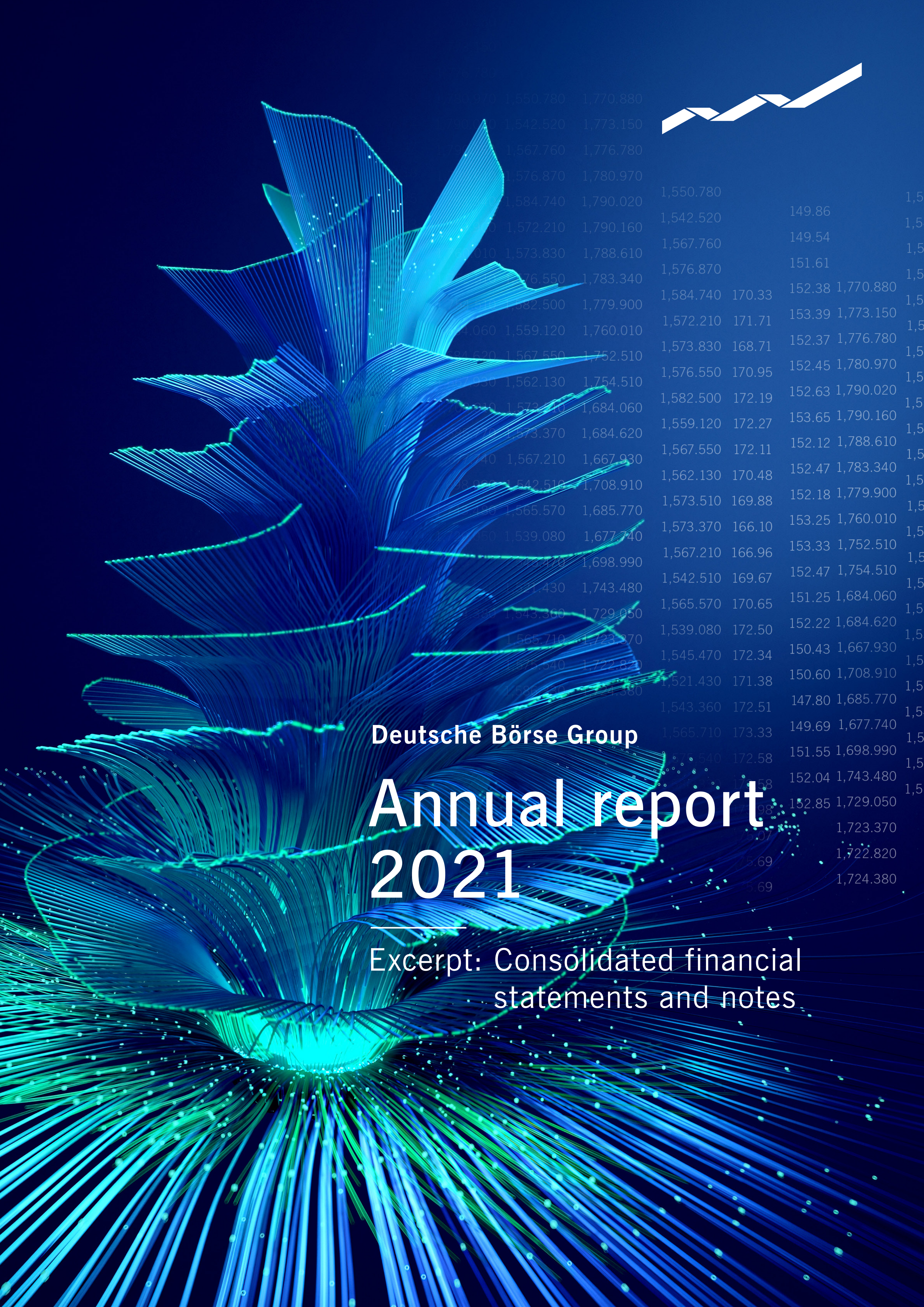

Deutsche Börse Group

Annual report 2021

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Consolidated income statement

for the period 1 January to 31 December 2021

	Note	2021 €m	2020 €m
Sales revenue	4	4,218.8	3,519.3
Treasury result from banking and similar business	4	142.7	196.6
Other operating income	4	85.1	40.5
Total revenue		**4,446.6**	**3,756.4**
Volume-related costs	4	– 937.1	– 542.6
Net revenue (total revenue less volume-related costs)		**3,509.5**	**3,213.8**
Staff costs	5	– 1,002.1	– 822.9
Other operating expenses	6	– 549.5	– 545.8
Operating costs		**– 1,551.6**	**– 1,368.7**
Result from financial investments	7	85.2	24.3
Result of the equity method measurement of associates		38.6	21.5
Other result		46.6	2.8
Earnings before interest, tax, depreciation, and amortisation (EBITDA)		**2,043.1**	**1,869.4**
Depreciation, amortisation and impairment losses	10	– 293.7	– 264.3
Earnings before interest and tax (EBIT)		**1,749.4**	**1,605.1**
Financial income	8	32.9	26.0
Financial expense	8	– 73.0	– 102.9
Earnings before tax (EBT)		**1,709.3**	**1,528.2**
Tax expense	9	– 444.4	– 403.1
Net profit for the period		**1,264.9**	**1,125.1**
thereof attributable to Deutsche Börse AG shareholders		1,209.7	1,079.9
thereof attributable to non-controlling interests		55.2	45.2
Earnings per share (basic) (€)	**22**	**6.59**	**5.89**
Earnings per share (diluted) (€)	**22**	**6.58**	**5.89**

Consolidated statement of comprehensive income

for the period 1 January to 31 December 2021

	Note	2021 €m	2020 €m
Net profit for the period reported in consolidated income statement		**1,264.9**	**1,125.1**
Items that will not be reclassified to profit or loss:			
Changes from defined benefit obligations		61.0	– 25.2
Equity investments measured at fair value through OCI		52.2	25.7
Other		– 4.8	– 0.4
Deferred taxes	15	– 29.1	– 0.4
		79.3	**– 0.3**
Items that may be reclassified subsequently to profit or loss:			
Exchange rate differences	15	269.0	– 106.2
Other comprehensive income from investments using the equity method		– 0.3	– 0.4
Remeasurement of cash flow hedges		52.7	– 40.3
Deferred taxes	15	– 3.4	0.1
		318.0	**– 146.8**
Other comprehensive income after tax		**397.3**	**– 147.1**
Total comprehensive income		**1,662.2**	**978.0**
thereof attributable to Deutsche Börse AG shareholders		1,570.3	950.4
thereof attributable to non-controlling interests		91.9	27.6

Consolidated balance sheet

as at 31 December 2021

Assets

	Note	31 Dec 2021 €m	31 Dec 2020 €m
NON-CURRENT ASSETS		**20,462.4**	**14,570.5**[1]
Intangible assets	10	**8,162.9**	**5,723.2**
Software		553.2	383.8
Goodwill		5,596.0	3,957.6
Payments on account and assets under development		100.1	126.3
Other intangible assets		1,913.6	1,255.4
Property, plant and equipment	11	**593.7**	**530.4**
Land and buildings		438.0	369.2
Fixtures and fittings		57.0	52.4
Computer hardware, operating and office equipment		90.1	101.7
Payments on account and construction in progress		8.5	7.0
Financial assets	12	**11,460.4**	**8,059.8**
Equity investments measured at FVOCI			
Strategic investments		224.3	107.0
Debt instruments		2.8	4.4
Debt financial assets measured at amortised cost		1,634.7	997.5
Financial assets at FVPL			
Financial instruments held by central counterparties		9,442.4	6,908.5[1]
Other financial debt assets at FVPL		156.2	42.4
Investment in associates		88.9	89.5
Other non-current assets		16.8	6.0
Deferred tax assets	9	139.8	161.7
CURRENT ASSETS		**202,457.0**	**138,107.4**[1]
Debt financial assets measured at FVOCI	12	1.5	0.5
Debt financial assets measured at amortised cost	12		
Trade receivables		969.4	616.6
Other financial assets at amortised cost		15,799.6	16,225.1
Restricted bank balances		78,542.0	38,420.1
Other cash and bank balances		1,029.6	1,467.3
Financial assets at FVPL	12		
Financial instruments held by central counterparties		103,195.7	80,704.5[1]
Other financial assets at FVPL		116.0	15.8
Income tax assets	9	115.5	109.5
Other current assets	14	2,675.6	548.1
Assets held for sale	2	11.9	0
Total assets		**222,919.3**	**152,677.9**[1]

1) Due to a correction of the previous year's figures, non-current assets decreased by €26.2 million and current assets by €63.6 million. Current and non-current liabilities decreased correspondingly.

Equity and liabilities

	Note	31 Dec 2021 €m	31 Dec 2020 €m
EQUITY	**15**		
Subscribed capital		190.0	190.0
Share premium		1,359.6	1,352.4
Treasury shares		– 458.2	– 465.2
Revaluation surplus		– 61.7	– 196.3
Retained earnings		6,163.8	5,287.4
Shareholders' equity		**7,193.6**	**6,168.3**
Non-controlling interests		548.8	387.8
Total equity		**7,742.4**	**6,556.1**
NON-CURRENT LIABILITIES		**13,623.0**	**11,005.2**[1]
Provisions for pensions and other employee benefits	17, 18	149.0	222.4
Other non-current provisions	18, 19	127.2	168.0
Financial liabilities measured at amortised cost	12	3,539.9	3,474.4
Financial liabilities at FVPL	12		
Financial instruments held by central counterparties		9,442.4	6,908.5[1]
Other financial liabilities at FVPL		8.4	1.5
Other non-current liabilities	20	17.5	13.9
Deferred tax liabilities	9	338.5	216.7
CURRENT LIABILITIES		**201,554.0**	**135,116.6**[1]
Income tax liabilities		244.6	267.1
Other current provisions	19	335.3	313.7
Financial liabilities at amortised cost	12		
Trade payables		704.4	388.6
Other financial liabilities at amortised cost		15,914.3	14,630.0
Cash deposits by market participants		78,292.5	38,188.8
Financial liabilities at FVPL	12		
Financial instruments held by central counterparties		103,267.7	80,609.5[1]
Other financial liabilities at FVPL		4.7	174.1
Other current liabilities	20	2,788.6	544.7
Liabilities held for sale	2	1.9	0
Total liabilities		**215,177.0**	**146,121.8**[1]
Total equity and liabilities		**222,919.3**	**152,677.9**[1]

1) Due to a correction of the previous year's figures, non-current assets decreased by € 26.2 million and current assets by € 63.6 million. Current and non-current liabilities decreased correspondingly.

Consolidated cash flow statement

for the period 1 January to 31 December 2021

	Note	2021 €m	2020 €m
Net profit for the period		1,264.9	1,125.1
Depreciation, amortisation and impairment losses	10, 11	293.7	264.3
(Decrease)/increase in non-current provisions		– 53.1	– 61.8
Deferred tax income	9	– 0.1	– 11.9
Cash flows from derivatives		– 6.4	0
Other non-cash income		– 163.6	143.6
Changes in working capital, net of non-cash items:		– 154.4	82.8
Decrease/(increase) in receivables and other assets		– 358.2	– 78.6
Increase/(decrease) in current liabilities		206.6	163.5
Increase in non-current liabilities		– 2.8	– 2.1
Net loss on disposal of non-current assets		0.3	– 19.0
Cash flows from operating activities excluding CCP positions		**1,181.4**	**1,523.0**
Changes in liabilities from CCP positions		– 2,552.8	– 832.8
Changes in receivables from CCP positions		2,280.3	721.8
Cash flows from operating activities	**21**	**908.9**	**1,412.0**
Payments to acquire intangible assets		– 168.6	– 134.3
Payments to acquire property, plant and equipment		– 37.8	– 61.2
Payments to acquire non-current financial instruments		– 1,359.3	– 601.2
Payments to acquire investments in associates		– 12.0	– 26.4
Payments to acquire subsidiaries, net of cash acquired		– 1,843.0	– 448.5
Effects of the disposal of (shares in) subsidiaries, net of cash disposed		0	20.2
(Net increase)/net decrease in current receivables and securities from banking business with an original term greater than three months		506.0	– 341.5
Net increase/(net decrease) in current liabilities from banking business with an original term greater than three months		229.3	177.4
Proceeds from disposals of non-current financial instruments		516.5	625.3
Proceeds from disposals of intangible assets		0.9	2.5
Cash flows from investing activities	**21**	**– 2,168.0**	**– 787.7**
Proceeds from sale of treasury shares		8.7	9.1
Payments to non-controlling interests		– 40.9	– 26.6
Proceeds from long-term financing		999.1	945.5
Repayment of long-term financing		– 356.0	– 602.9
Repayment of short-term financing		– 1,900.0	0
Proceeds from short-term financing		2,701.0	0
Finance lease payments		– 62.6	– 47.4
Dividends paid	16	– 550.6	– 531.9
Cash flows from financing activities	**21**	**798.7**	**– 254.2**
Net change in cash and cash equivalents		**– 460.5**	**370.0**

	Notes	2021 €m	2020 €m
Net change in cash and cash equivalents (brought forward)		**– 460.5**	**370.0**
Effect of exchange rate differences		– 6.3	– 8.9
Cash and cash equivalents at beginning of period		2,506.7	2,145.5
Cash and cash equivalents at end of period	21	**2,040.0**	**2,506.7**
Interest-similar income received		441.2	526.1
Dividends received		10.2	5.4
Interest paid		– 340.9	– 352.4
Income tax paid		– 470.7	– 381.8

Consolidated statement of changes in equity

for the period 1 January to 31 December 2021

	Attributable to Deutsche Börse AG shareholders							
	Subscribed capital €m	Share premium €m	Treasury shares €m	Revaluation surplus €m	Retained earnings €m	Shareholders' equity €m	Non-controlling interests €m	Total equity €m
Balance as at 1 January 2020	**190.0**	**1,344.7**	**– 471.8**	**– 155.8**[1]	**4,828.2**[1]	**5,735.3**	**375.3**	**6,110.6**
Net profit for the period	–	–	–	–	1,079.9	1,079.9	45.2	1,125.1
Other comprehensive income after tax	–	–	–	– 40.5	– 89.0	– 129.5	– 17.6	– 147.2
Total comprehensive income	**–**	**–**	**–**	**– 40.5**	**990.9**	**950.4**	**27.6**	**978.0**
Other adjustments	–	–	–	–	0.2	0.2	– 0.2	0.0
Sales under the Group Share Plan	–	7.7	6.6	–	–	14.3	–	14.3
Changes from business combinations	–	–	–	–	–	–	11.7	11.7
Dividends paid	–	–	–	–	– 531.9	– 531.9	– 26.6	– 558.5
Transactions with shareholders	**–**	**7.7**	**6.6**	**–**	**– 531.7**	**– 517.4**	**– 15.1**	**– 532.5**
Balance as at 31 December 2020	**190.0**	**1,352.4**	**– 465.2**	**– 196.3**[1]	**5,287.4**[1]	**6,168.3**	**387.8**	**6,556.1**
Balance as at 1 January 2021	**190.0**	**1,352.4**	**– 465.2**	**– 196.3**[1]	**5,287.4**[1]	**6,168.3**	**387.8**	**6,556.1**
Profit for the period	–	–	–	–	1,209.7	1,209.7	55.2	1,264.9
Other comprehensive income	–	–	–	133.3	227.3	360.6	36.7	397.3
Total comprehensive income	**–**	**–**	**–**	**133.3**	**1,437.0**	**1,570.3**	**91.9**	**1,662.2**
Other adjustments	–	–	–	–	1.2	1.2	0.1	1.2
Sales under the Group Share Plan	–	7.2	7.0	–	–	14.2	–	14.2
Increase in share-based payments	–	–	–	1.3	–	1.3	–	1.3
Changes due to capital increases/decreases	–	–	–	–	–	–	0.4	0.4
Changes from business combinations	–	–	–	–	– 11.1	– 11.1	98.9	87.8
Dividends paid	–	–	–	–	– 550.6	– 550.6	– 30.3	– 580.9
Transactions with shareholders	**–**	**7.2**	**7.0**	**1.3**	**– 560.6**	**– 545.0**	**69.1**	**– 476.0**
Balance as at 31 December 2021	**190.0**	**1,359.6**	**– 458.2**	**– 61.7**	**6,163.8**	**7,193.6**	**548.8**	**7,742.4**

1) Adjustment of revaluation reserve and retained earnings see Note 15.

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, Deutsche Börse AG has a stock exchange licence and certain subsidiaries of Deutsche Börse AG have a banking licence and offer banking services to customers. Eurex Clearing AG is a central counterparty, a bank and its role is to mitigate performance risks for buyers and sellers. For details regarding internal organisation and reporting, see Fundamental information about the Group in the combined management report.

Basis of reporting

The 2021 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 Handelsgesetzbuch (HGB, German Commercial Code) section 315e (1) have been presented in the notes to the consolidated financial statements.

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.

Information about capital management, which is also part of these consolidated financial statements, is included in the chapter Regulatory capital requirements and regulatory capital ratios in section Risk management in the combined management report.

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.

Assets and liabilities, items in the consolidated statement of comprehensive income, and disclosure requirements are listed separately if they are material. We define as material a proportion of around 10 per cent of the relevant total.

New accounting standards – implemented in the year under review

All the mandatory standards and interpretations endorsed by the European Commission were applied by us in the reporting year 2021. They were not applied earlier than required.

Standard/amendment/interpretation

		Application date	Effects on Deutsche Börse Group
IFRS 4	Amendments to IFRS 4: Insurance Contracts	1 Jan 2021	none
IFRS 9, IAS 39, IFRS 7 and others	IBOR Reform 2: Amendment of IFRS 9, IAS 39, IFRS 7 and other standards	1 Jan 2021	none
IFRS 16	Amendments due to COVID-19-related lease concessions beyond 30 June 2021	1 Apr 2021	None

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 on Deutsche Börse Group
IAS 1	Amendments in classifcation of liabilities as current or non-current	1 Jan 2023	See notes under this table
IAS 1	Amendment to IAS 1 and IFRS Guidance Document 2 on Materiality	1 Jan 2023	See notes under this table
IFRS 3	Amendments to IFRS 3 relating to a reference in the Conceptual Framework	1 Jan 2022	None
IAS 8	Amendments relating to accounting estimates	1 Jan 2023	None
IAS 12	Amendments in relation to deferred taxes that relate to assets and liabilities arising from a single transaction	1 Jan 2023	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
IFRS 17, IFRS 9	First-time Adoption of IFRS 17 and IFRS 9 – Comparative Information	1 Jan 2023	None
IAS 37	Amendments to IAS 37 include the definition of what costs an entity includes when assessing whether a contract will be loss-making	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. We are currently analysing the potential impact of the amendments on the presentation of the consolidated financial statements.

The amendment to IAS 1 and IFRS guidance document 2 on materiality
The amendment to IAS 1 supplements guidelines for determining disclosures on accounting methods in an entity’s financial statements and explains how an entity can identify material accounting policies. We are currently analysing potential additions to the disclosures in the notes.

The amendments to deferred tax related to assets and liabilities arising from a single transaction
The amendment to IAS 12 clarifies that the exemption from recognising deferred taxes on the initial recognition of an asset or liability outside a business combination does not apply to transactions in which equal amounts of deductible and taxable temporary differences arise on initial recognition. This amendment generally matches our approach. Potential effects on the financial performance and financial position of the Group are being analysed, however.

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 information to consistently represent 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. The standard is now applicable in the EU for financial years beginning on or after 1 January 2023. The standard was endorsed by the EU on 23 November 2021. On the basis of our analysis we are not expecting any effect on the financial position and financial performance

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 shareholders are presented 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. Monetary balance sheet items in foreign currencies are measured at the exchange rate on the reporting date. 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 and similar business or as net income from financial investments in the period in which they arise, unless the underlying transactions are hedged. In the case of equity instruments designated at FVOCI, the exchange rate differences are recognised in other comprehensive income. 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".

Balance sheet items of entities whose functional currency is not the euro are translated into the reporting currency as follows: assets and liabilities are translated into euro at the spot rate and equity items at historical rates. 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 2021	Average rate 2020	Closing price as at 31 Dec 2021	Closing price as at 31 Dec 2020
Swiss franc	CHF (Fr.)	1.0800	1.0713	1.0337	1.0832
US dollars	USD (US$)	1.1821	1.1477	1.1317	1.2299
Czech koruna	CZK (Kč)	25.6569	26.5249	24.8605	26.2698
Singapore dollar	SGD (S$)	1.5871	1.5791	1.5277	1.6254
British pound	GBP (£)	0.8589	0.8908	0.8371	0.8999

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 from a monetary item that is part of a net investment of Deutsche Börse Group in a foreign operation are initially recognised in other comprehensive income and reclassified to profit or loss when the net investment is sold.

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. Non-controlling interests are measured at their relevant interest of the acquiree's net identifiable assets at acquisition date.

Deutsche Börse AG's equity interests in subsidiaries and associates included in the consolidated financial statements as at 31 December 2021 are presented in the list of shareholdings in note 34.

Essential acquisitions

Acquisition of Institutional Shareholder Services Inc., Rockville, USA (ISS)
In the first quarter 2021, Deutsche Börse AG completed the acquisition of 81.2 per cent of the shares in ISS for a price of €1,653.3 million (USD 1,978.9 million), thereby assuming control. The business operations of ISS and the Group are a perfect fit. Together the two companies will meet the steadily growing demand for detailed data, research solutions and analysis of non-financial information, particularly relating to ESG criteria. ISS is included in the segment reporting as a separate operating segment as of the closing date of the transaction on 25 February 2021.

Initial recognition of ISS, a provider of governance solutions, ESG data and analytics, in the consolidated financial statements took place using the purchase method. Significant synergies are expected from the transaction, particularly revenue synergies, which is reflected in the goodwill resulting from the transaction.

The identifiable assets and liabilities of ISS are recognised at fair value on the acquisition date. 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.

The preliminary purchase price allocation as at the acquisition date was as follows:

Goodwill resulting from the business combination with Institutional Shareholder Services Inc., Rockville, USA (ISS)

	Preliminary goodwill calculation 25 Feb 2021 €m
Consideration transferred	
Purchase price in cash	903.4
Settlement of option programmes	66.8
Payment to escrow account[1]	22.9
Transaction costs for seller[2]	25.9
Debt repayment	584.5
Contingent purchase price components at fair value	26.5
Sponsor call right[3]	– 8.7
Cash flow hedge[4]	32.0
Total consideration	**1,653.3**
Acquired assets and liabilities	
Customer relationships	476.9
Trade names	107.6
Software	30.2
Software in development	2.2
Property, plant and equipment	89.9
Other non-current assets	5.4
Deferred tax assets	1.6
Other current assets	9.1
Trade receivables	35.5
Acquired bank balances	200.1
Deferred tax liabilities	– 83.3
Other non-current liabilities	– 69.5
Contract liabilities	– 103.8
Other current liabilities	– 226.4
Non-controlling interests[5]	– 67.0
Total assets and liabilities acquired	**408.5**
Goodwill (not tax-deductible)	**1,244.8**

1) Purchase price payments to an escrow account until final settlement
2) Original costs of seller
3) A call right was purchased for €8.7 million that is recognised as a financial instrument in accordance with IFRS 9 rather than in accordance with IFRS 3.
4) Reclassification of effective portion of cash flow hedge for the purchase price to acquisition cost of the investment
5) The non-controlling interests are calculated on the basis of the acquired net assets, excluding goodwill.

The full consolidation of ISS resulted in an increase in net revenues of €222.4 million as well as in an increase in profit after tax of €15.7 million. If the company had been fully consolidated as at 1 January 2021, this would have resulted in an increase in net revenues of €257.7 million as well as in an increase in profit after tax of €18.0 million.

The contingent purchase price component is based on an increase in company value within the first three years and the resulting obligation has no upper limit. It is classified as a financial liability in accordance with IFRS 9.

Goodwill amounts to €1,340.1 million as at 31 December 2021. The change compared to the acquisition date results from exchange rate differences amounting to €95.3 million.

The purchase price allocation was based on a preliminary basis, as it was not yet possible to make a final determination, particularly with regards to taxes.

Acquisition of the 2nd tranche of Clearstream Fund Centre AG, Zurich, Switzerland (CFC)
On 1 June 2021 Deutsche Börse AG completed the acquisition of the remaining 48.8 per cent of the CHF shares in CFC (formerly Fondcenter AG) from UBS Group (UBS) for a purchase price of CHF 390 million (€356 million). A further 51.2 per cent of the shares in CFC were sold within the Group by Clearstream Holding AG to Deutsche Börse AG, making it the sole owner of the Zurich-based fund distribution platform. Deutsche Börse Group acquired the first 51.2 per cent of CFC from UBS in September 2020. The transaction included the right to buy the remaining shares at a later date. Deutsche Börse Group had recognised the related financial liability before acquiring the 2nd tranche, accounting for it at the expected settlement amount using the effective interest method (in the category "financial liabilities measured at amortised cost"). No non-controlling interests were recognised, in accordance with the anticipated acquisition method. The remeasurement of the financial liability on the basis of the agreed purchase price resulted in income of €39.9 million, which is shown in the item "Other operating income".

Acquisition of Crypto Finance AG., Zurich, Switzerland
Deutsche Börse AG completed the acquisition of 57.5 per cent of the shares in Crypto Finance AG for a price of €77.3 million (CHF 87.4 million) on 15 December 2021, thereby assuming control. In the course of a capital increase against cash, Deutsche Börse AG increased its capital share to 67.5 per cent. The business operations of Crypto Finance and the Group are a perfect fit. With this acquisition Deutsche Börse has a direct entry point for investments in digital assets, including post-trading and custody services. Crypto Finance was allocated to the Xetra segment (cash market) when the transaction was concluded.

Crypto Finance, a FINMA-regulated provider of trading, custody and investment services for digital assets, was included in the consolidated financial statements for the first time using the purchase method. Significant synergies are expected from the transaction, particularly revenue synergies, which is reflected in the goodwill resulting from the transaction.

The identifiable assets and liabilities of Crypto Financ are recognised at fair value on the acquisition date. 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.

The preliminary purchase price allocation as at the acquisition date was as follows:

Goodwill resulting from the business combination with Crypto Finance AG, Zurich, Switzerland (Crypto Finance)

	Preliminary goodwill calculation 15 Dec 2021 €m
Consideration transferred	
Purchase price in cash	89.4
Call option[1]	– 5.7
Cash flow hedge[2]	– 6.5
Total consideration	**77.3**
Acquired assets and liabilities	
Customer relationships	16.0
Tradename	3.6
Software	4.4
Property, plant and equipment	0.2
Deferred tax assets	0.9
Acquired bank balances	23.5
Current assets	19.0
Non-current liabilities	– 2.2
Current liabilities	– 14.5
Deferred tax liabilities on temporary differences	– 3.0
Non-controlling interests[3]	– 20.8
Total assets and liabilities acquired	**27.1**
	0
Goodwill (not tax-deductible)	**50.2**

1) A call option in the amount of €5.7 million was acquired, which is accounted outside the scope of IFRS 3 as a financial instrument under IFRS 9.
2) Reclassification of the effective portion of the cash flow hedge of the purchase price to the cost of the investment
3) Non-controlling interests are calculated on the basis of the acquired net assets excluding goodwill.

The full consolidation of Crypto Finance resulted in an increase in net revenues of €1.6 million as well as in an increase in profit after tax of €0.1 million. If the company had been fully consolidated as at 1 January 2021, this would have resulted in an increase in net revenues of €18.3 million as well as in an increase of profit after tax of €2.2 million.

The purchase price allocation was based on a preliminary basis, as it was not yet possible to make a final determination, particularly with regards to taxes and the valuation of intangible assets.

Acquisition of Discovery Data Holdings Inc., New Jersey, USA (Discovery Data)
On 9 December 2021, Institutional Shareholder Services Inc. completed the acquisition of 100 per cent of the shares in Discovery Data Holdings, Inc. for a price of €201.4 million (USD 228.0 million), thereby assuming control. The business operations of Discovery Data and the Group are a perfect fit. Together the two companies will serve the growing demand for detailed data, research solutions and analytics. Discovery Data was allocated to the ISS segment when the transaction was concluded.

Discovery Data, a global provider of data solutions and analytics, was included in the consolidated financial statements using the purchase method. Significant synergies are expected from the transaction, particularly revenue synergies, which is reflected in the goodwill resulting from the transaction.

The identifiable assets and liabilities of Discovery Data are recognised at fair value on the acquisition date. 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.

The preliminary purchase price allocation as at the acquisition date was as follows:

Goodwill resulting from the business combination with Discovery Data Holdings Inc., New Jersey, USA (Discovery Data)

	Preliminary goodwill calculation 9 Dec 2021 €m
Consideration transferred	
Purchase price in cash	201.4
Total consideration	**201.4**
Acquired assets and liabilities	
Customer relationships	33.4
Trade names	2.8
Database	36.0
Software	8.7
Property, plant and equipment	0.6
Other non-current assets	0.1
Acquired bank balances	18.0
Other current assets (without cash)	3.7
Deferred tax liabilities	– 14.4
Other non-current and current liabilities	– 0.4
Contract liabilities	– 9.4
Other current liabilities	– 18.1
Total assets and liabilities acquired	**61.2**
Goodwill (not tax-deductible)	**140.2**

The consolidation of Discovery Data resulted in an increase in net revenues of €1.3 million as well as in a decrease in profit after tax of €– 0.3 million. If the company had been consolidated as at 1 January 2021, this would have resulted in an increase in net revenues of €18.6 million as well as in an decrease of profit after tax of €– 5.9 million.

The purchase price allocation was based on a preliminary basis, as it was not yet possible to make a final determination, particularly with regards to taxes and the valuation of intangible assets.

Disposals

Disposal Régis-T.R. S.A., Luxembourg, Luxembourg (REGIS-TR)

At the beginning of September 2021, Clearstream International S.A. signed a binding agreement on the sale of REGIS-TR S.A., Luxembourg, Luxembourg, and Clearstream Holding AG on the sale of REGIS-TR UK Ltd, London, United Kingdom, to the SIX Group. Both entities, assigned to the Clearstream segment, were therefore classified as disposal groups as of the same date. We expect the transaction to be closed in the first quarter of 2022.

The assets and liabilities of the disposal group are held at their carrying amount, which is lower than their fair value less costs to sell, and shown separately in the statement of financial position under the items "Assets held for sale" and "Liabilities held for sale".

No impairment losses were recognised since the agreed sales price is higher than the carrying amount of the disposal group. From the date of reclassification, intangible assets and property, plant and equipment are no longer depreciated or amortised.

Assets and liabilities held for sale

	31.12.2021 €m
Intangible assets	11.7
Property, plant and equipment	0.2
Other non-current assets	0.0
Assets held for sale (total)	**11.9**
Provisions for pensions and other employee benefits	0.3
Financial liabilities	0.1
Deferred tax liabilities	1.4
Liabilities held for sale (total)	**1.9**

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, our significant influence is exercised through the Group's representation on the supervisory board or the board of directors.

3. Adjustments

Segment reporting
We modified our segment reporting in the first quarter of 2021, adding the segment Institutional Shareholder Services (ISS). The business operations of ISS are now reported in the new segment ISS. The separate reporting corresponds to the internal management and reporting structure and increases transparency as well as value of information for users of the financial statements.

Internally developed software
Deutsche Börse AG reviewed its amortisation period for internally developed software in the first quarter. The useful lives applied the previous year were five years for internally developed software releases and seven years for newly developed systems.

The review showed that the fundamental useful life for internally developed software releases is seven years and for newly developed systems ten years. We therefore decided to bring the amortisation period into line with the useful life of the assets. The change took place as of 1 January 2021. Amortisation in 2021 would have been €74.7 million instead of €42.1 million if the useful lives had not been modified.

Notes on the consolidated income statement

4. Net revenue

Recognition of income and expenses

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

- Revenue,
- result of treasury activities in banking and similar business,
- other operating income and
- volume-related costs.

Revenue recognition
This section comprises details on revenue from contracts with customers. They particularly include performance obligations and methods of revenue recognition. Revenue is measured on the basis of the consideration agreed in a customer contract. The Group recognises revenue when it transfers control over goods or services to the customer. For information on contract assets and liabilities see Note 13. Revenue is recognised in Deutsche Börse Group's segments as follows:

Eurex (financial derivatives)
Revenue in the derivatives business (mainly equity, interest rate and share index derivatives) is generated primarily from fees that are charged for transactions with regard to the matching/registration, administration and regulation of order book and off-book transactions on Eurex 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. Administration fees of financial derivatives are recognised over time as the service is provided until the transaction has been closed, terminated or has matured. 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 when the promised service is provided at a specific point in time or monthly based on the utilisation in the respective month 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.

Revenue is also generated with clearing and settlement services for over-the-counter (OTC) transactions. This mainly comes in the form of booking and management 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 and Market Data Services 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 Frankfurter Wertpapierbörse (FWB, the Frankfurt Stock Exchange) are subject to the admission and listing or inclusion, resolved by FWB's 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, for corporate events for 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, we offer a wide range of global securities financing (GSF) services. These include 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 our custody and clearing systems. They are accounted for in the same way as described in the section "Eurex (financial derivatives)".

IFS (Investment Fund Services)

The segment provides services to standardise fund processing and to increase efficiency and safety in the investment fund sector. The services offered comprise order routing, settlement and asset administration, as well as custody services. By acquiring Clearstream Fund Centre AG, IFS has expanded its range of services related to the distribution and placement of collective investment funds in Germany and abroad. Service and distribution agreements are signed with the fund providers or asset managers. A trailer fee is charged and recognised in "Funds distribution". Service fees are also charged for the management of distribution contracts 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, benchmark, strategy, 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 (summarised as "Maintenance") of the software products, which are realised 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”.

Additional costs are capitalised for multi-year contracts when initiating a contract.

ISS (Institutional Shareholder Services)

The ISS segment offers corporate governance solutions, ESG data and analytics services. Net revenue aggregated as ESG revenue is generated in the business units Corporate Solutions, ESG Analytics and Governance Solutions. Net revenue aggregated as non-ESG revenue is generated in the business units Market Intelligence, Media, FWW (fund data), LiquidMetrics and SCAS (Securities Class Action Service). Most of this revenue stems from fixed-term contracts and recurring services. Revenue is recognised over time when the contractually agreed service is provided to the customer. Fees are generally charged in advance, either before the licence starts or periodically over the term of the licence. Proxy voting services are provided at a point in time and revenue is recognised when the contractually agreed service is provided to the client.

The other revenue stems from non-recurring service contracts. The performance obligations for advertising services and event sponsoring are settled when the service is provided, i.e. when the publication takes place or the advert is published. Performance obligations for advisory services are settled over time on the basis of the service rendered up to the reporting date. Measurement of the percentage of completion follows the invoicing.

Performance-related fees for services in connection with securities and class-action litigation are variable consideration and are only recognised when all the conditions have been met and no uncertainty remains concerning the variable consideration that is beyond the control of the entity. This is the case when the lawsuit has been won or a settlement has been reached. Fees for exceeding the minimum volumes for proxy research and services in connection with the exercise of voting rights are also variable consideration.

Since neither the volume that will be used nor the price of these services can be determined with reasonable certainty when the contract starts, the variable portion of the consideration is restricted up to the date of full performance and only recognised when the transaction price can be determined.

Consideration is generally due 30 days after the invoice date. At the start of the contract ISS expects that the period between providing the service and receiving the consideration from the clients is at most one year, so there is no significant financing component.

Additional costs are capitalised for multi-year contracts when initiating a contract.

Result of treasury activities in banking and similar business
The treasury result of banking and similar 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, we also generate interest income from customer balances held with us (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 directly attributable to our typical business model. Other operating income is usually realised when all chances and risks have been transferred. Other operating income comprises, for instance from, income from subleasing property, agency contracts as well as the reversal of impairments recognised on trade receivables. In addition, valuation effects, such as income from exchange rate differences from non-banking business, are reported under other operating income.

Volume-related costs
The item “volume-related costs” consists of expenses directly related to revenue and which depend directly on the following factors:

- The number of certain trading and settlement transactions,
- The custody volume and volume of global securities financing,
- The amount of purchased data,
- The sales commissions to distribution partners for the distribution of capital investments,
- Revenue sharing agreements and maker-taker price models.

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

Composition of net revenue (part 1)

	Sales revenue		Treasury result from banking and similar business	
	2021 €m	2020 €m	2021 €m	2020 €m
Eurex (financial derivatives)				
Equity index derivatives	450.1	600.3	0	0
Interest rate derivatives	228.6	203.4	0	0
Equity derivatives	59.0	56.9	0	0
OTC Clearing	55.8	50.0	0	0
Margin fees	24.2	22.6	74.1	83.4
Infrastructure	88.5	84.2	0	0
Eurex Data	62.5	62.1	0	0
Other	50.7	33.5	0	0
	1,019.4	**1,113.0**	**74.1**	**83.4**
EEX (commodities)				
Power derivatives	128.0	128.0	1.2	1.4
Power spot	71.1	72.7	0	0
Gas	65.2	54.5	0	0
Annual fees	20.0	17.0	0	0
Technical connection fees	10.7	10.2	0	0
Market Data Services	10.5	7.7	0	0
Other	44.9	35.6	15.7	3.8
	350.4	**325.7**	**16.9**	**5.2**
360T (foreign exchange)				
Trading	88.6	86.7	0	0
Other	24.6	20.8	0	0
	113.2	**107.5**	**0**	**0**
Xetra (cash equities)				
Trading and clearing	226.9	237.3	0.4	0
Listing	19.4	18.0	0	0
Xetra Data	116.6	113.6	0	0
Regulatory services	9.9	12.7	0	0
Infrastructure	42.8	43.9	0	0
	415.6	**425.5**	**0.4**	**0**

Composition of net revenue (part 2)

	Other operating income		Volume-related costs		Net revenue	
	2021 €m	2020 €m	2021 €m	2020 €m	2021 €m	2020 €m
Eurex (financial derivatives)						
Equity index derivatives	0.1	0.1	– 60.3	– 59.9	389.9	540.5
Interest rate derivatives	0.1	0.1	– 3.0	– 3.4	225.7	200.1
Equity derivatives	0.0	0.1	– 9.5	– 8.6	49.5	48.4
OTC Clearing	23.9	22.3	– 22.6	– 17.4	57.1	54.9
Margin fees	– 30.2	– 20.6	– 0.1	0.0	68.0	85.4
Infrastructure	0.0	0.0	– 0.5	– 0.2	88.0	84.0
Eurex Data	10.9	8.7	– 10.4	– 11.0	63.0	59.8
Other	11.9	7.3	– 8.0	– 3.6	54.6	37.2
	16.7	**18.0**	**– 114.4**	**– 104.1**	**995.8**	**1,110.3**
EEX (commodities)						
Power derivatives	0.0	0.5	– 10.9	– 14.1	118.3	115.8
Power spot	0.0	0.0	0.0	– 0.6	71.1	72.1
Gas	0.0	0.0	– 10.3	– 11.5	54.9	43.0
Annual fees	0.0	0.0	0.0	0.0	20.0	17.0
Technical connection fees	0.0	0.0	0.0	0.0	10.7	10.2
Market Data Services	0.0	0.0	– 1.5	0.0	9.0	7.7
Other	1.1	1.6	– 4.2	– 4.6	57.5	36.4
	1.1	**2.1**	**– 26.9**	**– 30.8**	**341.5**	**302.2**
360T (foreign exchange)						
Trading	0.0	0.0	– 4.3	– 4.8	84.3	81.9
Other	0.0	0.4	– 1.1	– 1.6	23.5	19.6
	0	**0.4**	**– 5.4**	**– 6.4**	**107.8**	**101.5**
Xetra (cash equities)						
Trading and clearing	0.9	1.0	– 38.0	– 35.0	190.2	203.3
Listing	2.7	1.7	– 0.9	– 0.8	21.2	18.9
Xetra Data	0.1	6.9	– 23.8	– 27.0	92.9	93.5
Regulatory services	7.0	20.4	– 1.1	– 0.9	15.8	32.2
Infrastructure	1.2	0.0	– 0.1	– 0.1	43.9	43.8
	11.9	**30.0**	**– 63.9**	**– 63.8**	**364.0**	**391.7**

Composition of net revenue (part 3)

	Sales revenue		Treasury result from banking and similar business	
	2021 €m	2020 €m	2021 €m	2020 €m
Clearstream (post-trading)				
Custody	597.4	565.6	– 0.2	0.0
Settlement	193.0	180.8	0.0	0.0
Net interest income from banking business	0	0	50.8	100.8
Third-party services	23.9	23.9	0.0	0.0
GSF lending services	54.1	54.3	0.0	0.0
GSF collateral management	51.6	52.9	0.0	0.0
Connectivity ICSD	80.3	74.4	0.0	0.0
Other	47.4	47.9	0.7	7.3
	1,047.7	**999.8**	**51.3**	**108.1**
IFS (investment fund services)				
Custody	119.5	92.1	0.0	0.0
Settlement	96.2	78.6	0.0	0.0
Connectivity	35.5	26.0	0.0	0.0
Funds distribution[1]	531.9	101.2	0.0	0.0
Other	29.4	36.7	0.0	– 0.1
	812.5	**334.6**	**0**	**– 0.1**
Qontigo (index and analytics business)				
ETF licences	46.0	39.6	0.0	0.0
Exchange licences	36.9	37.8	0.0	0.0
Other licences	116.2	114.8	0.0	0.0
Axioma	90.8	85.7	0.0	0.0
	289.9	**277.9**	**0**	**0**
ISS (Institutional Shareholder Services)				
ESG	166.9	n/a	0.0	n/a
Non-ESG	70.3	n/a	0.0	n/a
	237.2	**n/a**	**0**	**n/a**
Total	**4,285.9**	**3,584.0**	**142.7**	**196.6**
Consolidation of internal revenue	**– 67.1**	**– 64.7**	**0.0**	**0.0**
thereof Eurex	– 0.1	– 0.1	0	0
thereof EEX	0.0	0	0	0
thereof 360T	0.0	0	0	0
thereof Xetra	– 5.4	– 5.7	0	0
thereof Clearstream	– 9.9	– 7.4	0	0
thereof IFS	– 0.4	– 0.3	0	0
thereof Qontigo	– 50.3	– 51.2	0	0
thereof ISS	– 1.0	0	0	0
Group	**4,218.8**	**3,519.3**	**142.7**	**196.6**

1) Clearstream Fund Centre was only included in the Group from 30 September 2020, which means that comparability is not possible.

Composition of net revenue (part 4)

	Other operating income		Volume-related costs		Net revenue	
	2021 €m	2020 €m	2021 €m	2020 €m	2021 €m	2020 €m
Clearstream (post-trading)						
Custody	1.9	0.2	–153.9	–148.3	**445.2**	417.5
Settlement	0.4	0.6	–73.2	–66.6	**120.2**	114.8
Net interest income from banking business	0.0	0.0	–0.8	–0.3	**50.0**	100.5
Third Parties	0.0	0.0	-0.1	–0.1	**23.8**	23.8
GSF Lending services	0.0	0.0	–24.5	–29.0	**29.6**	25.3
GSF Collateral management	0.0	0.0	-0.3	–1.3	**51.3**	51.6
Connectivity ICSD	0.0	0.0	–6.6	–5.3	**73.7**	69.1
Other	20.7	0.8	–27.2	–31.4	**41.6**	24.6
	23.0	**1.6**	**– 286.6**	**– 282.3**	**835.4**	**827.2**
IFS (investment fund services)						
Custody	0.0	0.0	-6.5	–4.7	**113.0**	87.4
Settlement	0.0	0.0	-6.0	–6.6	**90.2**	72.0
Connectivity	0.0	0.0	-1.6	–1.4	**33.9**	24.6
Funds distribution[1]	0.1	0.3	-454.4	–87.1	**77.6**	14.4
Other	39.4	0.1	-1.1	–2.3	**67.7**	34.4
	39.5	**0.4**	**– 469.6**	**– 102.1**	**382.4**	**232.8**
Qontigo (index and analytics business)						
ETF licences	0.0	0.0	-4.7	–4.9	**41.3**	34.7
Exchange licences	0.0	0.0	-3.0	–3.1	**33.9**	34.7
Other licences	0.6	0.0	-9.2	–9.2	**107.6**	105.6
Axioma	0.1	1.7	-15.0	–14.3	**75.9**	73.1
	0.7	**1.7**	**– 31.9**	**– 31.5**	**258.7**	**248.1**
ISS (Institutional Shareholder Services)						
ESG	0.0	n/a	-8.7	n/a	**158.2**	n/a
Non-ESG	1.1	n/a	-5.7	n/a	**65.7**	n/a
	1.1	**n/a**	**– 14.4**	**n/a**	**223.9**	**n/a**
Total	**94.0**	**54.2**	**– 1,013.1**	**– 621.0**	**3,509.5**	**3,213.8**
Consolidation of internal revenue	**– 8.9**	**– 13.7**	**76.0**	**78.4**	**0.0**	**0**
thereof Eurex	– 8.9	– 8.7	55.6	55.3	46.6	46.5
thereof EEX	0	0	0	0	0	0
thereof 360T	0	0	0	0	0	0
thereof Xetra	0	– 5.0	17.5	21.6	12.1	10.9
thereof Clearstream	0	0	2.9	1.5	– 7.0	– 5.9
thereof IFS	0	0	0	0	– 0.4	– 0.3
thereof Qontigo	0	0	0	0	– 50.3	– 51.2
thereof ISS	0	0	0	0	– 1.0	0
Group	**85.1**	**40.5**	**– 937.1**	**– 542.6**	**3,509.5**	**3,213.8**

1) Clearstream Fund Centre was only included in the Group from 30 September 2020, which means that comparability is not possible.

Revenue recognised in the financial year from performance obligations fulfilled or partially fulfilled in prior periods amounted to €12.3 million (2020: €17.1 million).

Composition of treasury result from banking and similar business

	2021 €m	2020 €m
Interest income from positive interest environment		
Debt financial assets measured at amortised cost	19.9	64.9
Interest expenses from positive interest environment		
Financial liabilities measured at amortised cost	– 33.4	– 31.3
Interest income from negative interest environment		
Debt financial assets measured at amortised cost	373.6	378.2
Interest expenses from negative interest environment		
Financial liabilities measured at amortised cost	– 239.5	– 256.0
Net interest income	**120.6**	**155.8**
Result from fair value valuation of foreign currency derivatives	20.6	33.4
Other currency result	1.5	7.3
Total	**142.7**	**196.6**

Other operating income

Other operating income of €85.1 million (2020: €40.5 million) related mainly to valuation of the acquisition of the second Clearstream Fund Centre tranche in the amount of €39.7 million, a receivable for reimbursement of costs in the amount of €17.1 million and the valuation of a contingent purchase price component in the amount of €7.0 million. Further effects result from income from exchange rate differences of €4.5 million (2020: €6.0 million), income from management services of €1.9 million (2020: €1.3 million).

5. Staff costs

Composition of staff costs

	2021 €m	2020 €m
Wages and salaries	827.2	682.2
Social security contributions, retirement and other benefits	174.9	140.7
Total	**1,002.1**	**822.9**

Wages and salaries comprise costs associated with the efficiency programme of €25.4 million (2020: €36.4 million).

6. Other operating expenses

Composition of other operating expenses

	2021 €m	2020 €m
Costs for IT service providers and other consulting services	196.6	248.2
IT costs	152.7	139.3
Non-recoverable input tax	59.7	40.0
Premises expenses	37.4	31.8
Insurance premiums, contributions and fees	29.1	21.6
Advertising and marketing costs	15.9	15.6
Travel, entertainment and corporate hospitality expenses	4.3	5.8
Cost of exchange rate differences	4.6	5.7
Voluntary social benefits	5.3	4.4
Supervisory Board remuneration	4.6	4.1
Short-term leases	2.9	3.0
Miscellaneous	36.5	26.2
Total	**549.5**	**545.8**

Composition of fees paid to the auditor (PwC)

	2021	
	PwC network €m	thereof PwC GmbH €m
Statutory audit services	6.8	4.1
Other assurance or valuation services	0.6	0.2
Tax advisory services	0.4	0.2
Other services	0	0
Total	**7.8**	**4.5**

Composition of fees paid to the auditor (KPMG)

	2020	
	KPMG network €m	thereof KPMG AG[1] €m
Statutory audit services	6.1	3.9
Other assurance or valuation services	0.6	0.5
Tax advisory services	0.8	0.2
Other services	0.2	0
Total	**7.7**	**4.6**

1) Additional values added for the appointed auditor.

In the financial year 2021, after an extensive selection process by the Supervisory Board, the Annual General Meeting elected PricewaterhouseCoopers GmbH Wirtschaftsprüfungsgesellschaft, Frankfurt/Main, (PwC) as the new auditors for the annual and consolidated financial statements 2021 as well as for the review of the half-year financial report in the reporting year. Fees paid for "statutory audit services" rendered by PwC mainly comprise the audit of the consolidated financial statements and the annual financial statements of Deutsche Börse AG as well as various audits of the annual financial statements of subsidiaries. Audit-integrated reviews of interim financial statements were performed. Other assurance services relate to ISAE 3000 reports and statutory or contractual audit services. Tax advisory services comprise support services for the preparation of tax returns and the assessment of and advice on tax matters. Quality assurance support services were provided for Deutsche Börse AG as part of other services.

7. Result from financial investments

Net income from financial investments 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

	2021 €m	2020 €m
Result of the equity method measurement of associates	38.6	21.5
Result of strategic investments measured at fair value through other comprehensive income (dividends)	0	0.3
Result of financial investments measured at amortised cost	0	– 5.3
Result of financial investments measured at fair value through profit or loss	53.0	2.9
Result of derivatives	– 5.0	5.2
Result of hedge accounting	– 1.4	– 0.2
Total	**85.2**	**24.3**

In addition to the result of the equity valuation the net income from associates also includes impairment losses. Impairment losses of €0.2 million were recognised in the reporting year on the investment in enermarket GmbH (2020: none). The increase in the result of the equity method measurement of associates compared with the previous year is mainly attributable to the valuation of Tradegate AG Wertpapierhandlesbank in the amount of € 28.2 million and Clarity AI Inc. in the amount of € 10.5 million, both of which showed a positive business performance in the reporting year.

In 2021, the investment Clarity AI Inc., which was previously measured at equity, was reclassified to the category "measured at fair value through profit or loss". The fair value measurement resulted in a - valuation effect of €34.5 million. Furthermore, this item includes € 18.5 million in valuation effects from fund units measured at fair value through profit or loss. 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 Group's banking business 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

	2021 €m	2020 €m
Interest income from financial assets measured at fair value through other comprehensive income	0.1	0.1
Interest income from financial assets measured at amortised cost	5.1	0.4
Interest income from financial liabilities measured at amortised cost	2.2	0
Interest income from financial assets measured at fair value through profit or loss	0.1	0.1
Interest income on tax refunds	24.2	25.3
Other interest income and similar income	1.2	0.1
Total	**32.9**	**26.0**

Composition of financial expense

	2021 €m	2020 €m
Interest expense from financial assets measured at amortised cost	1.2	3.9
Interest expense from financial liabilities measured at amortised cost	39.8	49.7
Transaction cost of financial liabilities measured at amortised cost	2.3	3.4
Interest expense on taxes	20.8	35.8
Interest expense on lease liabilities	5.2	5.5
Expense of the unwinding of the discount on pension provisions	1.4	1.8
Other interest expense	2.2	2.8
Total	**73.0**	**102.9**

The financial result benefited from a one-time effect resulting from the adjustment of the expected interest rate (~3 per cent for interest periods as of 2019) for possible tax repayments in the amount of €4.8 million due to the decision of the Federal Constitutional Court of 8 July 2021.

9. Taxes

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 recognition of uncertain tax positions is reassessed 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 and interest 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 taxes

	2021 €m	2020 €m
Current income tax expense/(-income)	**443.6**	**414.5**
for the current year	425.5	425.5
for previous years	18.1	– 11.0
Deferred income tax expense/(-income)	**– 0.1**	**– 11.9**
due to temporary differences	– 3.4	– 25.2
due to tax loss and interest carryforwards	6.3	0.3
due to changes in tax legislation and/or tax rates	– 1.0	0
for previous years	– 2.0	13.0
Total income tax expense	**443.5**	**402.6**
Other taxes	**0.9**	**0.5**
Total taxes	**444.4**	**403.1**

Allocation of income tax expense to Germany and foreign jurisdictions

	2021 €m	2020 €m
Current income tax expense/(-income)	**443.6**	**414.5**
Germany	313.4	310.4
Foreign jurisdictions	130.2	104.1
Deferred income tax expense/(-income)	**– 0.1**	**– 11.9**
Germany	– 3.7	– 9.9
Foreign jurisdictions	3.6	– 2.0
Total	**443.5**	**402.6**

Tax rates of 27.4 to 31.9 per cent (2020: 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 (2020: 11.6 to 16.1 per cent), corporation tax of 15 per cent (2020: 15 per cent) and the 5.5 per cent solidarity surcharge (2020: 5.5 per cent) on corporation tax.

A tax rate of 24.9 per cent (2020: 24.9 per cent) was used for the Group companies in Luxembourg. This includes trade tax at a rate of 6.7 per cent (2020: 6.7 per cent) and corporation tax at 18.2 per cent (2020: 18.2 per cent).

Tax rates of 10.0 to 34.6 per cent (2020: 10.0 to 34.6 per cent) were applied to the Group companies in the remaining countries; see Note 34.

Current income tax expense was reduced by €1.2 million in the reporting year by the utilisation of previously unrecognised tax loss carryforwards (2020: €0.3 million). There was no deferred tax income from previously unrecognised tax losses (2020: €2.4 million). 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 carryforwards:

Composition of deferred taxes

	Deferred tax assets		Deferred tax liabilities	
	31.12.2021 €m	31.12.2020 €m	31.12.2021 €m	31.12.2020 €m
Intangible assets	**74.5**	**86.0**	**– 449.8**	**– 254.1**
Internally developed software	17.2	30.0	– 38.7	– 32.5
Other	57.3	56.0	– 411.1	– 221.6
Financial assets	1.5	1.7	– 31.0	– 13.8
Other assets	34.4	7.4	– 19.7	– 16.3
Provisions for pensions and other employee benefits	81.7	88.1	– 25.6	– 17.7
Other provisions	19.1	18.1	– 2.4	– 0.1
Liabilities	83.1	40.8	– 22.5	– 10.7
Tax loss and interest carryforwards	58.0	15.6	0	0
Deferred taxes (before netting)	**352.3**	**257.7**	**– 551.0**	**– 312.7**
thereof recognised in profit and loss	300.9	190.4	– 525.1	– 303.4
thereof recognised in other comprehensive income[1)]	51.4	67.3	– 25.9	– 9.3
Deferred taxes set off	– 212.5	– 96.0	212.5	96.0
Total	**139.8**	**161.7**	**– 338.5**	**– 216.7**

1) See Note 15 for further information on deferred taxes recognised in other comprehensive income.

Short-term elements of deferred taxes are recognised in non-current assets and liabilities in the consolidated balance sheet, 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 €55.5 million (2020: €27.2 million). These unused tax losses are attributable to domestic losses totalling €14.4 million and to foreign tax losses totalling €41.1 million (2020: Germany nil, foreign tax losses €27.2 million).

Tax losses can be carried forward indefinitely in Germany as well as in the United Kingdom under consideration of the minimum taxation rules. In the United States, 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 (2020: none).

Reconciliation from expected to reported income tax expense

	2021 €m	2020 €m
Earnings before tax (EBT)	1,709.3	1,528.2
Expected income tax expense	444.4	397.3
Effects of different tax rates	– 12.8	– 15.2
Effects of non-deductible expenses	14.0	15.5
Effects of tax-exempt income	– 3.4	– 1.3
Tax effects from loss carryforwards	0.3	0.9
Effects from changes in tax rates	– 1.0	0
Effects from intra-group restructuring	0	1.5
Other	– 14.1	2.0
Income tax expense arising from current year	**427.4**	**400.7**
Income taxes for previous years	16.1	1.9
Income tax expense	**443.5**	**402.6**

To determine the expected income tax expense, earnings before tax have been multiplied by the composite tax rate of 26 per cent assumed for 2021 (2020: 26 per cent).

As at 31 December 2021, the reported income tax rate was 25.9 per cent (2020: 26.3 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 seven years; a useful life of ten years is used as the basis in the case of newly developed 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 to 20 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 are carried out on 1 October 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.

At the acquisition date, goodwill is allocated to the CGUs 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 CGUs 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 usually 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 2020	**296.8**	**1,147.2**	**3,470.5**	**102.4**	**1,199.8**	**6,216.7**
Acquisitions from 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**	**3,957.7**	**141.8**	**1,452.3**	**7,090.6**
Acquisitions through business combinations	79.5	0	1,456.2	2.4	652.7	2,190.8
Adjustment of previous year Goodwill	0	0	– 1.2	0	0	– 1.2
Additions	14.5	76.8	0	76.4	0.9	168.6
Disposals	0	0	0	0	0	0
Reclassifications	2.3	98.5	0	– 100.8	0	0
Reclassifications into assets held for sale	– 7.6	– 10.4	0	– 4.1	0	– 22.1
Exchange rate differences	12.0	4.0	183.3	– 0.1	78.8	278.0
Historical cost as at 31 Dec 2021	**416.4**	**1,392.0**	**5,596.0**	**115.6**	**2,184.7**	**9,704.7**
Amortisation and impairment losses as at 1 Jan 2020	**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**
Amortisation	37.6	57.8	0	0	71.0	166.4
Impairment losses	0	11.8	0	0	0	11.8
Reclassifications into assets held for sale	– 7.3	– 3.5	0	– 0.1	0	– 10.9
Reclassifications	1.1	– 1.1	0	0	0	0
Exchange rate differences	2.1	1.7	0	0.1	3.2	7.1
Amortisation and impairment losses as at 31 Dec 2021	**231.5**	**1,023.7**	**0**	**15.5**	**271.1**	**1,541.8**
Carrying amount as at 31 Dec 2020	117.7	266.1	3,957.7	126.3	1,255.4	5,723.2
Carrying amount as at 31 Dec 2021	**184.9**	**368.3**	**5,596.0**	**100.1**	**1,913.6**	**8,162.9**

Material intangible assets with finite useful lives

	Carrying amount as of		Remaining amortisation period as at	
	31 Dec 2021 €m	31 Dec 2020 €m	31 Dec 2021 years	31 Dec 2020 years
Customer Relationship ISS Data & Research	435.7	n/a	21.2	n/a
Customer Relationship Clearstream Funds Centre	235.8	237.1	18.8	19.8
Customer Relationship 360T	169.6	179.7	16.8	17.8

Software, payments on account and software in development

Research costs are recognised 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 infrastructure of software development. 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 in the reporting year 2021 came to €202.8 million (2020: €158.2 million), of which €128.7 million were capitalised (2020: €104.0 million).

Impairment testing in 2021 revealed an impairment loss of €11.8 million (2020: €8.2 million), which is shown in the line item “Depreciation, amortisation and impairment losses” and relates to the following assets:

- An impairment loss of €8.0 million (recoverable amount: negative) in the fourth quarter of 2021 concerned settlement, custody and asset servicing services for the Investor CSD product in the Clearstream segment. The asset was intended for use by a particular customer. Finally, the customer decided not to use the product. Promotional activities towards other potential customers did not result in successful marketing.

- Another impairment loss of €3.9 million (recoverable amount: negative) in the fourth quarter of 2021 relates to the OTC currency clearing system in the Eurex segment. The combination of internal and external operating costs and limited market interest led to the decision to cease providing OTC currency clearing services.

Goodwill and other intangible assets from business combinations

Changes in goodwill classified by (groups of) CGUs

	Eurex €m	EEX €m	360T €m	Xetra €m	Clear-stream €m	IFS €m	Qontigo €m	ISS €m	Total €m
Balance as at 1 Jan 2020	**1,293.6**	**119.5**	**245.2**	**6.7**	**969.0**	**66.3**	**608.6**	**0**	**3,308.9**
Reallocation due to change in reporting structure	17.0	0	0	2.5	142.1	0	0	0	**161.6**
Acquisitions through business combinations	64.1	1.2	0	0	0	484.9	0	0	**550.2**
Adjustment of previous year Goodwill	0	0	0	0	0	0	4.3	0	**4.3**
Exchange rate differences	– 2.3	– 4.9	– 5.0	– 0.1	0	– 1.5	– 53.6	0	**– 67.4**
Balance as at 31 Dec 2020	**1,372.4**	**115.8**	**240.2**	**9.1**	**1,111.1**	**549.7**	**559.3**	**0**	**3,957.6**
Acquisitions through business combinations	0	0	0	52.1	13.7	10.7	78.8	1,300.9	**1,456.2**
Adjustment of previous year Goodwill	0	0	0	0	0	– 1.2	0	0	**– 1.2**
Exchange rate differences	6.2	4.4	4.4	0.7	1.1	25.5	53.1	88.0	**183.4**
Balance as at 31 Dec 2021	**1,378.6**	**120.2**	**244.6**	**61.9**	**1,125.9**	**584.7**	**691.2**	**1,388.9**	**5,596.0**

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 2020	**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**
Acquisitions through business combinations	0	117.2	535.1	0.4	652.7
Additions	0	0	0	0.9	0.9
Amortisation	0	– 1.2	– 67.9	– 2.0	– 71.1
Exchange rate differences	1.8	14.3	59.5	0.1	75.7
Balance as at 31 Dec 2021	**24.2**	**648.4**	**1,237.1**	**4.0**	**1,913.6**

Key assumptions used for impairment tests in 2021

(Group of) CGUs	Allocated book value €m	Risk-free interest rate %	Market risk premium %	Discount rate %	Long-term growth rate %	CAGR[1] Net revenue %	CAGR[1] Operating costs %
Goodwill							
Eurex	1,379.9	0.1	7.8	6.5	1.5	4.9	4.3
ISS	1,240.9	2.0	6.0	8.0	2.5	8.2	6.3
Clearstream	1,125.7	0.1	7.8	6.7	1.0	3.3	2.2
Qontigo	675.7	0.1	7.8	7.4	1.5	7.1	5.6
IFS	557.8	0.1	7.8	6.6	1.5	9.9	7.5
360T	243.3	0.1	7.8	7.0	1.5	6.5	4.1
EEX	118.8	0.1	7.8	6.6	1.5	6.9	2.5
Xetra	11.2	0.1	7.8	6.8	1.0	– 0.4	3.9
Trade names and exchange licences							
STOXX	420.0	0.1	7.8	7.4	1.5	5.8	6.8
ISS Core	96.7	2.0	6.0	8.0	2.5	8.2	6.3
Axioma	62.1	2.0	6.0	7.7	2.0	9.6	4.6
Nodal	27.7	2.0	6.0	7.0	1.5	4.6	3.1
360T Core	19.9	0.1	7.8	7.0	1.5	7.0	4.8
EEX Core	13.7	0.1	7.8	6.6	1.5	6.7	4.4
360TGTX	1.7	1.5	6.0	6.9	1.5	2.7	1.8

1) CAGR = compound annual growth rate.

Key assumptions used for impairment tests in 2020

	Allocated book value €m	Risk-free interest rate %	Market risk premium %	Discount rate %	Long-term growth rate %	CAGR[1] Net revenue %	CAGR[1] Operating costs %
Goodwill							
Eurex	1,310.0	– 0.2	7.8	6.2	1.5	3.9	1.4
Clearstream	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
IFS	551.8	– 0.2	7.8	7.5	1.5	10.4	2.8
360T	242.7	– 0.2	7.8	7.7	2.0	9.7	5.0
EEX	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 Core	19.9	– 0.3	7.8	7.7	2.0	8.7	7.1
EEX Core	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

1) CAGR = compound annual growth rate

Even in case of a reasonably possible change of one of the parameters, under the condition that all the other parameters remain constant, none of the above-mentioned CGUs or groups of CGUs with the exception of ISS CGU, would be impaired. At the ISS CGU, the recoverable amount exceeds the carrying amount in the annual impairment test by €136.4 million. A reduction in the annual growth rate of the net revenue by 8.7 per cent or rather an increase in operating costs by 9.1 per cent or a reduction in the growth rate in perpetuity by 0.6 percent or rather an increase in capital costs by 0.4 per cent would result in the recoverable amount being equal to the carrying amount.

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 or 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, costs 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 19 years
Leasehold improvements	Based on lease term

Measurement of right-of-use assets

We lease a large number of different assets. These mainly include buildings and cars. 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, we present the leased asset as an item of property, plant and equipment and measures the 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	Purch-ased	Total		
	€m	€m	€m	€m	€m	€m	€m
Historical costs as at 1 Jan 2020	**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**
Acquisitions through business combinations	85.1	6.0	1.4	4.2	5.6	0.4	97.1
Additions	42.6	7.2	3.5	25.6	29.1	5.0	83.9
Disposals	– 2.8	– 0.5	– 0.2	– 2.8	– 3.0	– 0.4	– 6.7
Reclassifications	0	2.0	0	1.3	1.3	– 3.3	0
Reclassifications into assets held for sale	– 0.1	0	– 0.1	0	– 0.1	0	– 0.2
Exchange rate differences	3.8	1.0	0.3	1.1	1.4	– 0.2	6.0
Historical costs as at 31 Dec 2021	**588.1**	**112.3**	**17.5**	**372.6**	**390.1**	**8.5**	**1,099.0**
							0
Depreciation and impairment losses as at 1 Jan 2020	**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**
Amortisation	59.2	10.5	4.9	42.2	47.1	0	116.9
Disposals	– 0.3	0	– 0.1	– 2.2	– 2.3	0	– 2.6
Reclassifications into assets held for sale	0.1	0	0	0	0	0	0.1
Exchange rate differences	0.8	0.7	0	1.0	1.0	0	2.6
Depreciation and impairment losses as at 31 Dec 2021	**150.1**	**55.3**	**11.7**	**288.2**	**299.9**	**0**	**505.3**
							0
Carrying amount as at 31 Dec 2020	**369.2**	**52.5**	**5.7**	**96.0**	**101.7**	**7.0**	**530.4**
Carrying amount as at 31 Dec 2021	**438.0**	**57.0**	**5.8**	**84.4**	**90.1**	**8.5**	**593.7**

The average remaining term of leases is 13.8 years.

The remaining term of the material sub-lease is one year; 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

Additions and disposals

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.

First-time measurement and classification

Financial assets are first recognised at fair value. For financial assets not 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 as incurred.

Financial assets are classified at the acquisition date, from which subsequent measurement is derived. We assign 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. We do not make use of the option to designate debt instruments at fair value through profit or loss upon initial recognition (fair value option).

The classification of investments in equity instruments not held for trading depends on whether the option of designating the corresponding financial assets 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
We allocate 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 of banking and similar business. Interest income from the non-banking business is shown in the financial result. All other effects of non-banking business are presented in net income 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 as at fair value through other comprehensive income. Impairments on these debt instruments are recognised as net income from financial investments through profit or loss. On disposal of these debt instruments all the balances in the revaluation surplus are reclassified to net income from financial investments through profit or loss. Interest income from fixed income debt 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 net income from financial investments. Distributions from fund interests are also shown in net income from financial investments. Interest income from fixed income bonds in this category are shown in the financial result.

Subsequent measurement of equity instruments
Equity instruments are always subsequently measured at fair value. In the reporting year 2021, we are reporting three strategic investments for the first time under other financial assets at fair value through profit or loss. For all other equity instruments, we have exercised the irrevocable FVOCI option as of the reporting date, with the result that the 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 assets are shown in Result 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 in the event of default within the next twelvemonths after the reporting date.
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 and is assumed if there is a downgrade of three notches within the internal rating system.
Stage 3: Credit-impaired financial assets are allocated to Stage 3 and the impairment is based on the full 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.

We have the following two triggers to identify a default event and which cause a transfer to stage 3 of the model:

Legal default event: a contractual partner of the Group is unable to fulfil its contractual obligations due to its insolvency.
Contractual default event: a contractual partner of the Group is unable or unwilling to fulfil its contractual obligations in a timely manner. The non-fulfilment of the contractual obligation could result in a financial loss for us.

We measure the expected credit losses for trade receivables using a simplified approach, which requires lifetime expected losses to be recognised from initial recognition of a receivable. Due to the high recovery rate for trade receivables with a due date of less than 360 days, a default is assumed for amounts which are overdue for more than 360 days.

Financial Liabilities

Additions and disposals
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 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. The effect of the present value of accrued interest on the financial obligation and all measurement changes in the obligation is subsequently measured through profit or loss. The equity interest attributable to a non-controlling shareholder underlying the transaction is accounted for as if it had already been acquired at the time of the transaction.

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. 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.

We do not make use of the option to designate financial liabilities at fair value through profit or loss upon initial recognition (fair value option).

Our exposure to various risks associated with the financial instruments is discussed in Note 24. 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 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 set off 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

The derivative financial instruments we use include interest rate swaps, foreign exchange swaps, foreign exchange forwards and foreign exchange options.

Derivatives are initially recognised at fair value on the date a derivative contract is taken out. The Group applies the provisions of IFRS 9 to account for hedges that meet the criteria for hedge accounting. When a hedging transaction takes place the economic relationship between the hedging instrument and the hedged item is documented in accordance with the requirements of IFRS 9.

All other derivative transactions are mainly used to hedge foreign currency risks in economic hedging relationships and 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 result of treasury activities in banking business and similar business or in net income from financial investments.

Cash flow hedges that qualify for hedge accounting

In 2021 we used cash flow hedge accounting to hedge the foreign exchange risk on highly likely transactions as well as translation effects of intercompany monetary items. We also used cash flow hedge accounting to hedge the interest rate risk of a highly probable securities issue by means of interest rate swaps.

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. This entails establishing hedging transactions in which all the relevant contractual parameters of the hedging instrument exactly match those of the hedged item. Ineffectiveness may arise in the hedging of planned transactions if the timing of the planned transaction changes compared with the original estimate. Ineffectiveness due to changes in our default risk or the default risk of 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.

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 absolute change in the hedged fair value of the hedged since the hedging transaction. Gains or losses on the ineffective portion are recognised directly through profit or loss, either in the treasury result of banking and similar business or in net income from financial investments. If forward contracts are used to hedge planned transactions we designate 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 hedges serve to hedge a planned transaction, 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.

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. The hedging relationship continues, however, if it was originally designated as a rolling hedge. If the expected transaction is deemed to be highly probable, new hedging instruments are arranged to replace those that have expired. 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

This item comprises strategic investments which we have irrevocably elected to recognise at fair value through other comprehensive income in this category at initial recognition. Fixed-income bonds 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

	2021 €m	2020 €m
Strategic investments	224.3	107.0
Listed debt instruments	4.3	4.9
Total	**228.6**	**111.9**

We do not pledge any of these financial assets as collateral. Debt securities amounting to €0.5 million expired in 2021 (2020: €0.5 million). Debt securities amounting to €1.5 million were classified as current as at 31 December 2021 (2020: €0.5 million); total impairments came to less than €0.1 million (2020: less than €0.1 million). Additions to this item came partly from follow-on investments of €64.7 million and also from the reclassification of two strategic investments of €7.0 million, which were previously accounted for using the equity method.

Amounts recognised in profit or loss and other comprehensive income

	2021 €m	2020 €m
Gains/(losses) recognised in other comprehensive income		
Strategic investments	49.7	25.5
Debt instruments	0.1[1]	0.3
Total	**49.8**	**25.8**
Gains/(losses) recognised in profit or loss		
Dividends related to investments derecognised during the period	0	0.3
Total	**0**	**0.3**

1) Of which €<0.1 million (2020: €0.1 million) are attributable to non-controlling interests.

The sale of a strategic investment resulted in a disposal of financial assets for €8.8 million (2020: €12.5 million) and a resulting effect of €–4,9 million (2020: €0.1 million) recognised directly in equity and transferred to the retained earnings. The sale of the strategic investment was due to its acquisition by another company outside the Group.

Furthermore, there was a significant positive valuation effect of €39.0 million resulting from a strategic investment.

Financial assets and liabilities measured at amortised cost

Composition of financial assets at amortised cost

	31 Dec 2021			31 Dec 2020		
	Non-current €m	Current €m	Total €m	Non-current €m	Current €m	Total €m
Trade receivables	**0**	**969.4**	**969.4**	**0**	**616.6**	**616.6**
of which expected losses	0	– 8.8	– 8.8	0	– 9.2	– 9.2
Other financial assets measured at amortised costs	**1,634.7**	**15,799.6**	**17,434.3**	**997.5**	**16,225.1**	**17,222.5**
Fixed income securities	1,528.8	396.1	1,924.9	992.1	206.0	1,198.1
Reverse repo transactions	0	4,274.3	4,274.3	0	6,176.7	6,176.7
Balances on nostro accounts	0	1,905.4	1,905.4	0	2,252.4	2,252.4
Money market lendings	0	7,440.3	7,440.3	0	6,440.0	6,440.0
Customer overdrafts from settlement business	0	531.6	531.6	0	267.7	267.7
Receivables from CCP balances	0	1,189.3	1,189.3	0	675.6	675.6
Margin calls	0	6.7	6.7	0	156.6	156.6
Other	105.9	55.9	161.8	5.4	50.0	55.4
of which expected losses	– 0.4	0	– 0.4	– 0.3	0	– 0.3
Restricted bank balances	**0**	**78,542.0**	**78,542.0**	**0**	**38,420.1**	**38,420.1**
Cash and other bank balances	**0**	**1,029.6**	**1,029.6**	**0**	**1,467.3**	**1,467.3**
Total	1,634.7	96,340.6	97,975.3	997.5	56,729.1	57,726.6

Debt securities amounting to €218.9 million expired in 2021 (2020: €609.6 million).

Amounts reported separately under liabilities as cash deposits by market participants are restricted. Such amounts are mainly invested via bilateral or triparty reverse repurchase agreements and in the form of overnight deposits at central banks and banks and shown as restricted bank balances. Government and government-guaranteed bonds with an external credit rating of at least AA– are accepted as collateral for the reverse repurchase agreements.

Composition of financial liabilities at amortised cost

	31 Dec 2021			31 Dec 2020		
	Non-current €m	Current €m	Total €m	Non-current €m	Current €m	Total €m
Trade payables	**0**	**704.4**	**704.4**	**0**	**388.6**	**388.6**
Other liabilities at amortised costs	**3,539.9**	**15,914.3**	**19,454.2**	**3,474.4**	**14,630.0**	**18,104.4**
Bonds issued	3,037.3	599.4	3,636.7	2,637.1	0	2,637.1
Deposits from securities settlement business	0	12,177.2	12,177.2	0	12,191.6	12,191.6
Money market borrowings	0	574.4	574.4	0	1,176.2	1,176.2
Purchase price liabilities from business combinations	0	0	0	479.5	0	479.5
Commercial Papers issued	0	1,551.8	1,551.8	0	546.4	546.4
Liabilities from CCP balances	0	733.1	733.1	0	565.3	565.3
Leasing liabilities	423.1	63.6	486.7	357.8	51.1	408.9
Bank overdrafts	0	74.5	74.5	0	27.8	27.8
Other	79.5	140.3	219.8	0	71.7	71.7
Cash deposits from market participants	**0**	**78,292.5**	**78,292.5**	**0**	**38,188.8**	**38,188.8**
Total	**3,539.9**	**94,911.2**	**98,451.1**	**3,474.4**	**53,207.4**	**56,681.8**

Deutsche Börse AG issued senior hybrid bonds with a nominal volume of €1,000.0 million in the financial year to refinance an acquisition. The issue was divided into two tranches, with maturities of five and ten years. The five-year bond pays interest of 0.00 per cent and the ten-year bond pays interest of 0.125 per cent.

The financial liabilities recognised on the balance sheet were not secured by liens or similar rights as at 31 December 2021 or as at 31 December 2020.

Cash deposits by market participants

Composition of cash deposits by market participants

	31 Dec 2021 €m	31 Dec 2020 €m
Liabilities from margin payments		
to Eurex Clearing AG by clearing members	34,444.5	31,750.3
to European Commodity Clearing AG by clearing members	42,567.5	5,964.8
to Nodal Clear, LLC by clearing members	1,280.1	473.3
to European Energy Exchange AG by clearing members	0.4	0.4
Total	**78,292.5**	**38,188.8**

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 all 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). Eurex Clearing AG also guarantees the settlement of off-order-book trades entered for clearing in the trading systems of the Eurex exchanges as well as Eurex Repo. 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 houses in accordance with the rules set out in the contract specifications.

Composition of financial instruments held by central counterparties

	31 Dec 2021 €m	31 Dec 2020 €m
Repo transactions	82,264.9	58,020.6
Options	30,373.2	29,587.4[1]
Others	0	5.0
Total	**112,638.1**	**87,613.0**[1]
thereof non-current	9,442.4	6,908.5[1]
thereof current	103,195.7	80,704.5[1]

1) Due to a correction of the previous year's figures, non-current assets decreased by €26,2 million and current assets by €63,6 million.

Receivables and liabilities that may be offset against a clearing member are reported on a net basis. Financial liabilities of €128,0 million (31 December 2020: €95.0 million) and financial assets of €200.0 million (31.December 2020: €0.0 million) were eliminated because of intra-Group GC Pooling transactions.

Other financial assets and liabilities at FVPL

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

	Carrying amount 31 Dec 2021			Carrying amount 31 Dec 2020		
	Non-current €m	Current €m	Total €m	Non-current €m	Current €m	Total €m
Derivatives	**10.1**	**102.0**	**112.2**	**0.2**	**8.1**	**8.3**
Forward exchange transactions designated as cash flow hedges	0	0.2	0.2	0.2	0	0.2
Interest rate swaps designated as cash flow hedges	0	11.6	11.6	0	0	0
Foreign currency derivatives not designated as hedges	0	90.2	90.2	0	8.1	8.1
Call options not designated in hedging relationships	10.1	0	10.1	0	0	0
Other financial assets	**146.0**	**14.0**	**160.0**	**42.2**	**7.6**	**49.8**
Strategic investments	**74.6**	**0**	**74.6**	**0**	**0.0**	**0.0**
Fund units and debt securities	71.4	0	71.4	42.2	0	42.2
Contingent consideration	0	14.0	14.0	0	7.6	7.6
Total assets	**156.2**	**116.0**	**272.2**	**42.4**	**15.8**	**58.2**
Derivatives	**6.9**	**4.2**	**11.1**	**1.5**	**172.6**	**174.1**
Forward exchange transactions designated as cash flow hedges	6.9	2.1	9.0	1.5	39.9	41.4
Foreign currency derivatives not designated as hedges	0	2.1	2.1	0	132.7	132.7
Other financial liabilities	**1.5**	**0.6**	**2.1**	**0**	**1.5**	**1.5**
Contingent consideration	1.5	0.6	2.1	0	1.5	1.5
Total liabilities	**8.4**	**4.7**	**13.1**	**1.5**	**174.1**	**175.6**

As at 31 December 2021 there were foreign currency derivatives not designated in hedges with a term of less than eight months with a nominal amount of €3,419.2 million (31 December 2020: €2,524.2 million with a term of less than seven months). Thereof €2,359.1 million (31 December 2020: €510.3 million) is attributable to derivatives with a positive fair value and thereof €1,060.1 million (31 December 2020: €2,013.9 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

	2021 €m	2020 €m
Net gain/(loss) from derivatives not designated as hedges	15.6	38.6
Net gain/(loss) from cash flow hedges	– 1.4	– 0.2
Net gain/(loss) from other financial assets measured at fair value through profit or loss	59.1	9.4
Distributions from fund units	0.3	0.8
Net gain/(loss) from other financial liabilities measured at fair value through profit or loss	1.4	1.8
Total	**75.0**	**50.4**

Cash flow hedges that qualify for hedge accounting

We enter into cash flow hedges in various currencies to hedge existing or future transactions. The hedged items included in hedge accounting are, on the one hand, intercompany loans in USD and CHF and, on the other hand, a highly probable planned business acquisition in AUD. In addition, a highly probable planned refinancing of a bond maturing in 2022 was designated in a cash flow hedge to hedge the interest rate risk.

The effects of interest rate and foreign currency hedging instruments on the net assets, financial position and results of operations are as follows:

Changes in value of the hedged items in cash flow hedges

	2021 €m	2020 €m
Hedging foreign currency risks		
Intra-group monetary foreign currency items	9.9	0.9
Planned acquisitions	– 0.2	39.9
Hedging interest rate risks		
Planned refinancings	– 11.7	0

Forward exchange contracts and foreign exchange swaps were concluded in USD, CHF and AUD and are denominated in the same currency as the intercompany foreign currency transactions and the highly probable future transactions. Therefore, the hedge ratio is 1:1. The foreign currency hedges in USD will mature in 2024. The other foreign currency hedges and the interest rate hedges expire in 2022.

Hedging transactions in cash flow hedges

	2021	2020
Currency risk		
Foreign exchange swaps and forward exchange contracts		
CHF		
Nominal amount in CHFm	56.3	436.3
Carrying amount in €m	– 2.3	1.3
Hedge rate for hedging instruments	1.08	1.08
USD		
Nominal amount in USDm	340.8	1,421.8
Carrying amount in €m	– 7.4	39.9
Weighted average hedge rate for hedging instruments	1.16	1.20
AUD		
Nominal amount in AUDm	16.0	0
Carrying amount in €m	0.2	0
Hedge rate for hedging instruments	1.56	0
Interest rate risk		
Interest rate swaps		
Nominal amount €m	600.0	0
Carrying amount €m	11.6	0
Weighted average hedge rate for hedging instruments	0.14	0

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	Reserve for cash flow hedges interest rate swaps €m	Total €m
Balance as at 1 Jan 2020	**0**	**0**	**0.2**	**0**	**0.2**
Change in fair value of hedging instruments recognised in OCI	0	– 41.3	0	0	– 41.3
Hedging costs deferred and recognised in OCI	– 0.3	0	0	0	– 0.3
Reclassification to profit or loss	0.2	1.3	0	0	1.5
Settlement	0	0	– 0.2	0	– 0.2
Balance as at 31 Dec 2020	**– 0.1**	**– 39.9**	**0**	**0**	**– 40.1**
Change in fair value of hedging instruments recognised in OCI	0	– 8.1	0.3	11.6	**3.8**
Hedging costs deferred and recognised in OCI	– 0.4	0	0	0	**– 0.4**
Reclassification to profit or loss	1.2	8.3	– 0.3	0	**9.2**
Settlement	0.2	39.9	0	0	**40.1**
Balance as at 31 Dec 2021	**0.9**	**0.2**	**0**	**11.6**	**12.6**

The separate amount in the cost of 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 company acquisitions.

Fair value hierarchy

The financial assets measured at fair value includes financial assets and liabilities at 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 2021	thereof attributable to:		
		Level 1	Level 2	Level 3
	€m	€m	€m	€m
ASSETS				
Financial assets measured at fair value through other comprehensive income (FVOCI)				
Strategic investments	224.3	0	0	224.3
Debt instruments	4.3	4.3	0	0
Total	**228.6**	**4.3**	**0**	**224.3**
Financial assets measured at fair value through profit or loss (FVPL)				
Non-current financial instruments held by central counterparties	9,442.4	0	9,442.4	0
Other non-current financial assets	156.2	17.0	0	139.2
Current financial instruments held by central counterparties	103,195.7	0	103,195.7	0
Other current financial assets	116.0	0	102.0	14.0
Total	**112,910.3**	**17.0**	**112,740.2**	**153.2**
Total assets	**113,138.9**	**21.3**	**112,740.2**	**377.4**
LIABILITIES				
Financial liabilities measured at fair value through profit or loss (FVPL)				
Non-current financial instruments held by central counterparties	9,442.4	0	9,442.4	0
Other non-current financial liabilities	8.4	0	6.9	1.5
Current financial instruments held by central counterparties	103,267.7	0	103,267.7	0
Other current financial liabilities at FVPL	4.7	0	4.2	0.6
Total liabilities	**112,723.3**	**0**	**112,721.2**	**2.1**

Fair value hierarchy previous year

	Fair value as at 31 Dec 2020 €m	thereof attributable to: Level 1 €m	Level 2 €m	Level 3 €m
ASSETS				
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	6,908.5[1]	0	6,908.5[1]	0
Other non-current financial assets	42.4	15.8	0.2	26.4
Current financial instruments held by central counterparties	80,704.5[1]	0	80,704.5[1]	0
Other current financial assets	15.7	0	8.1	7.6
Total	**87,671.1[1]**	**15.8**	**87,621.4[1]**	**34.0**
Total assets	**87,783.0[1]**	**20.7**	**87,621.4[1]**	**141.0**
LIABILITIES				
Financial liabilities measured at fair value through profit or loss (FVPL)				
Non-current financial instruments held by central counterparties	6,908.5[1]	0	6,908.5[1]	0
Other non-current financial liabilities	1.5	0	1.5	0
Current financial instruments held by central counterparties	80,609.5[1]	0	80,609.5[1]	0
Other current financial liabilities	174.1	0	172.6	1.5
Total liabilities	**87,693.6[1]**	**0**	**87,692.1[1]**	**1.5**

1) Due to a correction of the previous year's figures non-current financial assets held by central counterparties decreased by €26.2 million and current financial assets held by central counterparties by €63.6 million. The current and non-current liabilities oft the central counterparties decreased correspondingly.

The other non-current and current assets and liabilities included in the Level 2 hierarchy 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.

The following table shows the valuation techniques including the significant unobservable inputs used to determine the fair value of financial instruments (FVPL) in Level 3.

Measurement methods and inputs for the fair value hierarchy Level 3

Financial instrument	Measurement Method	Material unobservable inputs	Connection between material unobservable inputs and fair value measurement
Derivates	Internal Black-Scholes option pricing model	Value of equity Volatility	The estimated fair value would go up (down), if: - the expected value of the equity were higher (lower) - the volatility were higher (lower)
Strategic investments	Adjusted prices for assets on inactive markets	Measurement by means of price adjustments for assets on inactive markets A descriptive sensitivity analysis is not used here for this reason.	n/a
Interests in institutional investment funds	Net asset value	These investments include private equity funds and alternative investments held by Deutsche Börse Group They are valued by the fund manager based on net asset value. Net asset value is determined using non-public information from the respective private equity managers. Deutsche Börse Group only has limited insight into the specific inputs used by the fund managers; a descriptive sensitivity analysis is therefore not used here.	n/a
Contingent purchase price components	Discounted-cash flow-model	Value of equity	The estimated fair value would go up (down), if: - the expected value of the equity were higher (lower)

The table below shows the reconciliation of the opening balance to the closing balance for Level 3 fair values.

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 2020	**53.8**	**17.5**	**– 87.9**	**– 16.7**
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**
Acquisitions from business combinations	0	0.8	0	0.8
Additions	73.0	40.4	– 1.9	111.5
Disposals	– 9.1	– 12.8	0	– 21.9
Reclassifications	37.0	0	0	37.0
Unrealised capital gains/(losses) recognised in profit or loss	34.1	16.1	1.5	51.7
Other operating income	0	6.4	1.5	7.8
Result from financial investments	34.1	9.8	0	43.8
Changes recognised in the revaluation surplus	44.9	0	0	44.9
Unrealised gains/(losses) from currency translation recognised in equity	7.1	0	0	7.1
Gains/(losses) recognised in equity	4.9	0	0	4.9
Balance as at 31 Dec 2021	**298.9**	**78.6**	**– 1.9**	**375.4**

The unobservable inputs can generally consist of a range of values that are considered probable. The sensitivity analysis determines the fair values of the financial instruments using input factors that lie at the lower or upper limit of the possible range. The fair values of the financial instruments in Level 3 would change as follows using these inputs:

Sensitivity analysis of the financial assets and financial liabilities allocated to Level 3 depending on unobservable input parameters.

	Change input paramter[1]	Fair value change	
		Increase €m	Decrease €m
Financial assets			
Derivatives	Expected value of equity (10% change)	5.5	– 3.8
	Volatility (10% change)	3.0	– 2.7
Financial liabilities			
Contingent consideration	Value of equity (10% change)	7.6	– 15.3

1) A possible change in one of the significant unobservable input factors with the other input factors remaining unchanged would have the effects shown in the table above.

The fair values of the other financial assets and liabilities not measured at fair value were determined as follows:

The financial assets measured at amortised cost held by Deutsche Börse Group include debt instruments with a fair value of €1,914.7 million (31 December 2020: €1,205.0 million). The fair value of the debt instruments 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 €3,722.9 million (31 December 2020: €2,784.0 million) and are disclosed under liabilities measured at amortised cost. The fair value of such instruments is based on the debt instruments' quoted prices. Due to insufficient market liquidity, the debt securities were allocated to Level 2.

The financial instrument's carrying amount represents a reasonable approximation of fair value for all other positions.

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 2021 €m	31 Dec 2020 €m	31 Dec 2021 €m	31 Dec 2020 €m	31 Dec 2021 €m	31 Dec 2020 €m
Financial assets from repo transactions	126,856.4	81,173.2	– 44,591.5	– 23,152.6	82,264.9	58,020.6
Financial liabilities from repo transactions	– 126,928.4	– 81,078.2	44,591.5	23,152.6	– 82,336.9	– 57,925.6
Financial assets from options	108,810.4	78,015.0[1]	– 78,437.2	– 48,427.6	30,373.2	29,587.4[1]
Financial liabilities from options	– 108,810.4	– 78,015.0[1]	78,437.2	48,427.6	– 30,373.2	– 29,587.4[1]

1) Due to a correction of the previous year's figures, the gross amounts and thus also the net amounts of financial assets from options decreased by € 89.7 million. The financial liabilities from options decreased correspondingly.

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 section risk management 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 €109,657.0 million as at the reporting date (2020: €62,467.3 million). Collateral totalling €126,842.0 million (2020: €79,747.6 million) was actually deposited.

Composition of collateral held by central counterparties

	31 Dec 2021 €m	31 Dec 2020 €m
Cash collateral (cash deposits)[1, 3]	78,250.7	38,193.0
Securities and book-entry securities collateral[2, 3]	48,591.2	41,554.6
Total	**126,842.0**	**79,747.6**

1) The amount includes the clearing fund totalling €5,943.5 million (2019: € 4,600.8 million).
2) The amount includes the clearing fund totalling €2,995.7 million (2019: € 2,294.1 million).
3) The collateral value is determined on the basis of the fair value less a haircut

13. Contract balances

The Group has recognised the following other contract assets and liabilities:

Contract balances

	31 Dec 2021 €m	31 Dec 2020 €m
Contract costs		
Non-current contract costs	2.9	0
Current contract costs	1.2	0
Total	**4.1**	**0**
Contract liabilities		
Long-term contract liabilities	15.1	13.8
Short-term contract liabilities	136.3	30.5
Total	**151.4**	**44.3**

Contract costs are “incremental costs of obtaining a contract” within the meaning of IFRS 15 and include sales commissions. The Group only recognises the costs of obtaining a contract as an asset for multi-year contracts. The recognised costs are amortised in line with revenue recognition. Total amortisation came to €1.6 million in 2021 (2020: €0 million) and is shown in the consolidated income statement under depreciation, amortisation and impairment losses. Other contract assets are presented in the consolidated statement of financial position in “Other non-current assets” and “Other current assets”.

Contract liabilities are generally advance payments by customers for performance obligations that have not yet been satisfied in full. The increase in contract liabilities mainly results from changes in the basis of consolidation amounting to €117.3 million. The €34.4 million included in contract liabilities as at 31 December 2020 (2020: €30.0 million) was recognised as revenue in 2021. Contract liabilities are presented in the consolidated statement of financial position in “Other non-current liabilities” and “Other current liabilities”.

The total transaction price allocated to performance obligations that have not been satisfied in full as at 31 December 2021 for multi-year contracts that are not invoiced on a variable basis as performance obligations are satisfied is €148.3 million. We anticipate that €75.5 million of the transaction price will be recognised as revenue in the next reporting period. The remaining €72.7 million will be recognised in subsequent financial years.

14. Other current assets

Composition of other current assets

	31 Dec 2021 €m	31 Dec 2020 €m
Other receivables from CCP transactions (commodities)	2,477.0	414.3
Prepaid expenses	93.0	67.6
Tax receivables (excluding income taxes)	47.8	28.9
Interest receivables on taxes	15.3	26.6
Crypto assets	6.3	0
Miscellaneous	36.2	10.7
Total	**2,675.6**	**548.1**

The increase in other current assets results almost exclusively from the increase in other receivables from the CCP business in connection with physical commodity deliveries not yet settled on the spot markets, which were subject to high volatility at year-end 2021. Other current liabilities also increased correspondingly, see Note 20. These receivables do not belong to the financial assets, as the claims do not include receipts of cash or cash equivalents but claims on physical deliveries of commodities.

15. Equity

Changes in equity are presented in the consolidated statement of changes in equity. As at 31 December 2021 the number of no-par value registered shares of Deutsche Börse AG in issue was 190,000,000 (31 December 2020: 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 authori-sation 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]	19,000,000	19 May 2021	18 May 2026	n/a
Authorised share capital II[1]	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[1]	19,000,000	19 May 2020	18 May 2024	n/a
Authorised share capital IV[2]	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: (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. 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 2021 or 31 December 2020.

Revaluation surplus

Revaluation surplus

	Share-based payments €m	Equity investments measured at FVOCI €m	Cash flow hedges €m	Defined benefit obligations €m	Other €m	Total[1] €m
Balance as at 1 Jan 2020 (gross)	**0**	**6.1**	**0.2**	**– 219.2**	**– 1.2**	**– 214.1**
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)	**0**	**31.8**	**– 40.1**	**– 244.4**	**– 1.6**	**– 254.3**
Changes from defined benefit obligations	0	0	0	60.8	0.1	60.9
Changes from share-based payments	1.3	0	0	0	0	1.3
Fair value measurement	0	52.2	52.7	0	0	104.9
Balance as at 31 Dec 2021 (gross)	**1.3**	**84.0**	**12.6**	**– 183.6**	**– 1.5**	**– 87.2**
Deferred taxes						
Balance as at 1 Jan 2020	**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**
Reversals	0	– 13.0	– 3.5	– 16.0	0	– 32.5
Balance as at 31 Dec 2021	**0**	**– 22.3**	**– 3.4**	**50.8**	**0.4**	**25.5**
Balance as at 1 Jan 2020 (net)	**0**	**4.3**	**0.1**	**– 159.3**	**– 0.9**	**– 155.8**
Balance as at 31 Dec 2020 (net)	**0**	**22.5**	**– 40.0**	**– 177.6**	**– 1.2**	**– 196.3**
Balance as at 31 Dec 2021 (net)	**1.3**	**61.7**	**9.2**	**– 132.8**	**– 1.1**	**– 61.7**

1) The position recognition of hidden reserves from fair value measurement, which was included in the previous year, was retroactively allocated to the retained earnings.

Retained earnings

The “retained earnings” item includes exchange rate differences amounting to €133.9 million (2020: €–98.3 million).

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

The annual financial statements of the parent company Deutsche Börse AG, prepared as at 31 December 2021 in accordance with the provisions of Handelsgesetzbuch (HGB, the German Commercial Code), report net profit for the period of €943.3 million) (2020: €1,161.9 million) and equity of €3,919.9 million (2020: €3,511.8 million). In 2021, Deutsche Börse AG distributed €550.6 million (€3.00 per share) from distributable profit for the previous year.

Proposal on the appropriation of the unappropriated surplus

	31 Dec 2021 €m
Net profit for the period	943.3
Appropriation to other retained earnings in the annual financial statements	– 323.3
Unappropriated surplus	**620.0**
Proposal by the Executive Board:	
Distribution of a regular dividend to the shareholders of €3.20 per share for 183,618,782 no-par value shares carrying dividend rights	587.6
Appropriation to retained earnings	32.4

No-par value shares carrying dividend rights

	31 Dec 2021 Number	31 Dec 2020 Number
Number of shares issued as at 31 December	190,000,000	190,000,000
Number of treasury shares as at the reporting date	– 6,381,218	– 6,478,743
Number of shares outstanding as at 31 December	**183,618,782**	**183,521,257**

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 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 €3.20 per eligible share, an amended resolution for the appropriation of distributable profit will be proposed to the Annual General Meeting.

17. 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. 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 the plan assets is deducted from the present value of the pension obligations, if necessary taking into account the regulations on the upper limit of the value of plan assets in excess of the obligation (so-called asset ceiling), so that the net pension obligation or the asset value from the defined benefit plans results.

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 based on a discount rate which is determined according to the adjusted "GlobalRate:Link" methodology from the advisory company Willis Towers Watson, 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 (e.g. 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 2021 €m	Total 31 Dec 2020 €m
Present value of defined benefit obligations that are at least partially funded	513.8	83.9	65.4	663.1	666.7
Fair value of plan assets	– 414.1	– 63.8	– 55.2	– 533.1	– 464.4
Funded status	**99.7**	**20.1**	**10.2**	**130.0**	**202.3**
Present value of unfunded obligations	4.8	0.6	0.1	5.5	5.5
Net liability of defined benefit obligations	**104.5**	**20.7**	**10.3**	**135.5**	**207.8**
Amount recognised in the balance sheet	**104.5**	**20.7**	**10.3**	**135.5**	**207.8**

The defined benefit plans comprise a total of 4,156 beneficiaries (2020: 2,882). 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 2021 €m	Total 31 Dec 2020 €m
Eligible current employees	216.1	74.9	62.1	353.1	347.0
Former employees with vested entitlements	184.5	9.1	0	193.6	206.8
Pensioners or surviving dependants	118.4	0.6	2.9	121.9	118.4
Total	**519.0**	**84.6**	**65.0**	**668.6**	**672.2**

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

Executive boards of Group companies (Germany and Luxembourg)

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

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. Every year, participating Group companies provide for an amount that corresponds to a certain percentage of the pensionable income. 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. Employees receive an annual account statement showing their current balance. The pension plan does not pay any benefits in the event of death or disability. 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	
	2021 €m	2020 €m	2021 €m	2020 €m	2021 €m	2020 €m
Balance as at 1 Jan	**672.2**	**621.6**	**– 464.4**	**– 428.2**	**207.8**	**157.2**
Current service cost	27.9	26.2	0	0	27.9	26.2
Interest expense/(income)	4.7	6.0	– 3.3	– 4.1	1.4	1.9
Past service cost	0	0.3	0	0	0	0.3
	32.6	**32.5**	**– 3.3**	**– 4.1**	**29.3**	**28.4**
Remeasurements						
Return on plan assets, excluding amounts already recognised in interest income	0	0	– 20.2	6.0	– 20.2	6.0
Adjustments to demographic assumptions	– 2.3	0	0	0	– 2.3	0
Adjustments to financial assumptions	– 38.0	25.1	0	0	– 38.0	25.1
Experience adjustments	– 0.9	– 5.8	0	0	– 0.9	– 5.8
	– 41.2	**19.3**	**– 20.2**	**6.0**	**– 61.4**	**25.3**
Effect of exchange rate differences	2.7	0.1	– 1.6	0	1.1	0.1
Contributions:						
Employers	0	0	– 42.9	– 43.6	– 42.9	– 43.6
Plan participants	1.4	0.9	– 1.4	– 0.9	0.0	0
Benefit payments	– 8.7	– 13.5	8.7	13.5	0.0	0
Withdrawal from plan assets	0	0	0	0	0	0
Settlements	0	0	0	0	0	0
Tax and administration costs	– 0.7	– 0.8	1.3	1.4	0.6	0.6
Reclassification to “Held for Sale”	– 0.6	0	0.3	0	– 0.3	0
Changes in the basis of consolidation	11.0	12.1	– 9.8	– 8.5	1.2	3.6
Balance as at 31 Dec	**668.6**	**672.2**	**– 533.1**	**– 464.4**	**135.5**	**207.8**

In the 2021 financial year, employees converted a total of €5.0 million (2020: €4.8 million) of their variable remuneration into deferred compensation benefits.

Assumptions

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

Actuarial assumptions

	31 Dec 2021		31 Dec 2020	
	Germany %	Luxembourg %	Germany %	Luxembourg %
Discount rate	1.10	1.10	0.70	0.70
Salary growth	3.00	3.30	3.00	3.30
Pension growth	2.00	n/a	1.90	n/a
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

	Change in actuarial assumption	Effect on defined benefit obligation			
		2021		2020	
		Defined benefit obligation €m	Change %	Defined benefit obligation €m	Change %
Present value of the obligation		**603.1**	–	**630.6**	–
Discount rate	Increase by 1.0 percentage point	519.2	–13.9	537.8	–14.7
	Reduction by 1.0 percentage point	707.9	17.4	746.9	18.4
Salary growth	Increase by 0.5 percentage points	613.5	1.7	642.1	1.8
	Reduction by 0.5 percentage points	593.4	–1.6	619.3	–1.8
Pension growth	Increase by 0.5 percentage points	615.3	2.0	643.8	2.1
	Reduction by 0.5 percentage points	591.4	–1.9	617.2	–2.1
Life expectancy	Increase by one year	621.0	3.0	650.1	3.1
	Reduction by one year	584.6	–3.1	609.9	–3.3

Composition of plan assets

Germany

In Germany, plan assets are held by a trustee in safekeeping for individual companies of the Group and for 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 2021		31 Dec 2020	
	€m	%	€m	%
Bonds	**402.9**	**75.6**	**349.9**	**75.3**
Government bonds	241.2		211.5	
Multilateral development banks	144.4		0	
Corporate bonds	17.3		138.4	
Derivatives	**2.8**	**0.5**	**3.0**	**0.6**
Stock index futures	3.0		2.9	
Interest rate futures	–0.2		0.1	
Investment funds	**31.2**	**5.9**	**28.1**	**6.1**
Total listed	**436.9**	**82.0**	**381.0**	**82.0**
Qualifying insurance policies	42.8	8.0	31.8	6.8
Cash	53.3	10.0	51.6	11.1
Total not listed	**96.2**	**18.0**	**83.4**	**18.0**
Total plan assets	**533.1**	**100.0**	**464.4**	**100.0**

As at 31 December 2021 the plan assets did not include any financial instruments of the Group (2020: 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. We consider 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 2021 is 15.6 years (2020: 16.6 years).

Expected maturities of undiscounted pension payments

	Expected pension payments[1]	
	31 Dec 2021 €m	31 Dec 2020 €m
Less than 1 year	16.7	15.7
Between 1 and 2 years	13.5	15.6
Between 2 and 5 years	57.0	50.1
More than 5 years up to 10 years	161.6	144.6
Total	**248.8**	**226.0**

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 €15.2 million plus €1.5 million for the 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.

During the reporting period, the costs associated with defined contribution plans amounted to €43.5 million (2020: €37.0 million).

Multi-employer plans
Amongst other financial institutions, 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. The notice period is specified in the BVV constitution. The subsidiary liability for the reached entitlement of each employee remains with the employer after the membership termination. 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. Deutsche Börse group is not liable for other BVV members' obligations.

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 designated multi-employer plans, amounted to €10.3 million (2020: €10.0 million). In 2022 we expect to make contributions to multi-employer plans amounting to around €10.2 million.

Other long-term employee benefits

Other long-term employee benefits

	31 Dec 2021 €m	31 Dec 2020 €m
Pensions obligations (IHK)	7.7	8.5
Jubilee	6.0	6.2
Total	**13.7**	**14.6**

The obligation arising from partial retirement agreements is reported under other current assets, as the allocated plan assets exceed the corresponding liability.

18. 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
To determine the fair value of the stock options the intrinsic value of the additional pro rata stock options is calculated, which also includes an expectation about future dividend payments.

Valuation of SBP shares

Tranche	Balance at 31 Dec 2021 Number	Deutsche Börse AG share price at 31 Dec 2021 €	Intrinsic value/ option at 31 Dec 2021 €	Fair value/ option at 31 Dec 2021 €	Settlement obligation €m	Current provision at 31 Dec 2021 €m	Non-current provision at 31 Dec 2021 €m
2017	45	147.10	136.00	136.00	0.0	0.0	0.0
2018	10,596	147.10	147.10	138.45	1.5	1.5	0.0
2019	6,409	147.10	147.10	101.71	0.7	0.0	0.7
2020	7,739	147.10	147.10	66.39	0.5	0.0	0.5
2021	9,768	147.10	147.10	32.48	0.3	0.0	0.3
Total	**34,557**				**3.0**	**1.5**	**1.5**

Average price of the exercised and forfeited share options

Tranche	Average price of the exercised share options €	Average price of the forfeited share options €
2017	135.97	130.51
2018	138.55	104.78
2019	140.38	74.02
2020	142.26	50.56

The stock options from the 2017 SBP tranche were exercised in the reporting period following the expiration of the waiting period. Shares of the SBP tranches 2018, 2019 and 2020 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 €3.0 million were recognised at the reporting date of 31 December 2021 (31 December 2020: €3.4 million). The total expense for SBP stock options in the reporting period amounted to €1.3 million (2020: €1.5 million).

Change in number of SBP shares allocated

	Balance at 31 Dec 2020	Disposals tranche 2017	Disposals tranche 2018	Disposals tranche 2019	Disposals tranche 2020	Additions tranche 2021	Fully settled cash options	Options forfeited	Balance at 31 Dec 2021
To other senior executives	38,225	303	278	107	– 171	9,768	– 12,539	– 1,414	34,557
Total	**38,225**	**303**	**278**	**107**	**– 171**	**9,768**	**– 12,539**	**– 1,414**	**34,557**

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 2016 to 2020 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 2021 tranche is based on the closing auction price of Deutsche Börse shares as at the disbursement date of the cash component of the 2021 tranche in 2022 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 2016 to 2020 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 2021 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. In the reporting year, LSI shares of the tranches 2015 to 2019 were paid out with a relevant payout share price of € 138.22 for shares of tranches 2015 to 2017. For shares of tranches 2018 and 2019 the relevant payout share price was € 136.90. The difference in payout share prices is caused by the nature of the specific terms and conditions for the respective tranches.

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. In the reporting year, RSU shares of tranche 2016 were paid out with a relevant payout share price of € 138.22.

Evaluation of the LSI and the RSU

To determine the fair value of the subscription rights the intrinsic value of the additional pro rata subscription rights is calculated, which also includes an expectation about future dividend payments.

Valuation of LSI and RSU shares

Tranche	Balance as at 31 Dec 2021 Number	Deutsche Börse AG share price as at 31 Dec 2021 €	Intrinsic value/ option as at 31 Dec 2021 €	Fair value/ option as at 31 Dec 2021 €	Settlement obligation €m	Current provision as at 31 Dec 2021 €m	Non-current provision as at 31 Dec 2021 €m
2016	1,748	147.10	147.10	147.10	0.2	0.2	0.0
2017	42,764	147.10	147.10	147.10	6.3	6.3	0.0
2018	51,178	147.10	147.10	138.03-147.10	7.3	0.8	6.5
2019	40,408	147.10	147.10	128.88-147.10	5.7	0.6	5.1
2020	41,963	147.10	147.10	126.10-147.10	5.9	1.6	4.3
2021	48,024	147.10	147.10	134.98-144.09	6.8	0.0	6.8
Total	**226,085**				**32.2**	**9.5**	**22.7**

Provisions amounting to €32.2 million were recognised as at 31 December 2021 (31 December 2020: €33.3 million). The total expense for LSI/RSU stock options in the reporting period amounted to €9.5 million (31 December 2020: €5.9 million).

Change in number of LSI and RSU shares allocated

	Balance at 31 Dec 2020	Additions/ (disposals) Tranche 2016	Additions/ (disposals) Tranche 2017	Additions/ (disposals) Tranche 2018	Additions/ (disposals) Tranche 2019	Additions/ (disposals) Tranche 2020	Additions/ (disposals) Tranche 2021	Fully settled cash options	Balance at 31 Dec 2021
To other senior executives	247,236	1,149	– 1,287	395	4,881	1,064	48,024	– 75,377	226,085
Total	**247,236**	**1,149**	**– 1,287**	**395**	**4,881**	**1,064**	**48,024**	**– 75,377**	**226,085**

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

Performance Share Plan (PSP)
The PSP was launched in the 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.

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. For the 2021 tranche the overall target achievement depends on the performance against three different metrics over the performance period. The total shareholder return (TSR) for the Deutsche Börse AG share compared with the total shareholder return for the STOXX Europe 600 Financials Index accounts for 50 per cent. The annual growth rate for adjusted earnings per share over the performance period accounts for a further 25 per cent. The remaining 25 per cent are calculated by reference to performance against four equally weighted ESG targets.

The payout amount is calculated by multiplying the final number of performance shares with the average share price of Deutsche Börse AG's shares (Xetra closing price) 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. In the reporting year, PSP shares of tranche 2016 were paid out with a relevant payout share price of €150.87. Until the 2020 tranche, servicing and treatment will be in accordance with the cash settlement rules. Settlement is in cash and with the exception of the 2021 tranche the transaction is measured and recognised as cash-settled share-based remuneration. Because of its specific contractual conditions the 2021 tranche is treated as a settlement with equity instruments.

Co-Performance Investment Plan (CPIP)

In the 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 payment of the stock bonus was settled in cash and paid in full as at 31 March 2021.

Evaluation of the CPIP and the PSP

To determine the fair value of the subscription rights, the intrinsic value of the additional pro rata subscription rights is calculated, which also includes an expectation about future dividend payments.

Valuation parameters for CPIP and PSP shares

		Tranche 2021	Tranche 2020	Tranche 2019	Tranche 2018	Tranche 2017	Tranche 2016
Term to		31 Dec 2025	31 Dec 2024	31 Dec 2023	31 Dec 2022	31 Dec 2021	31 Dec 2020
Relative total shareholder return	%	100.0	0.0	75.0	235.0	235.0	250.0
Net profit for the period attributable to Deutsche Börse AG shareholders	%	n/a	119.59	120.80	144.13	139.72 - 149.97	171.86 - 182.10
Growth rate Earnings per Share	%	150.00	n/a	n/a	n/a	n/a	n/a
ESG-Target Achievement	%	175.00	n/a	n/a	n/a	n/a	n/a

Valuation of CPIP and PSP shares

Tranche	Balance as at 31 Dec 2021 Number	Deutsche Börse AG share price as at 31 Dec 2021 €	Intrinsic value/ option as at 31 Dec 2021 €	Fair value/ option as at 31 Dec 2021 €	Settlement obligation €m	Current provision as at 31 Dec 2021 €m	Non-current provision as at 31 Dec 2021 €m
2016	9,965	147.10	138.22	152.18	1.5	1.5	0.0
2017	132,150	147.10	141.35	154.75	20.4	20.4	0.0
2018	132,606	147.10	147.10	126.76	18.8	0.0	18.8
2019	53,342	147.10	147.10	93.57	5.7	0.0	5.7
2020	22,820	147.10	147.10	61.27	1.6	0.0	1.6
2021[1]	49,458	147.10	147.10	27.41	1.4	0	0
Total	**400,341**				**49.4**	**21.9**	**26.1**

1) Due to the treatment of the 2021 tranche as equity-settled, no provisions are recognized for this tranche. The above figures also include the shares of the members of the Board of Management

Provisions for the CPIP and the PSP amounting to €48.0 million were recognised at the reporting date 31 December 2021 (31 December 2020: €68.8 million). Of these provisions, €14.8 million were attributable to members of the Executive Board (2020: €8.5 million). The total expense for CPIP and PSP stock options in the reporting period was €6.0 million (2020: €8.5 million). Of that amount, an expense of €3.5 million was attributable to members of the Executive Board (2020: €6.0 million).

Change in number of CPIP and PSP shares allocated

	Balance at 31 Dec 2020	Additions/ (disposals) Tranche 2015	Additions/ (disposals) Tranche 2016	Additions/ (disposals) Tranche 2017	Additions/ (disposals) Tranche 2018	Additions/ (disposals) Tranche 2019	Additions/ (disposals) Tranche 2020	Additions/ (disposals) Tranche 2021	Balance at 31 Dec 2021
To the Executive Board[1]	496,043	– 87,574	– 87,744	– 3,025	– 3,574	– 20,117	– 24,016	38,116	308,109
To other senior executives	144,977	–	– 44,018	– 2,876	– 3,112	– 6,833	– 7,248	11,342	92,232
Total	**641,020**	**– 87,574**	**– 131,762**	**– 5,901**	**– 6,686**	**– 26,950**	**– 31,264**	**49,458**	**400,341**

1) Active and former Executive Board members.

Granting of PSP-Tranche 2021 for Board Members

At the beginning of the fiscal year 2021 PSP-tranche 2021 was granted. The relevant grant share price for tranche 2021 shares was at €138.22. The performance period ends on 31 December 2025. The individual investment target amounts, grant share price, number of initially granted virtual shares as well as the fair value at reporting date can be summarised for the respective board members as follows:

Granted PSP-Tranche 2021 for Board Members

Board member	Investment Target €	Grant Share Price €	Granted Number of Performance Shares Number	Fair value/ option as at 31 Dec 2021 €
Dr. Theodor Weimer	1,300,000	138.22	9,406	338,376
Dr. Christoph Böhm	560,000	138.22	4,052	145,794
Dr. Thomas Book	516,666	138.22	3,738	134,501
Heike Eckert	516,666	138.22	3,738	134,501
Dr. Stephan Leithner	560,000	138.22	4,052	145,794
Gregor Pottmeyer	560,000	138.22	4,052	145,794
Total	**4,013,332**			**1,044,760**

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 2021, 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 €4.8 million (2020: €4.8 million) was recognised in staff expense for the GSP.

Other share based payment programmes in the light of acquisitions

Axioma Management Incentive Programme (MIP)

The MIP was set up for the senior management of the Qontigo Group (index and analytics business of Group Deutsche Börse) as part of the acquisition. It grants a non-current remuneration component in the form of virtual shares of the Qontigo Group. These are generally accounted for as share based 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 three years with the possibility of an early execution and started with the implementation of the transaction. Due to a potential payout with cash by Group Deutsche Börse, the MIP is accounted for under the principles of a cash-settlement.

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 is 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. A pro rata addition of expenses over the vesting period is conducted in accordance with the criteria for a non-forfeiture of the programme.

ISS Employee Share Programme (MBP)

An employee share programme was set up for the senior management of ISS in the course of the acquisition. It enables management to purchase shares in the parent of ISS, Inc. (ISS HoldCo, Inc.). Deutsche Börse Group has the right to buy back the shares after not less than three years at their fair value. According to an IFRIC interpretation from 2005, this programme is treated like an award of stock options. Since Deutsche Börse Group has a unilateral right to settle the transaction with treasury shares in Deutsche Börse AG, the programme is treated according to the rules for equity settlement.

Valuation
The value of the programme was calculated using the Black-Scholes model and contract-specific inputs at the time the transaction was completed. The main valuation parameters were the enterprise value of ISS, its expected volatility, the contractually agreed interest rate on the loan and the expected time until maturity. Since the programme does not have a vesting period, the total value was recognised as expense at the transaction date.

ISS Employee Incentive Programme (MAP)

An employee incentive programme was set up for selected managers at ISS, which has not yet been fully awarded as at the reporting date. It grants a long-term remuneration component in the form of virtual shares in ISS. The programme is accounted for as share-based payments. The amounts awarded to the beneficiaries are intended to reflect the economic development of ISS. The MAP contains a time-based and a performance-based component. The vesting period is three years, and under certain circumstances can be exercised early. Since Deutsche Börse Group has a unilateral right to settle the transaction with treasury shares in Deutsche Börse AG, the programme is treated according to the rules for equity settlement.

Valuation
The value of the virtual shares is calculated at the date of each allocation to the beneficiaries, using a Black-Scholes model with contract-specific inputs. The main valuation parameters include the enterprise value and the expected volatility of ISS, as well as the expected term and the contract-specific payment profile. In line with the vesting criteria, the value of the award is recognised as an expense over the vesting period.

19. 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. The provision is to be reversed if it is no longer probable that settling the obligation will entail the outflow of resources embodying economic benefits.

A provision is only recognised for restructuring when a detailed, formal restructuring plan has been adopted and those concerned have been given the reasonable impression that the restructuring measures will be implemented. This can be by starting to implement the plan or by announcing its key elements to those concerned. 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 2021	**122.8**	**112.6**	**92.1**	**79.5**
Changes in the basis of consolidation	3.7	0	0	0
Reclassification	– 4.8	– 0.3	0	– 0.2
Utilisation	– 88.8	– 27.3	– 2.3	– 28.0
Reversal	– 11.0	– 19.5	– 24.1	– 2.6
Additions	129.1	19.6	11.2	7.7
Currency translation	3.1	0.22	0	0.1
Interest	0	0	0	– 0.2
Balance as at 31 Dec 2021	**154.1**	**85.4**	**76.9**	**56.2**

Changes in other provisions (part 2)

	Other tax provisions €m	Anticipated Losses €m	Other personnel provision €m	Miscellaneous €m
Balance as at 1 Jan 2021	**38.9**	**7.9**	**4.5**	**23.4**
Changes in the basis of consolidation	0.0	0	0.3	1.8
Reclassification	0	0	0	– 1.1
Utilisation	– 3.1	– 0.1	– 4.0	– 9.8
Reversal	– 0.5	– 0.2	– 0.3	– 2.8
Additions	9.3	7.5	4.6	12.9
Currency translation	0.0	0.2	0.2	0.2
Interest	0.0	0	0.0	0
Balance as at 31 Dec 2021	**44.6**	**15.4**	**5.2**	**24.7**

The other non-current and current provisions amount to a total of €462.5 million (31 December 2020: €481.7 million). The non-current provisions of €127.2 million (31 December 2020: €168.0 million) largely have a remaining term of one to five years. Furthermore current provisions exist for €335.3 million (31 December 2020: €313.7 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.

For details of share-based payments, see Note 18.

20. Other current liabilities

Composition of other current liabilities

	31 Dec 2021 €m	31 Dec 2020 €m
Other Liabilities from CCP positions (Commodities)	2,527.6	415.1
Contract liabilities	136.3	30.5
Tax liabilities (excluding income tax)	41.9	42.8
Vacation entitlements, flextime and overtime credits	30.6	29.9
Social security liabilities	13.8	9.1
Liabilities to employees	11.4	6.7
Liabilities to supervisory bodies	3.3	3.0
Miscellaneous	23.7	7.6
Total	**2,788.6**	**544,7**

The increase in other current liabilities results almost exclusively from the increase in liabilities from CCP business. These liabilities are not part of the financial liabilities because the obligation does not consist in payment of cash but in physical delivery of commodities.

Other disclosures

21. Notes on the consolidated cash flow statement

Composition of other non-cash income

	2021 €m	2020 €m
Subsequent measurement of non-derivative financial instruments	– 156.4	39.5
Reversal of discount and transaction costs from long-term financing	0.5	8.9
Equity method measurement	– 18.1	– 17.2
Impairment of financial instruments	– 0.4	2.1
Subsequent measurement of derivatives	19.4	101.5
Contract assets and liabilities	– 3.9	2.6
Gains on the disposal of subsidiaries and equity investments	– 10.5	0
Miscellaneous	5.8	6.3
Total	**– 163.6**	**143.6**

Reconciliation to cash and cash equivalents

Cash and cash equivalents 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 2021 €m	31 Dec 2020 €m
Restricted bank balances	78,542.0	38,420.1
Other cash and bank balances	1,029.6	1,467.3
Net position of financial instruments held by central counterparties	– 72.0	95.0
Current financial instruments measured at amortised cost	15,799.7	16,225.1
less financial instruments with an original maturity exceeding 3 months	– 2,019.0	– 1,919.7
Current financial liabilities measured at amortised cost	– 15,914.3	– 14,630.0
less financial instruments with an original maturity exceeding 3 months	2,966.5	1,037.7
Current liabilities from cash deposits by market participants	– 78,292.5	– 38,188.8
Cash and cash equivalents	**2,040.0**	**2,506.7**

Changes in liabilities arising from financing activities

	Bonds issued €m	Leasing liabilities €m	Commercial paper €m
Balance as at 1 Jan 2020	**2,286.2**	**380.1**	**0**
Lease payments (IFRS 16)	0	– 47.4	0
Acquisition from business combinations	0	2.9	0
Additions	948.2	73.3	0
Disposals	0	– 0.7	0
Repayments	– 602.9	0	0
Other and exchange rate differences	5.5	0.7	0
Balance as at 31 Dec 2020	**2,637.0**	**408.7**	**0**
Lease payments (IFRS 16)	0	– 62.8	0
Acquisition from business combinations	0	87.1	0
Additions	999.1	46.1	2,701.0
Disposals	0	– 4.7	0
Repayments	0	0	– 1,900.0
Other and exchange rate differences	0	12.1	0
Balance as at 31 Dec 2021	**3,636.1**	**486.7**	**801.0**

22. 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 are added to the average number of shares.

In order to determine diluted earnings per share, all subscription rights, for which a cash settlement has not been determined are assumed to be settled with equity instruments – regardless of actual accounting in accordance with IFRS 2.

All tranches of the Long-term Sustainability Instrument (LSI) for which a choice between settlement in cash or equity instruments exists were settled in the previous year. All current and future tranches may only be settled in cash. There are therefore no potentially dilutive ordinary shares from the Long-term Sustainability Instrument.

As part of the acquisition of Institutional Shareholder Services Inc. there are ongoing option rights valid until 25 February 2024, which did have a small dilutive effect during the reporting year up to the reporting date.

Calculation of earnings per share (basic and diluted)

	2021	2020
Number of shares outstanding at beginning of period	183,521,257	183,429,035
Number of shares outstanding at end of period	183,618,782	183,521,257
Weighted average number of shares outstanding	183,546,106	183,452,436
Number of potentially dilutive ordinary shares	368,326	0
Weighted average number of shares used to compute diluted earnings per share	183,914,432	183,452,436
Net profit for the period attributable to Deutsche Börse AG shareholders (€m)	1,209.7	1,079.9
Earnings per share (basic) (€)	6.59	5.89
Earnings per share (diluted) (€)	6.58	5.89

23. Segment reporting

Deutsche Börse Group divides its business into eight segments: This structure serves as a basis for the Group's internal management and financial reporting. Detailed information about the segment structure, which is part of these consolidated financial statements, can be found under the heading Business operations and Group structure in section Deutsche Börse: Fundamental information about the Group in the combined management report. Due to the acquisition of Institutional Shareholder Services (ISS), we adapted the segment reporting in the first quarter 2021 and added Institutional Shareholder Services as a segment, please see Note 3.

Segment reporting (part 1)

	Eurex (financial derivatives)		EEX (commodities)		360T (foreign exchange)	
	2021	2020	2021	2020	2021	2020
Net revenue (€m)	995.8	1,110.3	341.5	302.2	107.8	101.5
Operating costs (€m)	– 387.7	– 373.1	– 178.7	– 174.3	– 53.7	– 53.9
Result from financial investments	16.1	1.6	– 0.3	– 0.9	0	0
thereof result of the equity method measurement of associates	– 0.8	– 1.0	– 0.3	– 0.9	0	0
EBITDA (€m)	624.2	738.8	162.5	127.0	54.1	47.6
EBITDA margin (%)	63	67	48	42	50	47
Depreciation, amortisation and impairment losses (€m)	– 44.1	– 55.3	– 33.1	– 35.6	– 21.5	– 20.4
EBIT (€m)	580.1	683.5	129.4	91.4	32.6	27.2
Capital expenditure[1] (€m)	48.3	46.1	22.8	21.4	7.6	8.6
Employees (as at 31 December)	1,746	1,661	1,009	934	274	272

1) Excluding investments from business combinations.

Segment reporting (part 2)

	Xetra (cash equities)		Clearstream (post-trading)		IFS (investment fund services)	
	2021	2020	2021	2020	2021	2020
Net revenue (€m)	364.0	391.7	835.4	827.2	382.4	232.8
Operating costs (€m)	– 150.6	– 158.8	– 376.3	– 367.3	– 125.9	– 117.5
Result from financial investments	29.4	25.8	0.5	– 1.9	– 0.6	– 0.1
thereof result of the equity method measurement of associates	29.2	25.4	0.4	– 1.7	– 0.5	– 0.1
EBITDA (€m)	242.8	258.7	459.6	458.0	255.9	115.2
EBITDA margin (%)	67	66	55	55	67	49
Depreciation, amortisation and impairment losses (€m)	– 15.3	– 23.7	– 69.7	– 72.5	– 36.9	– 28.5
EBIT (€m)	227.5	235.0	389.9	385.5	219.0	86.7
Capital expenditure[1] (€m)	13.5	15.3	72.8	68.4	16.4	27.5
Employees (as at 31 December)	774	739	2,159	2,136	886	911

Segment reporting (part 3)

	Qontigo (index and analytics business)		ISS (Institutional Shareholder Services)		Group	
	2021	2020	2021	2020	2021	2020
Net revenue (€m)	258.7	248.1	223.9	n/a	3,509.5	3,213.8
Operating costs (€m)	– 123.3	– 123.8	– 155.4	n/a	– 1,551.6	– 1,368.7
Result from financial investments	45.2	– 0.2	– 5.1	n/a	85.2	24.3
thereof result of the equity method measurement of associates	10.5	– 0.2	0	n/a	38.6	21.5
EBITDA (€m)	180.6	124.1	63.4	n/a	2,043.1	1,869.4
EBITDA margin (%)	70	50	28	n/a	58	58
Depreciation, amortisation and impairment losses (€m)	– 28.5	– 28.3	– 44.6	n/a	– 293.7	– 264.3
EBIT (€m)	152.1	95.8	18.8	n/a	1,749.4	1,605.1
Capital expenditure[1] (€m)	7.7	8.1	17.3	n/a	206.4	195.4
Employees (as at 31 December)	611	585	2,741	n/a	10,200	7,238

1) Excluding investments from business combinations.

The net revenue includes revenue generated through external parties as well as through intercompany transactions. The impact of intercompany revenue is eliminated on Group level as such internally generated revenue of one segment has an adverse effect on revenue by the same amount on the corresponding partner segment. For an overview of intercompany revenue see Note 4. Services between segments are offset on the basis of measured amounts or fixed prices.

Our business model – and that of all our 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 it does not matter whether sales revenue is generated from German or international 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. We have therefore identified the following segments: Euro area, other 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, for example, that sales to an American investor trading a product with an Asian underlying via a European clearing member are classified as European sales.

Information on geographical regions

	Sales revenue[1]		Investments[2]		Non-financial non-current assets[3, 4]		Number of employees	
	2021 €m	2020 €m	2021 €m	2020 €m	2021 €m	2020 €m	2021	2020
European Union	2,358.5	2,047.8	177.7	172.8	4,199.1	4,008.7	5,464	5,042
Other Europe	1,201.0	1,063.2	4.2	15.4	1,339.4	1,241.0	1,792	1,449
America	472.1	289.1	24.3	6.5	3,279.2	1,061.6	1,209	435
Asia-Pacific	254.3	183.9	0.2	0.7	27.7	31.7	1,734	312
Total of all regions	**4,285.9**	**3,584.0**	**206.4**	**195.4**	**8,845.4**	**6,343.0**	**10,200**	**7,238**
Consolidation of internal net revenue	– 67.1	– 64.7	0	0	0	0	0	0
Group	**4,218.8**	**3,519.3**	**206.4**	**195.4**	**8,845.4**	**6,343.0**	**10,200**	**7,238**

1) Including countries in which more than 10 per cent of sales revenue was generated: UK (2021: €807.1 million, 2020: €732.1 million) and Germany (2021: €1,014.7 million,2020: €910.9 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 (2021: €3,859.2 million, 2020: €3,648.1 million), Switzerland (2021: €1,307.0 million, 2020: €1,210.1 million) and United States (2021: €3,279.2 million, 2020: €1,061.6 million).
4) These include intangible assets, property, plant and equipment as well as investments in associates and joint ventures.

24. Financial risk management

Detailed qualitative disclosures on financial instruments in accordance with IFRS 7.33 that are part of these consolidated financial statements, such as the nature and extent of risk arising from financial instruments and risk management objectives, strategies and procedures, are included under the caption Risk management approach and risk controlling in the combined management report in the section risk management.

Financial risks mainly arise in the form of credit risks and to a lesser extent in the form of market price risks. They are quantified using the economic capital concept. Detailed information, which is part of these consolidated financial statements, can be found under the caption financial risks in the combined management report in section risk management. Required economic capital is assessed on a 99.9 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 €664.0 million as at 31 December 2021, whereby €488.0 million stems from credit risk and €176.0 million stems from market risk.

We evaluate our risk position continuously. 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 (part 1)

	Segment	Carrying amounts – maximum risk exposure: Amount at 31 Dec 2021 €m	Carrying amounts – maximum risk exposure: Amount at 31 Dec 2020 €m	Collateral: Amount at 31 Dec 2021 €m	Collateral: Amount at 31 Dec 2020 €m
Collateralised cash investments					
Reverse repo transactions	Eurex (financial derivatives)[1]	820.9	574.9	828.9	580.5
	Clearstream (post-trading)	4,274.3	6,176.7	4,360.6	6,346.0
		5,095.2	**6,751.6**	**5,189.5**	**6,926.5**
Uncollateralised cash investments					
Money market lendings – central banks	Eurex (financial derivatives)	33,709.3	31,711.6	0	0
	Clearstream (post-trading)	7,350.7	6,291.8	0	0
Money market lendings – other counterparties	Eurex (financial derivatives)	298.5	187.5	0	0
	Clearstream (post-trading)	89.6	148.3	0	0
Balances on nostro accounts and other bank deposits	Clearstream (post-trading)	1,905.4	2,252.4	0	0
	EEX (commodities)	43,888.7	3,809.7	0	0
	Group	854.1	3,603.7	0	0
Securities	Clearstream (post-trading)	1,910.2	1,186.3	0	0
	Eurex (financial derivatives)	10.1	7.0	0	0
	Group	14.0[2]	14.9[2]	0	0
Fund assets	Group	66.7[3]	37.1[3]	0	0
		90,097.3	**49,250.3**	**0**	**0**
Loans for settling securities transactions					
Technical overdraft facilities	Clearstream (post-trading)	531.6	267.7	n/a[4]	n/a[4]
Automated Securities Fails Financing[5]	Clearstream (GSF)	885.7[6]	427.3[6]	1,122.3	560.6
		1,417.3	**695.0[7]**	**1,122.3**	**560.6[7]**
Total		**96,609.8**	**56,696.9[7]**	**6,311.8**	**7,487.1[7]**

Credit risk of financial instruments (part 2)

	Segment	Carrying amounts – maximum risk exposure		Collateral	
		Amount at 31 Dec 2021 €m	Amount at 31 Dec 2020 €m	Amount at 31 Dec 2021 €m	Amount at 31 Dec 2020 €m
Balance brought forward		96,609.8	56,696.9[7]	6,311.8	7,487.1[7)]
Other financial instruments					
Other loans	Group	100.5	0.3	100.5	0
Other assets	Group	13.3	15.3	0	0
Trade receivables	Group	978.2	625.8	0	0
Other receivables	Clearstream (post-trading)	17.3	147.2	0	0
	Eurex (financial derivatives)	1,217.0	697.0	0	0
	Group	9.8	27.8	0	0
Other financial assets at fair value	Group	14.0	7.6	0	0
		2,350.1	**1,521.0**	**100.5**	**0**
Financial instruments held by central counterparties		**109,657.0[8]**	**62,467.3[8]**	**126,842.0[9]**	**79,747.6[9]**
Derivatives		**112.1**	**8.4**	**0**	**0**
Total		**208,729.0**	**120,693.6[7]**	**133,254.3**	**87,234.7[7]**

1) Presented in the items “restricted bank balances” and “other cash and bank balances”.
2) The amount includes collateral totalling €5.0 million (2020: €5.1 million)
3) The amount includes collateral totalling €8.0 million (2020: €8.0 million)
4) 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.
5) Off-balance-sheet items
6) Meets the IFRS 9 criteria for a financial guarantee contract
7) Prior-year figures adjusted as securities lending transactions from Clearsteam Banking S.A.’s ASLplus programme do not represent a risk position
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, while the carrying amount of the “financial instruments held by central counterparties” item in the balance sheet shows the gross amount of the open trades according to IAS 32.
9) Collateral value of cash and securities collateral deposited for margins, covering the net value of all margin and default fund requirements

Cash investments

Clearstream receives cash deposits from its customers in various currencies, whereas Eurex Clearing AG receives cash collateral mainly in EUR and CHF. In line with treasury policy, these entities shall invest such funds, and this is where the credit risk is potentially stemming from.

We mitigate such risks either – to the extent possible – by investing short-term funds 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– (S&P Global Ratings/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. In this context, impeccable creditworthiness means an internal rating of at least “D”, which corresponds to an external rating from Fitch of at least “BBB”. Counterparty credit risk is monitored on the basis of an internal rating system.

The fair value of securities received under reverse repurchase agreements was €5,189.5 million (2020: €6,926.0 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 at 31 December 2021, Clearstream Banking S.A. had pledged securities with a value of €229.0 million (2020: €168.20 million) to central banks as collateral for credit lines received from the central banks. As in the previous year, these all come from the Clearstream investment portfolio.

Eurex Clearing AG had pledged no securities to central banks as at 31 December 2021, the same as the previous year.

Loans for settling securities transactions

Clearstream 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 at 31 December 2021 they came to €110.2 billion (2020: €106.2 billion). Of the total, €5.9 billion (2020: €5.5 billion) are unsecured and only relate to credit lines granted to selected central banks and multilateral development banks in accordance with the CSDR exception defined in Article 23 of the Delegated Regulation (EU) 2017/390 based on the creditworthiness of the borrowers and zero risk weight applied by the Regulation (EU) No 575/2013 (CRR). Actual outstandings at the end of each business day generally represent a small fraction of the facilities and amounted to €531.6 million as at 31 December 2021 (2020: €267.7 million); see Note 12.

Clearstream also guarantees the undue residual risk resulting from the Automated Securities Fails Financing (ASL) programme it offers to its customers, where Clearstream Banking S.A. acts as an intermediary between borrower and lender. Such risks are secured. As at 31 December 2021 the outstanding loans under this programme amounted to €885.8 million (2020: €427.3 million). Collateral received by Clearstream Banking S.A. in connection with these loans amounted to €1,122.3 million (2020: €560.6 million).

In 2020 and 2021, 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 security mechanisms of the Group’s central counterparties are described in detail in the section risk management.

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 at 31 December 2021 there were no contract assets (2020: nil).

Loss allowances for trade receivables as at 31 December 2021

	Not more than 30 days past due €m	Not more than 60 days past due €m	Not more than 90 days past due €m	Not more than 120 days past due €m	Not more than 360 days past due €m	More than 360 days past due €m	Insol-vent €m	Total €m
Expected loss rate	0.0%	0.0%	0.5%	0.9%	5.4%	89.4%	100%	
Trade receivables	38.9	7.8	9.3	2.7	13.0	6.4	1.9	80.0
Loss allowance	0.0	0.0	0.0	0.0	0.7	6.1	1.9	8.8

Loss allowances for trade receivables as at 31 December 2020

	Not more than 30 days past due €m	Not more than 60 days past due €m	Not more than 90 days past due €m	Not more than 120 days past due €m	Not more than 360 days past due €m	More than 360 days past due €m	Insolvent €m	Total €m
Expected loss rate	0.0%	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	0.0	0.1	0.8	6.5	1.8	9.2

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 the reporting year, as in the previous year there were no significant write-offs due to customer defaults. Moreover, no significant payments were received for receivables which had previously been written off (2020: nil).

Debt securities
All debt securities measured at amortised cost are considered to have low default risk and the loss allowance recognised during the period was therefore limited to twelve months' expected losses. The Group considers listed bonds to have a low credit risk if they have an investment grade credit rating from an external rating agency. All debt securities measured at fair value through OCI are assigned to Level 1 on recognition and are reviewed regularly for changes in credit risk on the basis of their rating. The expected loss for listed debt securities 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 2020	**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**
Increase from business combinations	0	0	0	0
Increase in the allowance recognised in profit or loss during the period	0.2	0.2	0.8	1.2
Decrease in the allowance recognised in profit or loss during the period	– 0.1	– 0.3	– 1.2	– 1.6
Closing loss allowance as at 31 December 2021	**0.4**	**0.8**	**8.0**	**9.2**

Credit risk concentrations
Our 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 section regulatory capital requirements and regulatory capital ratios in the section risk management for a description of the 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 CSD authorisation under article 16 CSDR.

The required economic capital (based on the so-called "Value at Risk" (VaR) with a confidence level of 99.90 per cent) for credit risk is calculated monthly for each day and amounted to €488.0 million as at 31 December 2021 (2020: €657.0 million, based on VaR with a confidence level of 99.98 per cent).

We also apply 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 exposures 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 2021.

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. For market price risks, the required economic capital (based on the so-called "Value at Risk" (VaR) with a confidence level of 99.90 per cent) is determined on a monthly basis. As at 31 December 2021 the economic capital for market price risks was €176.0 million (2019: €107.0 million, based on VaR with a confidence level of 99.98 per cent).

Impairment losses of €0.2 million (2020: nil) were recognised in profit or loss in the financial year 2021 for strategic investments not included in VaR for market price risks.

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, while interest rate sensitive liabilities mainly consist of short-term debt instruments. Interest rate risk from long-term liabilities of Deutsche Börse AG is mitigated through issuance of fixed-coupon bonds.

In order to finance the acquisition of a majority stake in Institutional Shareholder Services, Deutsche Börse AG issued debt securities with a nominal volume of €1,000 million. For further details of the outstanding bonds issued by Deutsche Börse Group, see section "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.

In line with its risk strategy, we may use financial instruments to hedge highly probable interest rate exposures. For this purpose, interest rate swaps, as well as swaptions, might be used. Our Treasury policy requires that the critical terms of swaps and swaptions must align with the hedged items.

In 2021, we entered into forward interest rate swap contracts to hedge the interest rate risk in connection with the highly probable planned refinancing of a bond maturing in 2022. In this way, the cash flow risk arising from potential interest rate changes was hedged. Cash flow hedge accounting was applied for this hedge.

Foreign-exchange rate risk
Measuring and managing foreign-exchange risk is important for reducing our exposure to exchange rate movements. The three main types of foreign-exchange risk that we are exposed to are cash flow-, translation- and transaction-related foreign-exchange risk. Cash flow risk reflects the risk of fluctuations in present value of future operating cash flows from foreign-exchange movements. Translation risk comprises effects from the valuation of our 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.

We operate internationally and are, to a limited extent, exposed to foreign-exchange risk, primarily in USD, CHF, GBP 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 USD. The Clearstream (post-trading) segment generated 10 per cent of its revenue and treasury result from banking business directly or indirectly in USD (2020: 14 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 affecting our profits and losses. 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, we use 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 2021, 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 to that, the Group entered into FX derivative contracts to hedge the foreign currency exposure associated with intercompany cash pooling and loans.

For Clearstream, 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 2021 there were no significant net foreign-exchange positions (2020: nil).

Other market risks

Market risk arises also 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.

No sensitivity analyses were performed, as both interest rate and foreign currency risks are fully hedged. As in the previous year, there were no risk concentrations from market prices in the reporting year.

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. Term investments can be transacted via reverse repurchase agreements against highly liquid collateral. For refinancing purposes, Eurex Clearing AG and Clearstream Banking S.A. can pledge eligible securities with their respective central banks. 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 2021 m	Amount at 31 Dec 2020 m
Deutsche Börse AG	Working capital[1]	€	600.0	600.0
Eurex Clearing AG	Settlement	€	900.0	900.0
	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]	€	3,290.0	1,250.0
	Settlement[2]	US$	3,450.0	3,050.0
	Settlement[2]	£	3,200.0	350.0
Clearstream Banking AG	Settlement	€	200.0	0
European Energy Exchange AG	Working capital	€	22.0	22.0
	Settlement	€	110.0	81.6
	Settlement	£	0	1.0
Axioma Inc.	Working capital	US$	4.9	29.1
Quantitative Brokers LLC	Working capital	US$	3.0	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.

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 2021 (2020: 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 (2020: 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. As at 31 December 2021 Deutsche Börse AG had issued commercial paper with a nominal volume of €801.0 million (2020: nil).

Clearstream Banking S.A. also has a commercial paper programme with a programme limit of €1.0 billion, which is used to provide additional short-term liquidity. As at 31 December 2021 it had issued commercial paper with a nominal volume of €750.3 million (2020: €546.4 million).

In 2021, S&P Global Ratings (S&P) confirmed Deutsche Börse AG's AA credit rating with a stable outlook. 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 S&P Global Ratings (S&P) in 2021. S&P also rated Clearstream Banking AG as AA in November 2021. For further details on the rating of Deutsche Börse Group, see section "Financial position" section in the combined management report.

As in the previous year, there were no concentrations of liquidity risk in the reporting year.

Maturity analysis of financial instruments (1)

31 Dec 2021	Contractual maturity: Sight €m	Not more than 3 months €m	More than 3 months but not more than 1 year €m	More than 1 year but not more than 5 years €m	Over 5 years €m	Reconciliation to carrying amount €m	Carrying amount €m
Non-derivative financial liabilities							
Non-current financial liabilities measured at amortised cost	0	7.4	38.9	1,747.5	1,986.5	– 240.4	3,539.9
thereof lease liabilities	0	0	0	198.1	253.4	– 28.4	423.1
Non-current financial liabilities at fair value through profit or loss	0	0	0	1.5	0	0	1.5
Trade payables	0.1	702.5	1.8	0	0	0	704.4
Current financial liabilities measured at amortised cost	13,605.7	1,627.8	686.9	0	0	– 6.1	15,926.4
thereof lease liabilities	0	16.9	52.1	0	0	– 5.4	63.6
Current financial liabilities at fair value through profit or loss	0	0	0.6	0	0	0	0.6
Cash deposits by market participants	0	77,632.3	660.2	0	0	0	78,292.5
Total	**13,605.8**	**79,970.0**	**1,388.4**	**1,749.0**	**1,986.5**	**– 246.5**	**98,453.2**
Derivatives and financial instruments held by central counterparties							
Financial liabilities and derivatives held by central counterparties	61,366.4	34,231.1	7,670.2	8,465.2	977.2	0	112,710.1
less financial assets and derivatives held by central counterparties	– 61,294.4	– 34,231.1	– 7,670.2	– 8,465.2	– 977.2	0	– 112,638.1
Cash inflow – derivatives and hedges							
Cash flow hedges	0	10.3	11.6	194.0	0		
Fair value hedges	0	0	0	0	0		
Derivatives held for trading	615.1	1,850.5	1,233.1				
Cash outflow – derivatives and hedges							
Cash flow hedges	0	– 10.1	– 54.5	– 207.4	0		
Fair value hedges	0	0	0	0	0		
Derivatives held for trading	– 615.3	– 1,806.4	– 1,204.4		0		
Total	**71.8**	**44.3**	**– 14.2**	**– 13.4**	**0**		

Maturity analysis of financial instruments (2)

	Contractual maturity						
	Sight	Not more than 3 months	More than 3 months but not more than 1 year	More than 1 year but not more than 5 years	Over 5 years	Reconciliation to carrying amount	Carrying amount
31 Dec 2020	€m	€m	€m	€m	€m	€m	€m
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	**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 liabilities and derivatives held by central counterparties	41,684.5	25,955.1[1]	12,970.0[1]	5,876.9[1]	1,031.6	0	87,518.1[1]
less financial assets and derivatives held by central counterparties	– 41,684.5	– 26,050.1[1]	– 12,970.0[1]	– 5,876.9[1]	– 1,031.6	0	– 87,613.1[1]
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	**0**	**– 237.2**	**– 33.4**	**– 2.1**	**0**		

1) Due to a correction of the previous year's figures, the financial instruments held by central counterparties decreased by in total €89.7 million.

25. 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 assess whether the possible obligation results from a past event, as well as evaluate the probability of a cash outflow and estimate its amount.

We recognise provisions for possible 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 19). 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 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 have already taken place) as well as expert opinions and evaluations of legal advisers. Losses may also arise from legal risks which are not highly probable, so that no provisions have been recognised. If the event is not completely improbable, the legal risks may have to be recognised as contingent liabilities. As neither the timing of these contingent liabilities nor the amount of any payment can be estimated reliably, any quantitative disclosure would not be a useful guide to possible future losses. For this reason, no figure is provided for contingent liabilities.

Detailed information about the legal disputes, which have been classified as contingent liabilities as of 31 December 2021 and for which consequently no provisions have been recognised, is part of these consolidated financial statements and included in the combined management report in the section risk management under the heading legal disputes and business practice.

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. We continuously review whether the conditions for recognising corresponding tax liabilities are met. These tax risks, that are also part of these consolidated financial statements,
are included under the caption business risks in the combined management report in the section risk management.

26. Corporate governance

On 8 December 2021 the Executive and Supervisory Boards issued the latest version of the declaration of compliance in accordance with section 161 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).

27. 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.

Business relationships with related parties

The following table shows transactions entered into within the scope of business relationships with non-consolidated companies of Deutsche Börse AG during the 2021 financial year. All transactions took place at standard market terms.

Transactions with related parties

	Amount of the transactions: revenue		Amount of the transactions: expenses		Outstanding balances: receivables		Outstanding balances: liabilities	
	2021 €m	2020 €m	2021 €m	2020 €m	31 Dec 2021 €m	31 Dec 2020 €m	31 Dec 2021 €m	31 Dec 2020 €m
Associates	17.4	18.6	–28.7	–29.4	1.9	1.9	–5.0	–2.2
Total sum of business transactions	**17.4**	**18.6**	**–28.7**	**–29.4**	**1.9**	**1.9**	**–5.0**	**–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 company's activities. The Group only defines the members of the Executive Board and Supervisory Board of Deutsche Börse AG who were active in the reporting period as key management personnel for the purposes of IAS 24. In the reporting year and the previous year, no material transactions took place with key management personnel.

Executive Board

In the reporting year the fixed and variable remuneration of the members of the Executive Board, including non-cash benefits granted in the financial year, amounted to €18.2 million (2020: €19.4 million). During the year under review, expenses of €3.5 million (2020: €6.0 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 €17.3 million as at 31 December 2021 (2020: €18.4 million). Expenses of €2.6 million (2020: €3.2 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 €6.5 million in 2021 (2020: €8.3 million). The actuarial present value of the pension obligations was €79.3 million as at 31 December 2021 (2020: €86.0 million).

Termination benefits

There were no changes in the membership of the Executive Board of Deutsche Börse AG in the reporting year 2021, therefore no expenses were incurred in 2021 (2020 €0.7 million).

Supervisory Board

The aggregate remuneration paid to members of the Supervisory Board in the reporting year was €2.6 million (2020: €2.5 million).

In financial year 2021 the employee representatives on Deutsche Börse AG's Supervisory Board received remuneration (excluding Supervisory Board remuneration) amounting to €1.3 million (2020: €0.8 million). The total consists of the fixed and variable salary components for those employee representatives.

28. Employees

Employees

	2021	2020
Average number of employees during the year	9,347	6,996
Employed at the reporting date	10,200	7,238
Employees (average annual FTEs)	8,855	6,528

Of the average number of employees during the year, 29 (2020: 28) were managing directors (not including the Executive Board), 484 (2020: 348) were other senior managers and 8,834 (2020: 6,620) were employees.

Including part-time staff there were 8,855 full-time equivalents (FTE) on average during the year (2020: 6,528). Please also refer to the section "Our employees" in the combined management report.

29. Decision-making bodies

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

30. Events after the end of the reporting period

Deutsche Börse AG has successfully placed a corporate hybrind bond in the amount of €500,0 million on 16 February 2022. The bond has a term of 26.25 years with a first call date after 6 years and a coupon of 2.0 per cent annually until June 2028.

The hybrid bond will be used to refinance last year's M&A activities.

31. Date of approval for publication

Deutsche Börse AG's Executive Board approved the consolidated financial statements for submission to the Supervisory Board on 28 February 2022. The Supervisory Board is responsible for examining the consolidated financial statements and stating whether it endorses them.

32. Disclosures on material non-controlling interests

Material non-controlling interests (1/2)

	European Energy Exchange Group Leipzig, Germany		Qontigo Group Frankfurt/Main, Germany	
	31 Dec 2021	31 Dec 2020	31 Dec 2021	31 Dec 2020
Attributable to non-controlling interests:				
Capital (%)	24.9	24.9	21.7	21.7
Voting rights (%)	37.2	37.2	21.7	21.7
Net profit for the period (in €m)	15.9	10.3	21.0	19.2
Equity (in €m)	150.4	130.7	181.6	161.0
Dividend payments (in €m)	4.0	4.0	16.2	13.3
Assets (in €m)	47,938.8	7,783.6	1,028.4	958.7
Liabilities (in €m)	47,335.0	7,258.7	208.1	216.9
Profit/loss (in €m)	63.9	41.2	96.6	88.5
Other comprehensive income (in €m)	14.7	– 32.7	59.7	– 66.6
Comprehensive income (in €m)	78.6	8.5	156.3	22.0
Cash flows (in €m)	81.9	33.5	– 8.7	7.7

Material non-controlling interests (2/2)

	ISS Group Rockville, USA		Crypto Finance Group Zug, Switzerland	
	31 Dec 2021	31 Dec 2020	31 Dec 2021	31 Dec 2020
Attributable to non-controlling interests:				
Capital (%)	18.8	n/a	33.3	n/a
Voting rights (%)	18.8	n/a	33.3	n/a
Net profit for the period (in €m)	3.1	n/a	0	n/a
Equity (in €m)	345.8	n/a	51.3	n/a
Dividend payments (in €m)	0	n/a	0	n/a
Assets (in €m)	2,435.8	n/a	166.8	n/a
Liabilities (in €m)	596.5	n/a	12.7	n/a
Profit/loss (in €m)	16.5	n/a	0.1	n/a
Other comprehensive income (in €m)	0	n/a	0	n/a
Comprehensive income (in €m)	16.5	n/a	0.1	n/a
Cash flows (in €m)	– 87.4	n/a	42.3	n/a

33. Disclosures on associates

Non-material associates

	31 Dec 2021 €m	31 Dec 2020 €m
Book value of non-material associates	**88.9**[1]	**89.5**
Profit after tax	19.3[1]	18.6
Other income	– 0.1[1]	0
Comprehensive income	**19.3**[1]	**18.6**

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

34. List of shareholdings

Deutsche Börse AG's equity interests in subsidiaries, associates and joint ventures as at 31 December 2021 included in the consolidated financial statements are presented in the following tables. There were no joint ventures as of the reporting date.

Consolidated subsidiaries (part 1)

Company	Domicile	Equity interest as at 31 Dec 2021 direct/(indirect) %
Börse Frankfurt Zertifikate AG	Frankfurt/Main, Germany	100.00
Clearstream Fund Centre AG	Zurich, Switzerland	100.00
Clearstream Fund Centre (Hong Kong) Limited	Hong Kong, Hong Kong	(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 Australia Nominees Pty Ltd. (dormant)	Sydney, Australia	(100.00)
Clearstream Banking Japan, Ltd.	Tokyo, Japan	(100.00)
Clearstream Fund Centre SA	Luxembourg, Luxembourg	(100.00)
Clearstream London Ltd. (dormant)	London, United Kingdom	(100.00)
REGIS-TR S.A.	Luxembourg, Luxembourg	(50.00)
Clearstream Global Securities Services Limited	Cork, Ireland	(100.00)
Clearstream International S.A.	Luxembourg, Luxembourg	(100.00)
LuxCSD 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)
Crypto Finance AG	Zug, Switzerland	66.67[1)]
Crypto Finance (Brokerage) AG	Zug, Switzerland	(66.67)
Crypto Finance (Infrastructure Services) AG	Zug, Switzerland	(66.67)
Crypto Finance (Asset Management) AG	Zug, Switzerland	(66.67)
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 UK Limited	Hounslow, United Kingdom	(72.60)
Quantitative Brokers Australia Pty Ltd	Sydney, Australia	(72.60)
Quantitative Brokers Singapore Pte Ltd.	Singapore, Singapore	(72.60)
Quantitative Brokers Software India Private Limited	Chennai, India	(72.24)
U.S. Exchange, L.L.C. (dormant)	Wilmington, USA	(100.00)
Deutsche Börse Photography Foundation gGmbH	Frankfurt/Main, Germany	100.00
Deutsche Börse Services s.r.o.	Prague, Czech Republic	100.00
Eurex Frankfurt AG	Frankfurt/Main, Germany	100.00
Eurex Clearing AG	Frankfurt/Main, Germany	(100.00)
Eurex 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

Consolidated subsidiaries (part 2)

Company	Domicile	Equity interest as at 31 Dec 2021 direct/(indirect) %
European Energy Exchange AG	Leipzig, Germany	75.05
EEX Asia Pte. Limited	Singapore, Singapore	(75.05)
EEX Australia Pty Ltd	Sydney, Australia	(75.05)
EEX Link GmbH	Leipzig, Germany	(75.05)
European Commodity Clearing AG	Leipzig, Germany	(75.05)
European Commodity Clearing Luxembourg S.à r.l.	Luxembourg, Luxembourg	(75.05)
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)
EEX CEGH Gas Exchange Services GmbH	Vienna, Austria	(38.27)
EPEX SPOT SE	Paris, France	(38.27)
EPEX Netherlands B.V.	Amsterdam, Netherlands	(38.27)
EPEX SPOT Schweiz AG	Bern, Switzerland	(38.27)
Power Exchange Central Europe a.s.	Prague, Czech Republic	(50.03)
ISS HoldCo Inc.	Rockville, USA	81.20
Institutional Shareholder Services Inc.	Rockville, USA	(81.20)
Asset International, Inc.	Rockville, USA	(81.20)
Asset International Financial Information UK Holdings Ltd.	London, United Kingdom	(81.20)
AI Financial Information UK Ltd.	London, United Kingdom	(81.20)
Asset International Australia Pty Ltd.	Melbourne, Australia	(81.20)
Rainmaker Information Pty Limited	Sydney, Australia	(81.20)
Data Management & Integrity Systems Pty Ltd.	Sydney, Australia	(81.20)
Financial Standard Pty Ltd	Sydney, Australia	(81.20)
Asset International Deutschland GmbH	Haar, Germany	(81.20)
FWW Fundservices GmbH	Haar, Germany	(81.20)
FWW Media GmbH	Haar, Germany	(81.20)
Intelligent Financial Systems Limited	London, United Kingdom	(81.20)
Matrix-Data Limited	London, United Kingdom	(81.20)
Discovery Data Holdings Inc.	Eatontown, USA	(81.20)
Discovery Data Inc	Eatontown, USA	(81.20)
Institutional Shareholder Services (Australia) Pty. Ltd.	Sydney, Australia	(81.20)
Institutional Shareholder Services (Hong Kong) Limited	Hong Kong, Hong Kong	(81.20)
Institutional Shareholder Services Canada Inc.	Toronto, Canada	(81.20)
ACRe Data Inc.	Oakville, Canada	(81.20)
Institutional Shareholder Services Europe S.A.	Brussels, Belgium	(81.20)
Institutional Shareholder Services France S.A.S	Paris, France	(81.20)
Institutional Shareholder Services Switzerland AG	Zurich, Switzerland	(81.20)

Consolidated subsidiaries (part 3)

Company	Domicile	Equity interest as at 31 Dec 2021 direct/(indirect) %
Institutional Shareholder Services Germany AG	Munich, Germany	(81.20)
Institutional Shareholder Services India Private Limited	Mumbai, India	(81.20)
Institutional Shareholder Services K.K.	Tokyo, Japan	(81.20)
Institutional Shareholder Services Philippines Inc.	Manila, Philippines	(81.20)
Institutional Shareholder Services (Singapore) Private Limited	Singapore, Singapore	(81.20)
ISS Corporate Solutions, Inc.	Rockville, USA	(81.20)
ISS Europe Limited	London, United Kingdom	(81.20)
ISS-Ethix AB	Stockholm, Sweden	(81.20)
Nordic Investor Services AB	Stockholm, Sweden	(81.20)
Institutional Shareholder Services UK Limited	London, United Kingdom	(81.20)
Securities Class Action Services, LLC	Rockville, USA	(81.20)
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[1]
Börse Berlin AG	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) Of which 59.98 per cent direct and 3.99 per cent indirect equity interest.

Associates

Company	Domicile	Equity interest as at 31 Dec 2021 direct/(indirect) %
360X AG	Frankfurt/Main, Germany	48.30
BrainTrade Gesellschaft für Börsensysteme mbH	Frankfurt/Main, Germany	(37.72)
China Europe International Exchange AG	Frankfurt/Main, Germany	40.00
Deutsche Börse Commodities GmbH	Frankfurt/Main, Germany	16.20
EMEX East Med. Energy Exchange Ltd.	Giv'atajim, Israel	(30.02)
enermarket GmbH	Frankfurt/Main, Germany	(30.02)
FundsDLT	Luxembourg, Luxembourg	17.91
HQLAx S.à r.l.	Luxembourg, Luxembourg	31.40
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

Responsibility statement by the Executive Board

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

Frankfurt/Main, 2 March 2022
Deutsche Börse AG

Theodor Weimer | Christoph Böhm | Thomas Book

Heike Eckert | Stephan Leithner | Gregor Pottmeyer

Independent Auditors' Report

To Deutsche Börse Aktiengesellschaft, Frankfurt am Main

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

Audit Opinions

We have audited the consolidated financial statements of Deutsche Börse Aktiengesellschaft, Frankfurt am Main, and its subsidiaries (the Group), which comprise the consolidated statement of financial position as at December 31, 2021, and the consolidated statement of comprehensive income, consolidated statement of profit or loss, consolidated statement of changes in equity, and consolidated statement of cash flows for the financial year from January 1 to December 31, 2021, and notes to the consolidated financial statements, including a summary of significant accounting policies. In addition, we have audited the group management report of Deutsche Börse Aktiengesellschaft, which is combined with the Company's management report, – which comprises the content included to comply with the German legal requirements as well as the non-financial statement pursuant to § [Article] 289b Abs. [paragraph] 1 HGB [Handelsgesetzbuch: German Commercial Code]and § 315b Abs. 1 HGB included in section "About this report" of the group management report – for the financial year from January 1 to December 31, 2021. In accordance with the German legal requirements, we have not audited the content of those parts of the group management report listed in the "Other Information" section of our auditor's report.

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

- the accompanying consolidated financial statements comply, in all material respects, with the IFRSs as adopted by the EU, and the additional requirements of German commercial law pursuant to § 315e Abs. 1 HGB and, in compliance with these requirements, give a true and fair view of the assets, liabilities, and financial position of the Group as at December 31, 2021, and of its financial performance for the financial year from January 1 to December 31, 2021, and
- the accompanying group management report as a whole provides an appropriate view of the Group's position. In all material respects, this group management report is consistent with the consolidated financial statements, complies with German legal requirements and appropriately presents the opportunities and risks of future development. Our audit opinion on the group management report does not cover the content of those parts of the group management report listed in the "Other Information" section of our auditor's report.

Pursuant to § 322 Abs. 3 Satz [sentence] 1 HGB, we declare that our audit has not led to any reservations relating to the legal compliance of the consolidated financial statements and of the group management report.

Basis for the Audit Opinions

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

Key Audit Matters in the Audit of the Consolidated Financial Statements

Key audit matters are those matters that, in our professional judgment, were of most significance in our audit of the consolidated financial statements for the financial year from January 1 to December 31, 2021. These matters were addressed in the context of our audit of the consolidated financial statements as a whole, and in forming our audit opinion thereon; we do not provide a separate audit opinion on these matters.

In our view, the matters of most significance in our audit were as follows:

❶ Recoverability of goodwill and other intangible assets

❷ Assessment of certain legal risks

Our presentation of these key audit matters has been structured in each case as follows:

① Matter and issue

② Audit approach and findings

③ Reference to further information

Hereinafter we present the key audit matters:

❶ Recoverability of goodwill and other intangible assets

① In the Company's consolidated financial statements goodwill and other intangible assets amounting in total to EUR 7,509.6 million (97% of total consolidated assets) are reported under the "Intangible assets" balance sheet item. Other intangible assets relate in particular to stock exchange licenses, brand names and customer relationships. Goodwill and other intangible assets are tested for impairment by the Company once a year and/or when there are indications of impairment to determine any need for write-downs. The carrying amount of the relevant cash-generating units (for the test of the goodwill including their carrying amount) is compared with recoverable amount in the context of the impairment test. The recoverable amount is generally calculated on the basis of fair value less costs of disposal. The present value of the future cash flows from the respective cash-generating unit or the groups of cash-generating units normally serves as the basis of valuation. Present values are calculated using discounted cash flow models. For this purpose, the adopted medium-term business plan of the Group forms the starting point which is extrapolated based on assumptions about long-term rates of growth. Expectations relating to future market developments and assumptions about the development of macroeconomic factors fair value also taken into account. The discount rate used is the weighted average cost of capital for the respective cash-generating units. The impairment test determined that no write-downs were necessary.

The outcome of this valuation is dependent to a large extent on the estimates made by the executive directors with respect to the future cash flows from the respective cash-generating units, the discount rate used, the rate of growth and other assumptions, and is therefore subject to considerable uncertainty. Against this background and due to the complex nature of the valuation, this matter was of particular significance in the context of our audit.

② As part of our audit, we initially assessed the methodology used for the purposes of performing the impairment test. After matching the future cash flows used for the calculation against the adopted medium-term business plan of the Group for the respective groups of cash-generating units, we analyzed in particular the material planning assumptions, compared the plans against analyst expectations and performed plan-actual and plan-plan analyses in order to assess the appropriateness of these plans. In addition, we assessed the appropriate consideration of the costs of Group functions and the appropriateness of the growth assumptions after the forecast period and of the assumed weighted average cost of capital. The Company's valuation was additionally verified by comparing the implied multiples with market multiples. In order to reflect the uncertainty inherent in the projections, we evaluated the sensitivity analyses performed by the Company and carried out our own sensitivity analyses for those cash-generating units with low headroom (carrying amount compared with the recoverable amount). Taking into account the information available, we determined that the carrying amounts of the cash-generating units (including the allocated carrying amounts for goodwill) were adequately covered by the discounted future cash flows.

Overall, the valuation methods, parameters and assumptions used by the executive directors are in line with our expectations and are also within the ranges considered by us to be reasonable.

③ The Company's disclosures on impairment tests of goodwill and other intangible assets are contained in note 10 "Intangible assets" to the consolidated financial statements.

2 Assessment of certain legal risks

1 Companies of the Deutsche Börse Group are exposed to certain legal risks. These specific legal risks include legal disputes involving Clearstream Banking S.A. in connection with the Iranian Central Bank in which Clearstream Banking S.A. sees itself exposed to surrender and compensation claims from the Iranian Central Bank amounting to USD 4.9 billion (plus interest) and claims from additional group of claimants, an action by the insolvency administrator for the assets of Air Berlin PLC i.I. against Clearstream Banking AG demanding payment of approximately EUR 498 million and an investigation relating to securities transactions by market participants beyond the dividend date (cum/ex transactions). The determination of whether or not a provision should be recognized to cover the risks, and if so, in what amount, is subject to a high degree of uncertainty. Deutsche Börse Group recognizes provisions if a current obligation arises from a past event which is likely to result in an outflow of funds and can be reliably estimated. No provisions are recognized in the consolidated financial statements as at December 31, 2021 for the aforementioned legal risks, as the executive directors do not believe an outflow of funds to be likely. In our view, due to their legal complexity, the aforementioned legal risks are of particular significance to our audit based on the significant uncertainty as to their further development and potential effects on the assets, liabilities, financial position and financial performance.

2 As part of our audit, we examined the underlying documents to the above-mentioned legal disputes and proceedings and analyzed the legal assessment of Deutsche Börse Group. With the knowledge that uncertainty results in an increased risk of accounting misstatements and that the executive directors' decisions have a direct effect on consolidated net profit, we assessed the executive directors' estimates with the assistance of our own specialists. Furthermore, we also held regular meetings with the Company's legal department in order to receive updates on current developments and understand the reasons for the corresponding estimates of the outcomes of the proceedings. The development of material legal risks, including executive directors' assessments as to their potential outcomes, was provided to us by the legal departments in writing. Furthermore, we obtained external legal confirmations and assessed legal opinions prepared by external attorneys as at the balance sheet date. The executive directors' estimates regarding the aforementioned matters and their presentation in the consolidated financial statements are sufficiently substantiated and documented.

3 The Company's disclosures relating to material legal risks are contained in note 24 "Financial obligations and other risks" to the consolidated financial statements as well as in the risk report in the Group management report.

Other Information

The executive directors are responsible for the other information. The other information comprises the following non-audited parts of the group management report:

- the statement on corporate governance pursuant to § 289f HGB and § 315d HGB included in the "Corporate governance statement" section of the group management report.
- the information on CO2 emissions classified as unaudited.

The other information comprises further

- the remuneration report pursuant to § 162 AktG [Aktiengesetz: German Stock Corporation Act], for which the supervisory board is also responsible
- all remaining parts of the annual report – excluding cross-references to external information – with the exception of the audited consolidated financial statements, the audited group management report and our auditor‘s report

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

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

- is materially inconsistent with the consolidated financial statements, with the group management report disclosures audited in terms of content or with our knowledge obtained in the audit, or
- otherwise appears to be materially misstated.

Responsibilities of the Executive Directors and the Supervisory Board for the Consolidated Financial Statements and the Group Management Report

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

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

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

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

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

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

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

We exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the consolidated financial statements and of the group management report, whether due to fraud or error, design and per-form audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our audit opinions. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal controls.
- Obtain an understanding of internal control relevant to the audit of the consolidated financial statements and of arrangements and measures (systems) relevant to the audit of the group management report in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an audit opinion on the effectiveness of these systems.
- Evaluate the appropriateness of accounting policies used by the executive directors and the reasonableness of estimates made by the executive directors and related disclosures.
- Conclude on the appropriateness of the executive directors' use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Group's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in the auditor's report to the related disclosures in the consolidated financial statements and in the group management report or, if such disclosures are inadequate, to modify our respective audit opinions. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Group to cease to be able to continue as a going concern.

- Evaluate the overall presentation, structure and content of the consolidated financial statements, including the disclosures, and whether the consolidated financial statements present the underlying transactions and events in a manner that the consolidated financial statements give a true and fair view of the assets, liabilities, financial position and financial performance of the Group in compliance with IFRSs as adopted by the EU and the additional requirements of German commercial law pursuant to § 315e Abs. 1 HGB.
- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Group to express audit opinions on the consolidated financial statements and on the group management report. We are responsible for the direction, supervision and performance of the group audit. We remain solely responsible for our audit opinions.
- Evaluate the consistency of the group management report with the consolidated financial statements, its conformity with German law, and the view of the Group's position it provides.
- Perform audit procedures on the prospective information presented by the executive directors in the group management report. On the basis of sufficient appropriate audit evidence we evaluate, in particular, the significant assumptions used by the executive directors as a basis for the prospective information, and evaluate the proper derivation of the prospective information from these assumptions. We do not express a separate audit opinion on the prospective information and on the assumptions used as a basis. There is a substantial unavoidable risk that future events will differ materially from the prospective information.

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

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

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

Other Legal and Regulatory Requirements

Report on the Assurance on the Electronic Rendering of the Consolidated Financial Statements and the Group Management Report Prepared for Publication Purposes in Accordance with § 317 Abs. 3a HGB

Assurance Opinion

We have performed assurance work in accordance with § 317 Abs. 3a HGB to obtain reasonable assurance as to whether the rendering of the consolidated financial statements and the group management report (hereinafter the "ESEF documents") contained in the electronic file "deutschebrseag-2021-12-31-de.zip" and prepared for publication purposes complies in all material respects with the requirements of § 328 Abs. 1 HGB for the electronic reporting format ("ESEF format"). In accordance with German legal requirements, this assurance work extends only to the conversion of the information contained in the consolidated financial statements and the group management report into the ESEF format and therefore relates neither to the information contained within these renderings nor to any other information contained in the electronic file identified above.

In our opinion, the rendering of the consolidated financial statements and the group management report contained in the electronic file identified above and prepared for publication purposes complies in all material respects with the requirements of § 328 Abs. 1 HGB for the electronic reporting format. Beyond this assurance opinion and our audit opinion on the accompanying consolidated financial statements and the accompanying group management report for the financial year from January 1 to December 31, 2021 contained in the "Report on the Audit of the Consolidated Financial Statements and on the Group Management Report" above, we do not express any assurance opinion on the information contained within these renderings or on the other information contained in the electronic file identified above.

Basis for the Assurance Opinion

We conducted our assurance work on the rendering of the consolidated financial statements and the group management report contained in the electronic file identified above in accordance with § 317 Abs. 3a HGB and the IDW Assurance Standard: Assurance Work on the Electronic Rendering, of Financial Statements and Management Reports, Prepared for Publication Purposes in Accordance with § 317 Abs. 3a HGB (IDW AsS 410 (10.2021)) and the International Standard on Assurance Engagements 3000 (Revised). Our responsibility in accordance therewith is further described in the "Group Auditor's Responsibilities for the Assurance Work on the ESEF Documents" section. Our audit firm applies the IDW Standard on Quality Management 1: Requirements for Quality Management in the Audit Firm (IDW QS 1).

Responsibilities of the Executive Directors and the Supervisory Board for the ESEF Documents

The executive directors of the Company are responsible for the preparation of the ESEF documents including the electronic renderings of the consolidated financial statements and the group management report in accordance with § 328 Abs. 1 Satz 4 Nr. [number] 1 HGB and for the tagging of the consolidated financial statements in accordance with § 328 Abs. 1 Satz 4 Nr. 2 HGB.

In addition, the executive directors of the Company are responsible for such internal control as they have considered necessary to enable the preparation of ESEF documents that are free from material non-compliance with the requirements of § 328 Abs. 1 HGB for the electronic reporting format, whether due to fraud or error.

The supervisory board is responsible for overseeing the process for preparing the ESEF documents as part of the financial reporting process.

Group Auditor's Responsibilities for the Assurance Work on the ESEF Documents

Our objective is to obtain reasonable assurance about whether the ESEF documents are free from material non-compliance with the requirements of § 328 Abs. 1 HGB, whether due to fraud or error. We exercise professional judgment and maintain professional skepticism throughout the assurance work. We also:

- Identify and assess the risks of material non-compliance with the requirements of § 328 Abs. 1 HGB, whether due to fraud or error, design and perform assurance procedures responsive to those risks, and obtain assurance evidence that is sufficient and appropriate to provide a basis for our assurance opinion.

- Obtain an understanding of internal control relevant to the assurance work on the ESEF documents in order to design assurance procedures that are appropriate in the circumstances, but not for the purpose of expressing an assurance opinion on the effectiveness of these controls.
- Evaluate the technical validity of the ESEF documents, i.e., whether the electronic file containing the ESEF documents meets the requirements of the Delegated Regulation (EU) 2019/815 in the version in force at the date of the consolidated financial statements on the technical specification for this electronic file.
- Evaluate whether the ESEF documents provide an XHTML rendering with content equivalent to the audited consolidated financial statements and to the audited group management report.
- Evaluate whether the tagging of the ESEF documents with Inline XBRL technology (iXBRL) in accordance with the requirements of Articles 4 and 6 of the Delegated Regulation (EU) 2019/815, in the version in force at the date of the consolidated financial statements, enables an appropriate and complete machine-readable XBRL copy of the XHTML rendering.

Further Information pursuant to Article 10 of the EU Audit Regulation

We were elected as group auditor by the annual general meeting on May 19, 2021. We were engaged by the supervisory board on April 8, 2021. We have been the group auditor of the Deutsche Börse Aktiengesellschaft, Frankfurt am Main, without interruption since the financial year 2021.

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

Reference to an other matter– use of the Auditor's Report

Our auditor's report must always be read together with the audited consolidated financial statements and the audited group management report as well as the assured ESEF documents. The consolidated financial statements and the group management report converted to the ESEF format – including the versions to be published in the Federal Gazette – are merely electronic renderings of the audited consolidated financial statements and the audited group management report and do not take their place. In particular, the "Report on the Assurance on the Electronic Rendering of the Consolidated Financial Statements and the Group Management Report Prepared for Publication Purposes in Accordance with § 317 Abs. 3a HGB" and our assurance opinion contained therein are to be used solely together with the assured ESEF documents made available in electronic form.

German Public Auditor Responsible for the Engagement

The German Public Auditor responsible for the engagement is Dr. Michael Rönnberg.

Frankfurt am Main, March 2, 2022
PricewaterhouseCoopers GmbH
Wirtschaftsprüfungsgesellschaft

sgd. Marc Billeb	sgd. Dr. Michael Rönnberg
Wirtschaftsprüfer	Wirtschaftsprüfer
(German Public Auditor)	(German Public Auditor)

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The annual report 2021 is both available in German and English.

The annual report 2021 of Deutsche Börse Group is available as pdf on the internet:
www.deutsche-boerse.com/annual _ report

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