2020, the participating employees could subscribe for up to 50 shares of the Company at a discount of 40 per cent and another 50 shares at a discount of 10 per cent. The acquired shares are subject to a lock-up period of two years.

The expense of this discount is recognised in the income statement at the grant date. In the reporting period, an expense totalling € 4,800.0 million (2019: € 4,070.0 million) was recognised in staff expense for the GSP.

Management Incentive Programme (MIP)

The MIP was set up for the senior management of the Qontigo Group. It grants a non-current remuneration component in the form of virtual shares of the Qontigo Group. The remuneration is settled in cash. These are generally accounted for as sharebased payments. The amounts payable to the beneficiaries are intended to reflect the economic development of the Qontigo Group. The MIP contains a time-based and a performance-based component. The vesting period is four years and started one year after closing of the Axioma transaction on 13 September 2019.

Valuation

The value of the virtual shares is determined using a Monte Carlo simulation on the respective balance sheet date, which appropriately reflects the contract-specific conditions. The underlying simulations depend on the underlying from which the payment is linked to the beneficiaries of the MIP. The enterprise value of the Qontigo Group serves as the underlying.

On the basis of the simulations carried out, a discounted average payment of the contractually agreed payment flows to the respective participants as calculated. The main valuation parameters include the enterprise value and the expected volatility of the Qontigo Group as well as the expected term and the contract-specific payment profile.

18. Changes in other provisions

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. If it is no longer probable that an otflow of resources embodying economic benefits will be required to settle the obligation, the provision will be reversed.

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 that plan or by announcing its principal features to those affected by it. The restructuring provisions and the provisions for contractually agreed early retirement benefits and severance payments are recognised in other provisions.

Changes in other provisions (part 1)

	Bonuses €m	Share-based payments €m	Interest on taxes €m	Restructuring and efficiency measures €m
Balance as at 1 Jan 2020	**118.3**	**101.3**	**70.4**	**108.6**
Changes in the basis of consolidation	3.2	0	0	0
Reclassification	– 8.8	7.4	1.5	0
Utilisation	– 92.7	– 12.8	0	– 26.6
Reversal	– 9.1	– 3.7	– 11.7	– 8.9
Additions	114.2	20.5	32.0	4.8
Currency translation	– 2.3	– 0.2	0	0
Interest	0	0	0	1.5
Balance as at 31 Dec 2020	**122.8**	**112.6**	**92.1**	**79.5**

Changes in other provisions (part 2)

	Other tax provisions €m	Anticipated Losses €m	Other personnel provisions €m	Miscellaneous €m
Balance as at 1 Jan 2020	**34.1**	**8.7**	**9.6**	**16.4**
Changes in the basis of consolidation	0.2	0	0	0.7
Reclassification	– 0.3	0	– 6.0	– 0.1
Utilisation	– 0.6	0	– 1.7	– 1.8
Reversal	– 13.6	– 0.7	– 3.9	– 0.4
Additions	19.1	0.0	6.4	9.1
Currency translation	0.0	– 0.1	0.1	– 0.4
Interest	0	0	0	0
Balance as at 31 Dec 2020	**38.9**	**7.9**	**4.5**	**23.4**

The other non-current and current provisions amount to a total of €481.7 million (31 December 2019: €475.9 million). The non-current provisions of €168.0 million (31 December 2019: €225.2 million) essentially have a residual lifetime between one to five years. Furthermore current provisions exist for €313.7 million (31 December 2019: €250.7 million).

Provisions for restructuring and efficiency measures include provisions for contractually agreed early retirement benefits and severance payments as well as expenses directly related to restructuring measures. All provisions for implementing the restructuring plan (31 December 2019: €16.8 million) were reclassified as provisions for early retirement benefits and provisions for severance payments or reversed in the reporting period.

For details of share-based payments, see note 17.

19. Other liabilities

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

Contract liabilities

	31 Dec 2020 €m	31 Dec 2019 €m
Contract liabilities long-term	13.8	20.2
Contract liabilities short-term	30.5	21.5
Total	**44.3**	**41.7**

Composition of other current liabilities

	31 Dec 2020 €m	31 Dec 2019 €m
Liabilities from CCP positions	415.1	210.6
Tax liabilities (excluding income taxes)	42.8	50.6
Contract liability	30.5	21.5
Vacation entitlements, flexitime and overtime credits	29.9	27.7
Social security liabilities	9.1	8.3
Liabilities to employees	6.7	4.2
Liabilities to supervisory bodies	3.0	3.3
Special payments and bonuses	1.4	0
Deferred income	0.4	2.9
Miscellaneous	5.8	3.8
Total	**544.7**	**332.9**

Other disclosures

20. Notes on the consolidated cash flow statement

Composition of other non-cash income

	2020 €m	2019 €m
Subsequent measurement of non-derivative financial instruments	39.5	– 16.0
Reversal of discount and transaction costs from long-term financing	8.9	3.0
Equity method measurement	– 17.2	3.9
Impairment of financial instruments	2.1	1.8
Subsequent measurement of derivatives	101.5	26.4
Contract liabilities	2.6	26.3
Gains on the disposal of subsidiaries and equity investments	0	– 1.0
Miscellaneous	6.3	8.0
Total	**143.6**	**52.5**

Reconciliation to cash and cash equivalents

Cash and cash equivalents at Deutsche Börse Group comprise cash and bank balances – to the extent that these do not result from reinvesting current liabilities from cash deposits by market participants – as well as receivables and liabilities from banking business with an original maturity of three months or less.

Reconciliation to cash and cash equivalents

	31 Dec 2020 €m	31 Dec 2019 €m
Restricted bank balances	38,420.1	29,988.7
Other cash and bank balances	1,467.3	888.1
Net position of financial instruments held by central counterparties	95.0	890.0
Current financial instruments measured at amortised cost	16,225.1	15,381.6
less financial instruments with an original maturity exceeding 3 months	– 1,919.7	– 1,339.7
Current financial liabilities measured at amortised cost	– 14,630.0	– 14,225.4
less financial instruments with an original maturity exceeding 3 months	1,037.7	317.9
Current liabilities from cash deposits by market participants	– 38,188.8	– 29,755.8
Cash and cash equivalents	**2,506.7**	**2,145.5**

Changes in liabilitites arising from financing activitities

	Bonds issued €m	Leasing liabilities €m
Balance as at 1 Jan 2019	**2,283.2**	**278.1**
Lease payments (IFRS 16)	0	– 42.6
Acquisition from business combinations	0	13.2
Additions	0	123.0
Exchange rate differences	0	0
Other	3.0	8.4
Balance as at 31 Dec 2019	**2,286.2**	**380.1**
Lease payments (IFRS 16)	0	– 47.4
Acquisition from business combinations	0	2.9
Additions	948.2	73.3
Repayments	– 602.9	– 0.7
xchange rate differences	0	0
Other	5.5	0.7
Balance as at 31 Dec 2020	**2,637.0**	**408.7**

21. 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 17) 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 2020:

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 2020	Average price for the period[1] €	Number of potentially dilutive ordinary shares 31 Dec 2020
2014[2]	0	0	440	126.10	0
Total					**0**

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 2020.
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 2020.

Calculation of earnings per share (basic and diluted)

	2020	2019
Number of shares outstanding at beginning of period	183,429,035	183,347,045
Number of shares outstanding at end of period	183,521,257	183,429,035
Weighted average number of shares outstanding	183,452,436	183,381,196
Number of potentially dilutive ordinary shares	0	3,252
Weighted average number of shares used to compute diluted earnings per share	183,452,436	183,384,448
Net profit for the period attributable to Deutsche Börse AG shareholders (€m)	1,079.9	1003.9
Earnings per share (basic) (€)	5.89	5.47
Earnings per share (diluted) (€)	5.89	5.47

As in the previous year, there were no subscription rights for Deutsche Börse AG shares in 2020 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.

22. Segment reporting

Deutsche Börse divides its business into seven segments: 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).

Segment reporting (part 1)

	Eurex (financial derivatives)		EEX (commodities)		360T (foreign exchange)		Xetra (cash equities)	
	2020	2019	2020	2019	2020	2019	2020	2019
Net revenue (€m)	1,110.3	1,009.3	302.2	289.3	101.5	92.1	391.7	329.3
Operating costs (€m)	– 373.1	– 330.9	– 174.3	– 169.6	– 53.9	– 57.7	– 158.8	– 151.5
EBITDA (€m)	738.8	683.4	127.0	119.4	47.6	34.4	258.7	181.6
EBITDA margin (%)	67.0	68.0	42.0	41.3	47.0	37.4	66.0	55.0
Depreciation, amortisation and impairment losses (€m)	– 55.3	– 55.8	– 35.6	– 31.4	– 20.4	– 19.3	– 23.7	– 20.5
EBIT (€m)	683.5	627.6	91.4	88.0	27.2	15.1	235.0	161.1
Capital expenditure[1] (€m)	46.1	38.4	21.4	28.6	8.6	6.0	15.3	21.6
Employees (as at 31 December)	1,661	1,437	934	829	272	260	739	738

Segment reporting (part 2)

	Clearstream (post-trading)		IFS (investment fund services)		Qontigo (index and analytics business)		Group	
	2020	2019	2020	2019	2020	2019	2020	2019
Net revenue (€m)	827.2	842.7	232.8	183.1	248.1	190.2	3,213.8	2,936.0
Operating costs (€m)	– 367.3	– 343.4	– 117.5	– 110.3	– 123.8	– 101.0	– 1,368.7	– 1,264.4
EBITDA (€m)	458.0	497.5	115.2	72.8	124.1	89.2	1,869.4	1,678.3
EBITDA margin (%)	55.0	59.0	49.0	39.8	50.0	46.9	58.0	57.2
Depreciation, amortisation and impairment losses (€m)	– 72.5	– 67.5	– 28.5	– 19.2	– 28.3	– 12.5	– 264.3	– 226.2
EBIT (€m)	385.5	430.0	86.7	53.6	95.8	76.7	1,605.1	1,452.1
Capital expenditure[1] (€m)	68.4	61.0	27.5	22.1	8.1	7.0	195.4	184.7
Employees (as at 31 December)	2,136	2,016	911	887	585	608	7,238	6,775

1) Excluding investments from business combinations.

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. For an overview of intercompany revenes, see note 4. Services between the segments are charged on the basis of assessed quantities or at fixed prices.

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-current assets[3][4]		Number of employees	
	2020 €m	2019 €m	2020 €m	2019 €m	2020 €m	2019 €m	2020	2019
Euro zone	2,047.8	1,718.1	172.8	176.1	4,008.7	4,043.4	5,042	4,721
Rest of Europe	1,063.2	999.2	15.4	3.7	1,241.0	455.1	1,449	1,360
America	289.1	231.5	6.5	4.8	1,061.6	1,029.9	435	411
Asia-Pacific	183.9	168.5	0.7	0.1	31.7	22.5	312	283
Total of all regions	**3,584.0**	**3,117.3**	**195.4**	**184.7**	**6,343.0**	**5,550.9**	**7,238**	**6,775**
Consolidation of internal net revenue	– 64.7	– 63.1						
Group	**3,519.3**	**3,054.2**	**195.4**	**184.7**	**6,343.0**	**5,550.9**	**7,238**	**6,775**

1) Including countries in which more than 10 per cent of sales revenue was generated: UK (2020: €732.1 million, 2019: €704.2 million) and Germany (2020: €910.9 million, 2019: €769.6 million)
2) Excluding goodwill and right-of-use assets from leasing.
3) Including countries in which more than 10 per cent of assets are held: Germany (2020: €3,648.1 million, 2019: €3,634.1 million), Switzerland (2020: €1,210.1 million, 2019: €427.2 million) and United States (2020: €1,061.6 million, 2019: €1,029.9 million).
4) These include intangible assets, property, plant and equipment, and investments in associates and joint ventures.

23. Financial risk management

Deutsche Börse Group presents the qualitative disclosures required by IFRS 7, such as the type and extent of risks from financial instruments, as well as the goals, strategies and processes for risk management, in detail in the combined management report (see explanations in the risk report).

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 €764.0 million as at 31 December 2020, whereby €657.0 million stems from credit risk and €107.0 million stems from market 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

Credit risk of financial instruments

	Segment	Carrying amounts – maximum risk exposure: Amount at 31 Dec 2020 €m	Carrying amounts – maximum risk exposure: Amount at 31 Dec 2019 €m	Collateral: Amount at 31 Dec 2020 €m	Collateral: Amount at 31 Dec 2019 €m
Collateralised cash investments					
Reverse repo transactions	Eurex (financial derivatives)[1]	574.9	91.2	580.5[2]	100.8[2]
	Clearstream (post-trading)	6,176.7	6,394.3	6,346.0[3]	6,552.2[3]
		6,751.6	**6,485.5**	**6,926.5**	**6,653.0**
Uncollateralised cash investments					
Money market lendings – central banks	Eurex (financial derivatives)	31,711.6	26,038.8	0	0
	Clearstream (post-trading)	6,291.8	5,998.6	0	0
	Group	3,809.7	3,989.7	0	0
Money market lendings – other counterparties	Eurex (financial derivatives)	187.5	0	0	0
	Clearstream (post-trading)	148.3	437.2	0	0
Balances on nostro accounts and other bank deposits	Clearstream (post-trading)	2,252.4	1,604.5	0	0
	Group	3,603.7	748.7	0	0
Securities	Clearstream (post-trading)	1,186.3	1,266.9	0	0
	Eurex (financial derivatives)	7.0	4.2	0	0
	Group	14.9[4]	14.0[4]	0	0
Fund assets	Group	37.1	28.4	0	0
		49,250.3	**40,131.0**	**0**	**0**
Loans for settling securities transactions					
Technical overdraft facilities	Clearstream (post-trading)	267.7	231.7	n / A[5]	n / A[5]
Automated Securities Fails Financing[6]	Clearstream (GSF)	427.3[7]	288.8[7]	560.6	316.6
ASLplus securities lending[6]	Clearstream (GSF)	47,964.3	58,008.6	51,895.4	58,228.6
		48,659.3	**58,529.1**	**52,456.0**	**58,545.2**
Total		**104,661.2**	**105,145.6**	**59,382.5**	**65,198.2**

	Segment	Carrying amounts – maximum risk exposure: Amount at 31 Dec 2020 €m	Carrying amounts – maximum risk exposure: Amount at 31 Dec 2019 €m	Collateral: Amount at 31 Dec 2020 €m	Collateral: Amount at 31 Dec 2019 €m
Balance brought forward		104,661.2	105,145.6	59,382.5	65,198.2
Other financial instruments					
Other loans	Group	0.3	0.3	0	0
Other assets	Group	15.3	23.7	0	0
Trade receivables	Group	625.8	454.4	0	0
Other receivables	Clearstream (post-trading)	147.2	43.1	0	0
	Eurex (financial derivatives)	697.0	48.4	0	0
	Group	27.8	21,6	0	0
Other financial assets at fair value	Group	7.6	0.4	0	0
		1,521.0	591.9	0	0
Financial instruments held by central counterparties		62,467.3[8]	52,889.4[8]	79,747.6[9]	66,680.9[9]
Derivatives		8.4	1.4	0	0
Total		168,657.9	158,628.3	139,130.1	131,879.1

1) Presented in the items “restricted bank balances” and “other cash and bank balances”.
2) Thereof none pledged to central banks (2019: nil).
3) Thereof none pledged to central banks (2019: €274.0 million).
4) The amount includes collateral totalling €5.1 million (2019: €5.1 million)
5) 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.
6) Off-balance-sheet items
7) Meets the IFRS 9 criteria for a financial guarantee contract
8) 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, whilst 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.
9) 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 receives cash deposits from its customers in various currencies, and invests these cash deposits in money market instruments. Eurex Clearing AG receives cash collateral mainly in its clearing currencies EUR and CHF.

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

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

Unsecured cash investments are permitted only with counterparties with impeccable credit ratings 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 €6,926.6 million (2019: €6,653.0 million). Clearstream Banking S.A. and Eurex Clearing AG are entitled to pledge the eligible securities received to their central banks in order to make use of the central banks' monetary policy instruments.

As of 31 December 2020 Clearstream Banking S.A. had pledged securities from the Clearstream investment portfolio valued at €168.2 million to central banks as collateral for credit lines from the central banks. In the reporting period all of these securities stem from Clearstream investment portfolio (in 2019 €202.7 million relates to Clearstream's investment portfolio and €274.0 million relate to reverse repo agreements).

As at 31 December 2020, Eurex Clearing AG had pledged no securities to central banks.

Loans for settling securities transactions
Clearstream (post-trading) grants customers intraday technical overdraft facilities to maximise settlement efficiency. These settlement facilities are subject to internal credit review procedures. They are revocable at the discretion of the Clearstream subgroup and are in general fully secured. As of 31 December 2020 they came to €106.2 billion (2019: €115.5 billion). Of the total, €5.5 billion (2019: €3.4 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 €267.7 million as at 31 December 2020 (2019: €231.7 million); see note 12.

Clearstream (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 secured. As of 31 December 2020 the guarantees under this programme amounted to €427.3 million (2019: €288.8 million). Collateral received by Clearstream Banking S.A. in connection with these loans amounted to €560.6 million (2019: €316.6 million).

Under the ASLplus securities lending programme, Clearstream Banking S.A. had securities borrowings from various counterparties totalling €47,964.3 million as at 31 December 2020 (2019: €58,008.6 million). These securities were fully lent to other counterparties. Collateral received by Clearstream Banking S.A. in connection with these loans amounted to €51,895.4 million (2019: €58,228.6 million). This collateral was pledged to the lender, whilst Clearstream Banking S.A. remains its legal owner.

In 2019 and 2020, 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 safety mechanisms of the Group's central counterparties are described in detail in the risk report.

Trade receivables

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 of 31 December 2020 there were no contract assets (2019: nil).

Loss allowances for trade receivables as at 31 December 2020

	<30 days past due €m	<60 days past due €m	<90 days past due €m	<120 days past due €m	<360 days past due €m	>360 days past due €m	Insol-vent €m	Total €m
Expected loss rate	0.1%	0.0%	0.1%	1.3%	5.4%	81.9%	100%	
Trade receivables	33.0	13.3	5.9	3.2	15.0	7.9	1.8	80.1
Loss allowance	0	0	0	0.1	0.8	6.5	1.8	9.2

Loss allowances for trade receivables as at 31 December 2019

	<30 days past due €m	<60 days past due €m	<90 days past due €m	<120 days past due €m	<360 days past due €m	>360 days past due €m	Insol-vent €m	Total €m
Expected loss rate	0.1%	0.0%	0.1%	1.2%	5.4%	81.9%	100%	
Trade receivables	24.6	13.4	5.8	4.4	19.9	5.7	1.3	75.1
Loss allowance	0	0	0	0.1	1.1	4.7	1.3	7.1

Trade receivables are written off when there is no reasonable expectation of recovery. The following criteria are used for the assessment of derecognition:

- Insolvency proceedings are not started for want of assets.
- 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.

In 2019, there were no significant write-offs due to customer defaults. Moreover, no significant payments were received in 2020 for receivables which had previously been written off (2019: 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. All Deutsche Börse Group debt securities measured at fair value through OCI are assigned to stage 1 on initial recognition and are reviewed regularly for changes in credit risk on the basis of their rating. The expected loss for listed debt securities from Deutsche Börse Group is determined using the default rates provided by a rating agency.

Development of the loss allowance

Development of the loss allowance

	Debt securities Stage 1 €m	Trade receivables Stage 1/2 €m	Trade receivables Stage 3 €m	Total €m
Closing loss allowance as at 1 January 2019	**0.1**	**0.9**	**4.8**	**5.8**
Increase in the allowance recognised in profit or loss during the period	0	0.6	1.8	2.4
Decrease in the allowance recognised in profit or loss during the period	0	– 0.4	– 0.6	– 1.0
Closing loss allowance as at 31 December 2019	**0**	**1.1**	**6.0**	**7.1**
Increase from business combinations	0	0.1	1.0	1.1
Increase in the allowance recognised in profit or loss during the period	0.3	0.3	2.1	2.7
Decrease in the allowance recognised in profit or loss during the period	0	– 0.6	– 0.8	– 1.4
Closing loss allowance as at 31 December 2020	**0.3**	**0.9**	**8.3**	**9.5**

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 are limited by application of counterparty, group and country credit limits. Collateral and currency concentrations are also monitored.

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 14 for an explanation of regulatory capital requirements). Requirements of concentration risks arising from Regulation (EU) 909/2014 (Central Securities Depository Regulation, CSDR) have been 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 monthly for each day and amounted to €657.0 million as at 31 December 2020 (2019: €510.0 million).

Deutsche Börse Group also applies additional methods in order to detect credit concentration risks. It analyses the impact of a default by its two largest counterparties with unsecured exposures and stressed recovery parameters. In addition, analyses are carried out for the Group's top 5 and top 10 counterparties, based on the risk-weighted exosures of the individual counterparties. All the concentration metrics have dedicated early warning thresholds and limits and are part of the quarterly risk reporting to the Executive Board. As in the previous year, no material adverse credit concentrations were detected in 2020.

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 of 31 December 2020 the economic capital for market price risks was €107.0 million (2019: €117.0 million).

In the 2020 financial year, no impairment losses (2019: nil) 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 of financial assets and liabilities are different.

Interest rate sensitive assets include the Group's money market and investment portfolios, whilst 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 issuance of fixed-coupon bonds.

To refinance its existing indebtedness Deutsche Börse AG issued debt securities with a nominal volume of €600.0 million in June 2020. This enabled the company to refinance its outstanding hybrid loan of €600 million, which was called and redeemed in full in November 2020. In addition, Clearstream Banking AG issued a five-year senior preferred loan with a nominal volume of €350.0 million in November 2020 as part of the CSDR, in order to increase its qualifying liquid funds. The net proceeds of the loan will be reinvested in line with the financial risk policy in secure assets, to minimise credit and market risks. For further details of 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 invested mainly via short-term reverse repos and in the form of overnight deposits at central banks, limiting the risk of a negative impact due to a changed 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 market benchmark rate per currency after deducting an additional spread per currency. In exceptional cases such as market disruption, Eurex Clearing AG reserves the right to calculate interest rates on cash collateral based on the realised interest rate.

Group entities may furthermore invest their own capital and part 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 each business day 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 acceptable maximum 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 might be 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$, CHF, £ and CZK. Exchange rate fluctuations may affect the Group's profit margins and the value of assets and liabilities denominated in a currency that is not the functional currency of the relevant Group entity. Respective currency risks arise mainly from operating income and expenses denominated in a currency other than the functional currency, inter alia from that portion of the Clearstream (post-trading) segment's sales revenue and treasury result from banking business that is directly or indirectly in US$. The Clearstream (post-trading) segment generated 14 per cent of its revenue and treasury result from banking business directly or indirectly in US$ (2019: 20 per cent).

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 historic 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 in principle based on the Group level. Hedging may take place on a single entity level 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 critical terms of forwards and options must align with the hedged items.

In 2020, Deutsche Börse AG entered into FX derivative contracts to hedge the foreign currency exposure associated to transaction risk. Hereby, the cash flow risk arising from the time gap between signing the contracts and the actual payment out of the transaction was hedged. Cash flow hedge accounting was applied to this hedging.

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 2020, there were no significant net foreign-exchange positions (2019: nil).

Other market risks
Market risk also arises from investments in bonds, investments in funds, futures within the framework of contractual trust arrangements (CTAs) and from the Clearstream Pension Fund in Luxembourg. For the CTAs, the investment is 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, issued bonds 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. Eurex Clearing AG and Clearstream may invest stable customer balances for a maximum of one year in secured money market products, or in high-quality securities with a remaining maturity of less than ten years for Clearstream and less than five years for Eurex Clearing, subject to strict monitoring of mismatch and interest rate limits. There is an exception for UK gilts which may have a remaining term to maturity of up to 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. Eurex Clearing AG remains almost perfectly matched with respect to the durations of customer cash margins received and respective investments.

The companies of Deutsche Börse Group have the following credit lines at their disposal, which were not utilised as of the balance sheet date.

Contractually agreed credit lines

Company	Purpose of credit line	Currency	Amount at 31 Dec 2020 m	Amount at 31 Dec 2019 m
Deutsche Börse AG	Working capital[1]	€	600.0	605.0
Eurex Clearing AG	Settlement	€	900.0	1,170.0
	Settlement	Fr.	200.0	200.0
	Settlement[2]	US$	300.0	300.0
Clearstream Banking S.A.	Working capital[1]	€	750.0	750.0
	Settlement[2]	€	1,250.0	1,250.0
	Settlement[2]	US$	3,050.0	3,050.0
	Settlement[2]	£	350.0	350.0
European Energy Exchange AG	Working capital	€	22.0	22.0
	Settlement	€	81.6	0
	Settlement	£	1.0	1.0
Axioma Inc.	Working capital	US$	29.1	50.0

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) Including committed foreign exchange swap lines and committed repo lines.

For refinancing purposes, Eurex Clearing AG and the Clearstream Banking S.A. 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$3.0 billion as at 31 December 2020 (2019: US$ 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 (2019: US$3.0 billion).

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. At the end of the year there was no commercial paper outstanding (2019: 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 of 31 December 2020 it had issued commercial paper with a nominal volume of €546.4 million (2019: €311.9 million).

In 2019, Standard & Poor's confirmed Deutsche Börse AG's AA credit rating with a stable outlook. At year-end 2020 Deutsche Börse AG was one of only two DAX®-listed companies awarded an AA rating by S&P. Deutsche Börse AG's commercial paper programme also had the highest 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 Standard & Poor's in 2020. S&P also rated Clearstream Banking AG as AA in November 2020. 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 (1)

	Contractual maturity						
31 Dec 2020	Sight Mio. €	Not more than 3 months Mio. €	More than 3 months but not more than 1 year Mio. €	More than 1 year but not more than 5 years Mio. €	Over 5 years Mio. €	Reconciliation to carrying amount Mio. €	Carrying amount Mio. €
Non-derivative financial liabilities							
Non-current financial liabilities measured at amortised cost	0	6.8	38.9	2,239.0	1,477.6	– 287.9	3,474.4
thereof lease liabilities	0	0	0	169.7	224.4	– 36.2	357.9
Non-current financial liabilities at fair value through profit or loss	0	0	0	0	0	0	0
Trade payables	0	388.6	0	0	0	0	388.6
Current financial liabilities measured at amortised cost	13,999.7	409.4	219.2	0	0	1.7	14,630.0
thereof lease liabilities	0	12.8	36.4	0	0	1.8	51.0
Current financial liabilities at fair value through profit or loss	0	0	1.5	0	0	0	1.5
Cash deposits by market participants	38,188.8	0	0	0	0	0	38,188.8
Total non-derivative financial liabilties (gross)	**52,188.5**	**804.8**	**259.6**	**2,239.0**	**1,477.6**	**– 286.2**	**56,683.3**
Derivatives and financial instruments held by central counterparties							
Financial liabilites and derivatives held by central counterparties	41,684.5	25,965.5	13,023.1	5,903.1	1,031.6	0	87,607.8
less financial assets and derivatives held by central counterparties	– 41,684.5	– 26,060.5	– 13,023.1	– 5,903.1	– 1,031.6	0	– 87,702.8
Cash inflow - derivatives and hedges							
Cash flow hedges	0	1,156.0	0	403.2	0		
Fair value hedges	0	0	0	0	0		
Derivatives held for trading	0	1,870.6	654.1	0	0		
Cash outflow - derivatives and hedges							
Cash flow hedges	0	– 1,200.5	0	– 405.3	0		
Fair value hedges	0	0	0	0	0		
Derivatives held for trading	0	– 1,968.3	– 687.5	0	0		
Total derivatives and hedges	**0**	**– 237.2**	**– 33.4**	**– 2.1**	**0**		

Maturity analysis of financial instruments (2)

31 Dec 2019	Contractual maturity: Sight Mio. €	Not more than 3 months Mio. €	More than 3 months but not more than 1 year Mio. €	More than 1 year but not more than 5 years Mio. €	Over 5 years Mio. €	Reconciliation to carrying amount Mio. €	Carrying amount Mio. €
Non-derivative financial liabilities							
Non-current financial liabilities measured at amortised cost	0	0	45.6	1,457.8	1,362.2	– 238.4	2,627.2
thereof lease liabilities	0	0	0	153.3	227.2	– 39.4	341.0
Non-current financial liabilities at fair value through profit or loss	0	0	0	84.3	0	0	84.3
Trade payables	0.4	204.0	0.7	0	0	1.6	206.7
Current financial liabilities measured at amortised cost	13,826.3	63.7	335.1	0	0	0.3	14,225.5
thereof lease liabilities	0	11.6	33.9	0	0	– 6.4	39.1
Current financial liabilities at fair value through profit or loss	3.6	0	0	0	0	0	3.6
Cash deposits by market participants	29,751.1	4.7	0	0	0	0	29,755.8
Total non-derivative financial liabilties (gross)	**43,581.4**	**272.4**	**381.4**	**1,542.1**	**1,362.2**	**– 236.5**	**46,903.0**
Derivatives and financial instruments held by central counterparties							
Financial liabilites and derivatives held by central counterparties	11,220.4	59,271.0	6,920.1	4,176.5	1,057.7	0	82,645.7
less financial assets and derivatives held by central counterparties	– 11,220.4	– 60,161.0	– 6,920.1	– 4,176.5	– 1,057.7	0	– 83,535.7
Cash inflow - derivatives and hedges							
Cash flow hedges	0	16.0	80.3	0	0		
Fair value hedges	0	0	0	0	0		
Derivatives held for trading	828.2	75.9	2,172.2	0	0		
Cash outflow - derivatives and hedges							
Cash flow hedges	0	– 16.0	– 79.3	0	0		
Fair value hedges	0	0	0	0	0		
Derivatives held for trading	– 829.6	– 75.7	– 2,171.0	0	0		
Total derivatives and hedges	**– 1.4**	**– 889.9**	**2.2**	**0**	**0**		

24. Financial liabilities and other risks

Legal risks

The companies of Deutsche Börse Group are exposed to litigation. Such litigation may result in payments by entities in 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.

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 17). Contingent liabilities may result from present obligations and from possible obligations arising from events in the past. 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 advisers. In principle, losses can arise from legal risks of which the occurrence is not very probable and for which reason no provisions have been recognised. However, since there is some probability of their occurrence, they are presented as contingent liabilities. As a reliable estimate of these contingent liabilities cannot be made either for the time of occurrence or for possible outflows, a statement of the amount would not be representative for potential future losses. For this reason, the contingent liabilities are not disclosed in terms of amount. 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. The companies of Deutsche Börse Group are subject to litigation; as the outcome of litigation is usually uncertain, the judgement is reviewed continuously.

Deutsche Börse Group presents further details of litigation risks in the combined management report (see explanations in the risk report).

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 liability 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 liabilities are met.

25. Corporate governance

On 3 December 2020, the Executive and Supervisory Boards issued the latest version of the declaration of compliance 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 corporate governance statement).

26. Related party disclosures

Related parties as defined by IAS 24 are members of the executive bodies of Deutsche Börse AG and their close family members, 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 2020, the fixed and variable remuneration of the members of the Executive Board, including non-cash benefits granted in the financial year, amounted to €19.4 million (2019: €19.5 million). During the year under review, expenses of €11.3 million (2019: €6.9 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 €18.4 million as at 31 December 2020 (2019: €15.6 million). Expenses of €3.2 million (2019: €2.2 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 €8.3 million in 2020 (2019: €9.7 million). The actuarial present value of the pension obligations was €86.0 million as at 31 December 2020 (2019: €84.8 million).

Termination benefits

Expenses of €0.7 million were recognised in connection with the termination of Executive Board appointments.

Supervisory Board

The aggregate remuneration paid to members of the Supervisory Board in the reporting year was €2.5 million (2019: €2.4 million).

In the 2020 financial year, the employee representatives on Deutsche Börse AG's Supervisory Board received remuneration (excluding Supervisory Board remuneration) amounting to €0.8 million (2019: €1.1 million). The total consists of the fixed and variable salary components for those employee representatives.

Business relationships with related parties and key management personnel

The following table shows transactions entered into within the scope of business relationships with non-consolidated companies of Deutsche Börse AG during the 2020 financial year. All transactions took place on standard market terms.

Transactions with related parties

	Amount of the transactions: revenue		Amount of the transactions: expenses		Outstanding balances: receivables		Outstanding balances: liabilities	
	2020 €m	2019 €m	2020 €m	2019 €m	31 Dec 2020 €m	31 Dec 2019 €m	31 Dec 2020 €m	31 Dec 2019 €m
Associates	18.6	14.3	– 29.4	– 20.7	1.9	2.3	– 2.2	– 2.2
Total sum of business transactions	**18.6**	**14.3**	**– 29.4**	**– 20.7**	**1.9**	**2.3**	**– 2.2**	**– 2.2**

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. Key business relationships for Deutsche Börse Group are described below.

European Commodity Clearing Luxembourg S. à r.l., Luxembourg, 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 2020, ECC Luxembourg made payments in the amount of approximately €14 thousand for these management services.

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 are business relationships 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 €2,276.7 thousand as well as expenses of €1,977 thousand were recognised for such contracts during the reporting 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 2020 financial year, Deutsche Börse Group realised revenue of €9,374.4 thousand and incurred expenses of €25,913.2 thousand based on the business relationship with Deutsche Börse Commodities GmbH.

An Executive Board member of EPEX Spot SE is concurrently the sole shareholder of PELOUPIA SASU, which provides advisory services to EPEX SPOT SE on the basis of a service agreement. In the context of the services provided by PELOUPIA SASU, expenses of €14.0 thousand were incurred in 2020. As at 31 December 2020, liabilities amounted to €5.0 thousand.

One Executive Board member of Deutsche Börse AG as well as one Supervisory Board member of a fully-consolidated company of Deutsche Börse Group are members of the Supervisory Board of China Europe International AG (CEINEX), Frankfurt/Main, Germany. This stock corporation was established as a joint venture between Shanghai Stock Exchange Ltd., Shanghai, China; China Financial Futures Exchange, Shanghai, China; and Deutsche Börse AG. Expenses of €64.3 thousand were incurred in 2020 from the business relationship with CEINEX.

A member of the management of Axioma Inc., New York, USA, as well as one related party to this company which exercises control over the company Cloud9 Smart, New York, USA, maintain business relationships with each other. In the context of the services provided by Cloud9 Smart and Axioma Inc., expenses of €68.5 thousand were incurred in 2020. As at 31 December 2020, liabilities amounted to €28.6 thousand.

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.

27. Employees

Employees

	2020	2019
Average number of employees during the year	6,996	6,289
Employed at the reporting date	7,238	6,775
Employees (average annual FTEs)	6,528	5,841

Of the average number of employees during the year, 28 (2019: 26) were classified as Managing Directors (excluding Executive Board members), 348 (2019: 318) as senior executives and 6,620 (2019: 5,945) as employees.

There was an average of 6,528 full-time equivalent (FTE) employees during the year (2019: 5,841). Please also refer to the "Employees" section in the combined management report.

28. Decision-making bodies

The members of the company’s decision-making bodies are listed in the “The Executive Board” and “The Supervisory Board” chapters of this annual report.

29. Events after the end of the reporting period

Deutsche Börse AG has successfully completed the acquisition of Institutional Shareholder Services Inc., Rockville, USA (ISS) a governance, ESG data and analytics provider on 25 February 2021. The closing took place after the receipt of all necessary regulatory approvals. The transaction, announced in late 2020, is based on a valuation of US$2,275 million for 100 percent of the business cash and debt free. For more details, see section “Acquisitions”.

To partially finance this acquisition, Deutsche Börse AG successfully placed senior bonds in the amount of €1 billion on 15 February 2021, divided into two tranches with maturities of five and ten years. The five-year bond has a negative yield of – 0.19 percent and a coupon of 0 percent, and the ten-year bond has a yield of 0.19 percent and a coupon of 0.125 percent. In connection with the bond issues, Standard & Poor's has confirmed Deutsche Börse AG's "AA" credit rating with a stable outlook.

30. Date of approval for publication

Deutsche Börse AG's Executive Board approved the consolidated financial statements for submission to the Supervisory Board on 1 March 2021. The Supervisory Board is responsible for examining the consolidated financial statements and stating whether it endorses them.

31. Disclosures on material non-controlling interests

Wesentliche nicht beherrschende Anteile

	European Energy Exchange AG, Leipzig		Qontigo Group, Frankfurt/Main	
	31 Dec 2020	31 Dec 2019	31 Dec 2020	31 Dec 2019
Attributable to non-controlling interests:				
Capital (%)	75.1	75.1	78.3	78.3
Voting rights (%)	62.8	62.8	78.3	78.3
Net profit for the period (in €m)	58.5	53.9	88.5	32.8
Equity (in €m)	532.7	472.8	741.8	783.4
Dividend payments (in €m)	16.2	16.2	61.5	0
Assets (in €m)	593.9	527.0	958.7	1,018.5
Liabilities (in €m)	61.2	54.2	216.9	235.1
Profit/loss (in €m)	58.5	53.9	88.5	32.8
Other comprehensive income (in €m)	– 3.9	0.9	– 66.6	– 10.2
Comprehensive income (in €m)	54.6	54.8	22.0	22.6
Cashflows (in €m)	17.8	– 7.5	7.7	139.1

32. Disclosures on associates

Deutsche Börse Group does not have any material associates. The following table shows summarised financial information for the individual associates that are immaterial when considered separately.

Non-material associates

	31 Dec 2020[1] €m	31 Dec 2019 €m
Book value of non-material associates	**89.5**	**44.5**
Profit after Tax	18.6	0.9
Other income	0	0
Comprehensive income	18.6	0.9

1) Disclosures are based on preliminary and unaudited figures which may be adjusted subsequently.

33. List of shareholdings

Deutsche Börse AG's equity interests in subsidiaries, associates and joint ventures as at 31 December 2020 included in the consolidated financial statements are presented in the following tables. There were no joint ventures as of the reporting date.

Fully consolidated subsidiaries (part 1)

Company	Domicile	Equity interest as at 31 Dec 2020 direct/(indirect) %
Börse Frankfurt Zertifikate AG	Frankfurt/Main, Germany	100.00
Clearstream Holding AG	Frankfurt/Main, Germany	100.00
Clearstream Banking AG	Frankfurt/Main, Germany	(100.00)
Clearstream Banking S.A.	Luxembourg, Luxembourg	(100.00)
Clearstream Australia Limited	Sydney, Australia	(100.00)
Clearstream Banking Japan, Ltd.	Tokyo, Japan	(100.00)
REGIS-TR S.A.	Luxembourg, Luxembourg	(50.00)
Clearstream Fund Centre AG	Luxembourg, Luxembourg	(51.20)
Clearstream Global Securities Services Limited	Cork, Ireland	(100.00)
Clearstream International S.A.	Luxembourg, Luxembourg	(100.00)
Clearstream Nominees Limited	London, United Kingdom	(100.00)
Clearstream Operations Prague s.r.o.	Prague, Czech Republic	(100.00)
Clearstream Services S.A.	Luxembourg, Luxembourg	(100.00)
REGIS-TR UK Ltd. (dormant)	London, United Kingdom	(50.00)
DB1 Ventures GmbH	Frankfurt/Main, Germany	100.00
Deutsche Boerse Market Data + Services Singapore Pte. Ltd.	Singapore, Singapore	100.00
Deutsche Boerse Systems Inc.	Chicago, USA	100.00
Centana Growth Partners, LLC	New York, USA	(100.00)
Bryant Sands Partners, LLC	Delaware, USA	(100.00)
Bryant Sands Partners II, LLC	Delaware, USA	(100.00)
Quantitative Brokers LLC	New York, USA	(72.60)
Quantitative Brokers Australia Pty Ltd	Sydney, Australia	(72.60)
Quantitative Brokers Software India Private Limited	Chennai, India	(72.24)
Quantitative Brokers UK Limited	Hounslow, United Kingdom	(72.60)
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 Repo GmbH	Frankfurt/Main, Germany	(100.00)
Eurex Securities Transactions Services GmbH	Frankfurt/Main, Germany	(100.00)
Eurex Global Derivatives AG	Zug, Switzerland	100.00
Eurex Services GmbH	Frankfurt/Main, Germany	100.00

Fully consolidated subsidiaries (part 2)

Company	Domicile	Equity interest as at 31 Dec 2020 direct/(indirect) %
European Energy Exchange AG	Leipzig, Germany	75.05
EEX Asia Pte. Limited	Singapore, Singapore	(75.05)
EEX CEGH Gas Exchange Services GmbH	Vienna, Austria	(38.27)
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)
EPEX SPOT SE	Paris, France	(38.27)
EPEX Netherlands B.V.	Amsterdam, Netherlands	(38.27)
EPEX SPOT Schweiz AG	Bern, Switzerland	(38.27)
Gaspoint Nordic A/S	Brøndby, Denmark	(75.05)
Grexel Systems oy	Helsinki, Finland	(75.05)
KB Tech Ltd.	Tunbridge Wells, United Kingdom	(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)
Lapis HoldCo Inc.	Delaware, USA	100.00
Lapis Intermediate Inc.	Delaware, USA	(100.00)
Lapis Merger Sub Inc.	Delaware, USA	(100.00)
Qontigo GmbH	Frankfurt/Main, Germany	78.32
Axioma Inc.	New York, USA	(78.32)
Axioma (CH) GmbH	Geneva, Switzerland	(78.32)
Axioma (HK) Ltd.	Hong Kong, Hong Kong	(78.32)
Axioma (UK) Ltd.	London, United Kingdom	(78.32)
Axioma Argentina S.A.U.	Buenos Aires, Argentina	(78.32)
Axioma Asia Pte Ltd.	Singapore, Singapore	(78.32)
Axioma Deutschland GmbH	Frankfurt/Main, Germany	(78.32)
Axioma Japan G.K.	Tokyo, Japan	(78.32)
Axioma Ltd.	Sydney, Australia	(78.32)
Axioma S.A.S.U.	Paris, France	(78.32)
Qontigo Index GmbH	Frankfurt/Main, Germany	(78.32)
STOXX Ltd.	Zug, Switzerland	(78.32)
INDEX PROXXY Ltd.	London, United Kingdom	(78.32)
Tradegate Exchange GmbH	Berlin, Germany	63.97
Börse Berlin AG[1)]	Berlin, Germany	(63.97)
360 Treasury Systems AG	Frankfurt/Main, Germany	100.00
360 Trading Networks Inc.	New York, USA	(100.00)
360 Trading Networks Limited	Dubai, United Arab Emirates (UAE)	(100.00)
360 Trading Networks Sdn Bhd	Kuala Lumpur, Malaysia	(100.00)
360T Asia Pacific Pte. Ltd.	Singapore, Singapore	(100.00)
360TGTX Inc.	New York, USA	(100.00)
Finbird GmbH	Frankfurt/Main, Germany	(100.00)
ThreeSixty Trading Networks (India) Pte. Ltd.	Mumbai, India	(100.00)

1) Thereof 59.98 percent direct and 3.99 percent indirect.

Associates

Company	Domicile	Equity interest as at 31 Dec 2020 direct/(indirect) %
BrainTrade Gesellschaft für Börsensysteme mbH	Frankfurt/Main, Germany	(37.72)
China Europe International Exchange AG	Frankfurt/Main, Germany	40.00
Clarity AI, Inc.	Delaware, USA	19.90
CloudMargin Ltd.	London, United Kingdom	8.21
Deutsche Börse Commodities GmbH	Frankfurt/Main, Germany	16.20
enermarket GmbH	Frankfurt/Main, Germany	(30.02)
FundsDLT	Luxembourg, Luxembourg	17.91
HQLAx S.à r.l.	Luxembourg, Luxembourg	31.40
LuxCSD S.A.	Luxembourg, Luxembourg	(50.00)
Moorgate PV Holdings LLC	Delaware, USA	(9.55)
Proxymity Limited	Delaware, USA	(9.55)
Origin Primary Limited	London, United Kingdom	20.00
R5FX Ltd	London, United Kingdom	15.65
SEEPEX a.d.	Belgrade, Serbia	(9.57)
SPARK Commodities Ltd.	Singapore, Singapore	(18.76)
Tradegate AG Wertpapierhandelsbank	Berlin, Germany	19.99
ZDB Cloud Exchange GmbH in Liquidation	Eschborn, Germany	49.90
Zimory GmbH in Liquidation	Berlin, Germany	29.51

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