DEUTSCHE BÖRSE GROUP

Annual report 2018

Excerpt: risk report

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Risk report

Deutsche Börse Group's core area of expertise includes solutions that enable its customers to efficiently manage risk and collateral. It is therefore all the more important for the Group to protect itself against risk. This section of the combined management report shows how the company deals with risks and threats. Deutsche Börse Group ensures a solid capital base at all times. The proportion of risk to risk-bearing capacity has slightly declined in the 2018 financial year. Whereas Deutsche Börse Group's risk rose by 9 per cent compared to the previous year, the risk-bearing capacity rose by 12 per cent. New risks arose mainly in the areas of taxes and cyber crime.

The first section of this risk report explains the risk strategy and demonstrates how Deutsche Börse Group manages its risk. In the second section of this risk report, approaches and methods employed for monitoring risk will be outlined. In the third section, the various types of risks the Group is exposed to are described and how the Group manages them. The fourth section provides a summary of the risk situation, together with an outlook on future developments for Deutsche Börse Group's risk management. Supplementing the risk report, senior management sets out what it believes the Group's future prospects are in the report on opportunities.

Deutsche Börse Group includes the following entities which are regulated as credit institutions: Clearstream Banking S.A. and Clearstream Banking AG (hereinafter referred to as "Clearstream", including Clearstream Holding AG), as well as Eurex Clearing AG. Furthermore, Eurex Clearing AG and European Commodity Clearing AG are authorised as central counterparties (CCPs) and subject to the requirements of the European Market Infrastructure Regulation (EMIR). In addition, other Group companies hold different licences to provide regulated activities in the financial services sector. As such, these entities are subject to comprehensive statutory requirements, inter alia on risk management (for further information on the regulated entities, please refer to note 15 to the consolidated financial statements). Over and above the statutory requirements of the EU directives (CRD IV and MiFID II) and their implementation into national law, other regulations worth mentioning include primarily EU regulations (CRR and EMIR), the national requirements of the Minimum Requirements for Risk Management (MaRisk) issued by the Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht, BaFin), and circular 12/552 issued by the Financial Supervisory Authority of Luxembourg (Commission de Surveillance du Secteur Financier, CSSF). In this context, significant parts of risk management are defined in the scope of the so-called second pillar of the Basel III regime for a number of the Group's companies. Moreover, national regulations implementing the EU Banking Recovery and Resolution Directive (BRRD) and the establishment of recovery plans apply to Clearstream and Eurex Clearing AG. Deutsche Börse Group follows international standards (e.g. COSO) in its risk management and applies these also without or beyond statutory requirements. Hence, the risk management adheres to high standards on a Group-wide level.

The highest regulatory standards within the Group are applicable to Eurex Clearing AG and Clearstream given their regulation as credit institutions. Considering this and their economic importance, this risk report focuses on these two subsidiaries in particular.

In the course of 2018, Deutsche Börse Group has increased its personnel both in central risk management and in the regulated subsidiaries Eurex Clearing AG and Clearstream.

With its range of risk management services, Deutsche Börse Group strives to make a sustainable contribution – primarily through its role as an organiser of capital markets, securing market integrity and security, and also by enhancing market efficiency in distribution, through its price discovery function. On top of this, Deutsche Börse Group assumes key risk management functions for its clients – for example, through a central counterparty (Eurex Clearing AG).

Risk strategy and risk management

Deutsche Börse Group's risk strategy is aligned with its business model and company strategy. The Group provides the infrastructure for reliable and secure capital markets, assists constructively in their regulation and plays a leading role in all of the areas in which it does business. Deutsche Börse Group's risk strategy is based on three core principles:

1. Risk limitation – protecting the company against liquidation and ensuring its continuing operation

"Capital exhaustion should not occur more than once in 5,000 years and an operating loss may not be generated more than once every hundred years." This means that one goal is to ensure a probability of 99.98 per cent or more that the total capital will not be lost within the next twelve months. Another objective is to guarantee for a probability of 99.0 per cent or more that Deutsche Börse will at least break even, expressed in terms of its EBITDA. In other words, this principle establishes how much risk the Group must be able to withstand while also determining its risk appetite.

2. Support for growth in the various business segments

"Risk management supports the business areas in expanding their business by working together to comprehensively identify and communicate risks." This principle aims to permit the Group to make informed strategic decisions within the scope of the risk appetite that it has defined.

3. Appropriate risk/return ratio

"The return on equity should exceed the cost of equity." Deutsche Börse Group has set itself the goal of ensuring that risk and return should be reasonably balanced, both for specific business areas in general and for individual regions, products and customers.

Internal risk management is based on the Group-wide detection and management of risk, which is focused on its risk appetite, see the "Interlocking business strategy and risk strategy" chart. Deutsche Börse AG's Executive Board has the overall responsibility and defines the framework for risk management throughout the Group. Under these Group-wide risk management requirements, each business segment and each regulated company is responsible for managing its own risk. This coordinated process ensures, for example, that the Group's and its companies' reaction to the simultaneous failure of several systems and their reaction to the failure of a single system are equally quick and effective.

Interlocking business strategy and risk strategy

Implementation in the Group's organisational structure and workflow

The risk strategy applies to the entire Deutsche Börse Group. Risk management functions, processes and responsibilities are binding for all Group employees and organisational units. To ensure that all employees are risk-aware, risk management is firmly anchored in the Group's organisational structure and workflows and is flanked by measures such as risk management training. The Executive Board is responsible for risk management overall, whereas within the individual companies it is the responsibility of the management. The boards and committees given below receive comprehensive and timely information on risks.

Deutsche Börse AG's Supervisory Board evaluates the effectiveness of the risk management system, its continuing development and oversees the monitoring of risks. The Supervisory Board has delegated the regular evaluation of the appropriateness and the effectiveness of the risk management system to the Risk Committee. The Risk Committee reviews the risk management system, its continuing improvement and oversees the monitoring of risks. In addition, it examines the risk strategy and risk appetite on an annual basis.

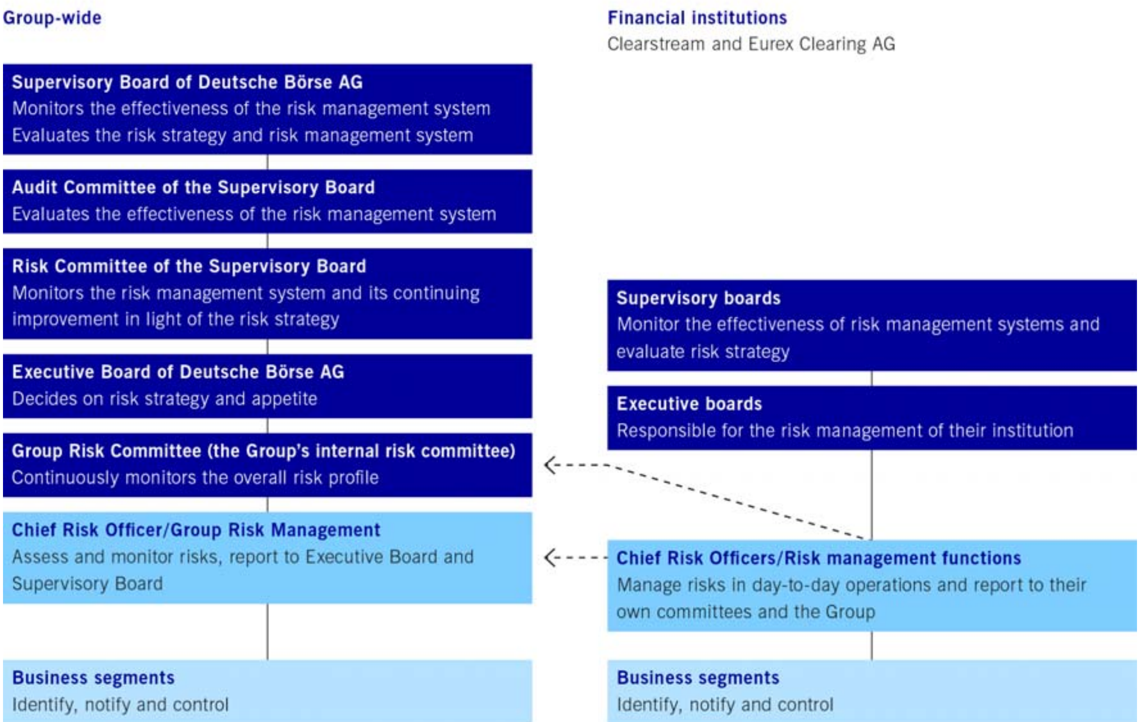
Deutsche Börse AG's Executive Board determines the Group-wide risk strategy and risk appetite and allocates the latter to the company's individual business segments and business units, respectively. It ensures that the Group's risk appetite is and remains compatible with its short- and long-term strategy, business and capital planning, risk-bearing capacity and remuneration systems. The Executive Board of Deutsche Börse AG also determines what parameters are used to assess risks, how risk capital is allocated and what procedures apply. It ensures that all business units comply with these requirements for the risk strategy, risk appetite and risk limits.

The Group Risk Committee (GRC) reviews the risk position of the Group every two months and involves the Executive Board in all decisive questions. The GRC is an internal Group committee, chaired by the Chief Financial Officer. In addition, the GRC regularly checks the levels of all parameters for appropriateness and current status and, where necessary, makes recommendations to the Chief Risk Officer (CRO) or the Executive Board, as to any adjustments that should be made.

Group Risk Management (GRM) is headed by the CRO. This unit prepares the proposals to be adopted for risk levers, i.e. the Group's risk strategy, risk appetite, parameters, capital allocation and procedures. GRM continuously analyses and evaluates risks and produces quantitative and qualitative reports. These are submitted six times a year to the GRC, once a month to the Executive Board, once a quarter to the Risk Committee of the Supervisory Board and twice a year to the Supervisory Board. This system means that the responsible bodies can regularly check whether the defined risk limits are being adhered to consistently. In addition, GRM recommends risk management measures.

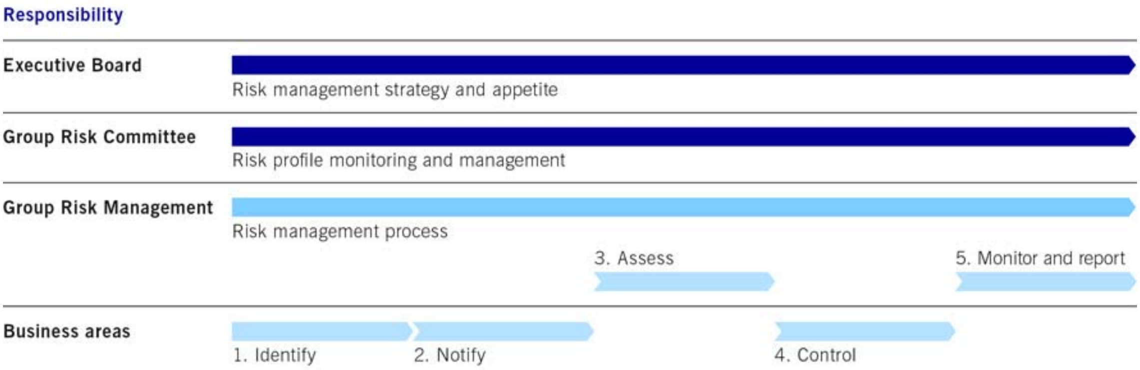
The Group's regulated subsidiaries act in the same way, always ensuring that they meet the requirements of the Group. In particular, they adhere to the risk appetite framework allocated to them by Deutsche Börse Group. The relevant supervisory boards and their committees are involved in the process, as are the executive boards and the risk management functions within the various business areas. Clearstream and Eurex Clearing AG implement customised versions of this risk strategy, using parameters and reporting formats that are compatible with the overarching Group-wide structure.
In general, the management of the subsidiary bears the responsibility for its risk management and is controlled by the supervisory board of the institute.

Risk management – organisational structure and reporting lines



Centrally coordinated risk management – a five-stage process
Risk management is implemented in a five-stage process. The objective is to identify all potential losses in good time, to record them centrally and to evaluate them in quantitative terms as far as possible; if necessary, management measures must then be recommended and their implementation monitored (see the "The five-stage risk management system" chart). The first stage identifies the risks and the possible causes of losses or operational hitches. In the second stage, the business areas regularly – or immediately, in urgent cases – report to GRM the risks that they have identified and quantified. In the third stage, GRM assesses the risk exposure, while in the fourth stage, the business areas manage the risks by avoiding, mitigating or transferring them, or by actively accepting them. The fifth and final stage involves, for example, monitoring different risk metrics and, where necessary, informing the responsible Executive Board members and committees of significant risks, their assessment and possible emergency measures. In addition to its regular monthly and quarterly reports, GRM compiles ad hoc reports for members of the executive and supervisory boards. The risk management functions at Clearstream and Eurex Clearing AG submit reports to the respective executive boards and supervisory boards. Internal Audit is responsible for monitoring compliance with the risk management system.

The five-stage risk management system



Approaches and methods for risk monitoring

Deutsche Börse Group uses quantitative and qualitative approaches and methods for risk monitoring, with the objective of providing as complete a picture as possible of its risk situation at all times. To this end, the Group continuously reviews internal events with regard to their risk properties, while also considering regional as well as global developments. The Group is thus able to recognise and analyse existing risks; at the same time, it is able to swiftly and adequately respond to emerging risks, as well as to changes in the market and the business environment.

Existing risks
Deutsche Börse Group employs a range of tools to monitor and evaluate its operational, financial and business risk on a continuous basis. The risks are quantified on different confidence levels using the concept of value at risk (VaR). This quantification takes into account the liquidation principle and the going-concern principle. Furthermore, the regulatory capital requirements for Eurex Clearing AG and Clearstream are calculated with regard to the above-mentioned risks. Moreover, so-called stress tests are carried out in order to simulate extreme, yet plausible, events and their impact upon the Group's risk-bearing capacity. Another approach to risk monitoring, which serves as an early warning system for

quantified and non-quantified in-house risks, is complementary risk metrics. These risk metrics are based on IT and security risks, potential losses, credit, liquidity and business risks.

Risk measurement

The required economic capital (REC) in accordance with the liquidation principle and the regulatory capital (RC) for credit institutions within Deutsche Börse Group are calculated. Earnings at risk (EaR) are also calculated to monitor adherence to the going concern principle.

1. Liquidation principle: what risk can the capital cover?

The first part of Principle 1 of its risk strategy specifies that Deutsche Börse Group should not exhaust its risk-bearing capacity in more than 0.02 per cent of all years. For Clearstream and Eurex Clearing AG, REC calculated in this manner also complies with the requirements of the second pillar of Basel III. Deutsche Börse Group determines its risk-bearing capacity on the basis of its reported equity in accordance with International Financial Reporting Standards (IFRSs). It adjusts this figure for precautionary reasons, for example, to take into account the fact that it may not be possible to dispose of intangible assets at their carrying amounts in cases of extreme stress. Clearstream and Eurex Clearing AG determine their risk-bearing capacity on the basis of their regulatory capital (for details, see note 15 to the consolidated financial statements).

For management purposes, GRM regularly determines the ratio of the REC to the risk-bearing capacity. This indicator is known as the utilisation of risk-bearing capacity and it answers a key risk management question: how much risk can the Group afford and what risk is it currently exposed to? The ratio of REC to risk-bearing capacity remained within the stipulated maximum risk throughout the reporting period. If this were not the case, the Group would in a worst-case scenario exhaust its entire risk-bearing capacity and would have to be liquidated ("gone concern").

2. Going-concern principle: what risks can be absorbed by earnings?

Deutsche Börse Group employs the going-concern principle, which assumes an orderly continuation of the Group and uses EaR as an indicator. This indicator corresponds to the second part of Principle 1 of the Group's risk strategy, i.e. that an operating loss equal to the earnings before interest, tax, depreciation and amortisation (EBITDA) may occur no more than once in a hundred years. In other words, there should be a probability of 99.0 per cent or more that Deutsche Börse should at least break even (net profit/loss expressed in terms of EBITDA). Under the going-concern principle, EaR determined in this way is compared with the Group's risk appetite – which is, in turn, measured in terms of projected EBITDA. EaR are calculated and monitored for Eurex Clearing AG and Clearstream Holding AG with the same objective.

3. Regulatory capital requirements

Clearstream and Eurex Clearing AG must calculate their capital requirements for various risk types (see the "Deutsche Börse Group's risk profile" chart) in line with the Pillar I requirements under Basel III. In addition, Eurex Clearing AG must fulfil EMIR requirements. A standardised approach is used for analysing and evaluating credit and market risk; risk weightings for counterparty credit risk are applied on the basis of the relevant counterparty ratings.

Deutsche Börse Group's risk profile

The approach taken for operational risk is different for Eurex Clearing AG and Clearstream: Clearstream has used the advanced measurement approach (AMA) for this in all business units since 2008. This means that it meets the regulatory capital requirements for operational risk set out in the EU's Capital Requirements Regulation (CRR). Similar to REC calculations, the model employed was fundamentally revised and improved in 2016. According to the method – which has been approved and is regularly tested by BaFin – the regulated units calculate the required capital. In contrast, Eurex Clearing AG employs the basic indicator approach in order to calculate regulatory capital requirements (for details, see note 15 to the consolidated financial statements).

Stress tests

Stress tests are being carried out in order to simulate extreme, yet plausible, events for all material types of risk. Using both hypothetical as well as historical scenarios, stress tests simulate the occurrence of extreme losses, or an accumulation of large losses, within a single year. In addition, liquidity risk is evaluated by way of liquidity stress tests as well as so-called inverse stress tests; the latter analyses which loss scenarios would exceed the risk-bearing capacity.

Risk metrics

Risk metrics are used to quantify the exposure to the most important internal operational risks against set limits. They are complementary to the VaR approach and serve to monitor other factors as well as non-quantifiable risks. Any breach of these limits serves as an early warning signal, which is reported to the Executive Board and other boards and committees on a monthly basis. Furthermore, any such breach immediately triggers the requisite risk mitigation processes.

Emerging risks

With regard to risk management, Deutsche Börse Group pursues a sustainable, long-term strategy by also evaluating risks beyond a twelve-month horizon. For this purpose, the Group has developed so-called risk maps tailored specifically for expected or upcoming regulatory requirements and IT and information security risks. In addition, other operational and financial risks are also assessed beyond a twelve-month period. The risk maps categorise the risks according to their likelihood of occurrence as well as by their potential financial loss. The probability of occurrence is broken down into four categories: unlikely (less than 1 per cent), possible (between 1 and 10 per cent), probable (from 10 to 50 per cent) and almost certain (between 50 and 100 per cent). The estimated financial impact is also divided into categories:

low (up to €20 million), substantial (between €20 million and €100 million) and critical (over €100 million). The observation period is five years and is based on the development period of the operational risks relevant to Deutsche Börse Group, namely, regulation and IT. Typically, regulatory requirements evolve over a period of up to five years, from the first draft to implementation. This horizon is also appropriate for the evaluation of IT risks, given that technology is subject to ongoing change.

Long-term developments
For Deutsche Börse Group, risks that prevail throughout longer consideration periods mainly comprise the failure to respond to global changes in, or mega-trends on, the financial markets and the business environment, or a late response to such developments. In order to compensate for such risks, Deutsche Börse Group aspires to think ahead and to set standards applicable throughout the industry. The Group pursues its targets by promoting mutual exchange with regulators and market participants (e.g. white papers). A further trend worth noting is the potential of start-up companies to come up with innovations that may have a disruptive effect upon markets. Deutsche Börse Group not only actively invests in such enterprises, through its DB1 Ventures subsidiary, it also offers them a platform. Deutsche Börse Venture Network® provides an opportunity to exchange ideas and experience, and also to find investors.

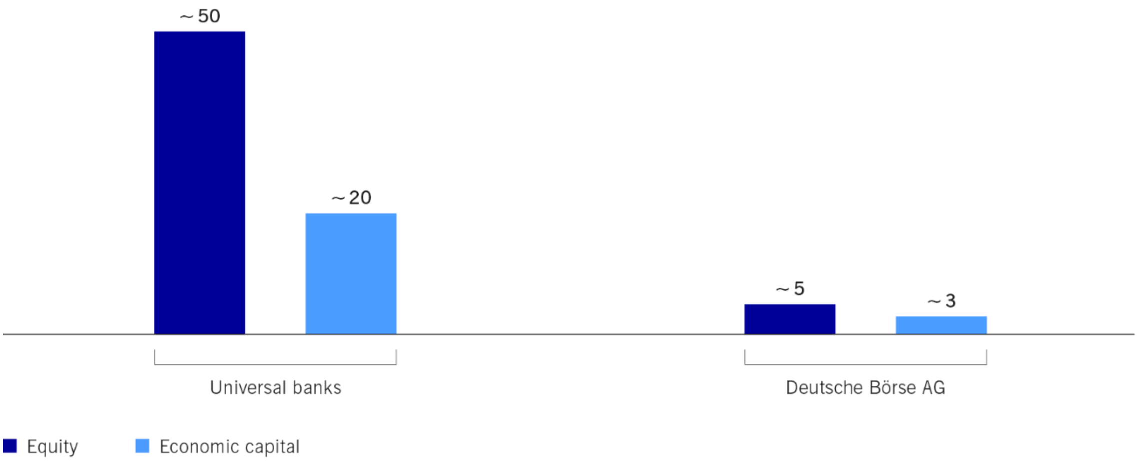
Risk description

The following section describes the types of risk that Deutsche Börse Group generally has to manage and presents the risks it actually faces. It also explains the measures that Deutsche Börse Group uses to reduce the loss event and to minimise their financial effects. Firstly, however, what follows is a brief explanation of the risk profile, which differs from most other financial services providers, since financial risk plays a comparatively lesser role for Deutsche Börse Group.

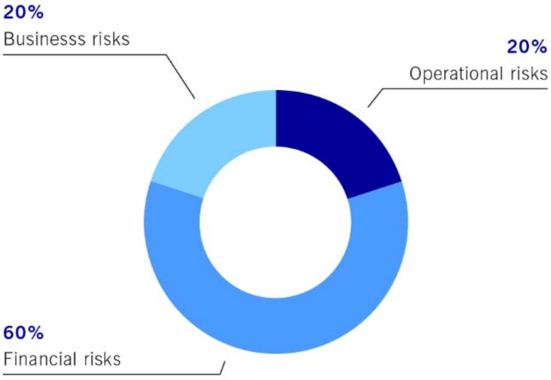
Risk profile
The risk profiles of Deutsche Börse Group differ fundamentally from those of other financial services providers. Unlike banks, Deutsche Börse Group has a low risk profile due to its low level of financial risk. Economic capital and balance sheet equity are also lower than that of banks (see the “Risk profile of Deutsche Börse Group in comparison to German universal banks” chart). Deutsche Börse Group differentiates between the three standard types of risk: operational risk, financial risk and business risk. Project risk also exists but the Group does not specifically quantify these as their impact is already reflected in the three traditional risk types. The majority of risks are operational risks (see the “Required economic capital for German universal banks by risk type” and “Required economic capital for Deutsche Börse Group by risk type” charts).

Risk profile of Deutsche Börse Group in comparison to German universal banks

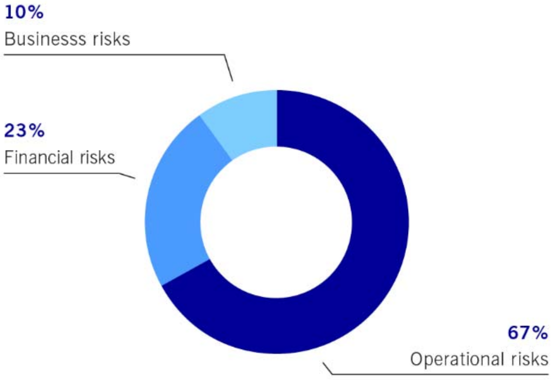
€ billion



Required economic capital for German universal banks by risk type



Required economic capital for Deutsche Börse Group by risk type



Operational risk greater than financial and business risk

Risk-bearing capacity in terms of the liquidation principle and risk appetite under the going-concern principle are used as internal management indicators throughout Deutsche Börse Group (see the “Approaches and methods for risk monitoring” section for an explanation of these terms). In addition to the financial and operational risk already mentioned, business risk is also identified and assessed. This relates in particular to potential threats to revenue such as price pressure or loss in market share, as well as cost risks. Under the liquidation principle, financial risk amounts to approximately 23 per cent of Deutsche Börse Group’s total risk, while business risk represents 10 per cent of the total. This makes the third typical risk type all the more important for Deutsche Börse Group: at 67 per cent, operational risk accounts for two-thirds of the total risk following the liquidation principle. The overwhelming majority of Deutsche Börse Group’s regulatory capital requirements arise from operational risks. The capital requirements of other subsidiaries are also described in note 15 to the consolidated financial statements.

A larger part of the risk is associated with the Clearstream (post-trading) and Eurex (financial derivatives) segments (see the table “Required economic capital by segment as at 31 December 2018”), in keeping with the proportion of sales revenue and earnings accounted for by their business.

Required economic capital by segment as at 31 December 2018

	Required economic capital €m	Risk cover amount €m	Utilisation %
Eurex (financial derivatives)	917.0	1,640.0	56
EEX (commodities)	158.0	311.0	51
360T (foreign exchange)	33.0	72.0	46
Xetra (cash equities)	233.0	300.0	78
Clearstream (post-trading)	806.0	1,257.0	64
IFS (investment fund services)	74.0	115.0	64
GSF (collateral management)	83.0	135.0	61
STOXX (index business)	114.0	141.0	81
Data (data business)	155.0	198.0	78
Total	**2,573.0**	**4,619.0**	**56**

The required economic capital includes the following risk types, which are illustrated with specific examples and then explained in detail:

1. Operational risk
- Failure of a trading system
- Cyber attacks
- Incorrect processing of client instructions (e.g. corporate actions)
- Incorrect handling of the default of a large customer
- Losses from ongoing legal disputes
- Conflicting laws of different jurisdictions
- Threat of tax back-payments

2. Financial risk
- Default of a credit counterparty
- Losses of on-balance sheet and off-balance sheet assets and liabilities, due to market price fluctuations
- Default by a customer and an associated liquidity squeeze

3. Business risk
- Market share loss in European trading markets
- The return of the European government debt crisis
- Implementation of a financial transaction tax

Risks which could jeopardise the Group’s continued existence could arise only from a combination of extreme events that have a very low probability:

- Failure of a trading system over several days in a highly volatile market environment
- Simultaneous default of multiple large banks with systemic relevance
- Successful serious abuse of banking applications through a coordinated cyber attack

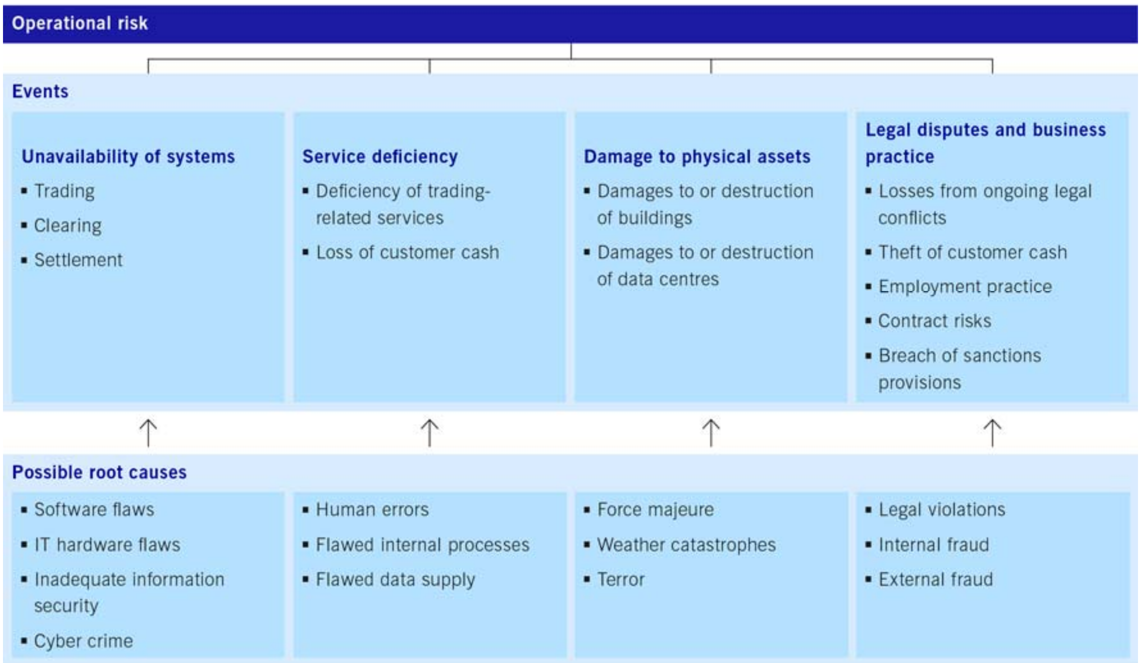
- Failure of key infrastructure providers in extreme market conditions associated with failure of lines of defence

These extreme events that could lead to a loss corresponding to more than 100 per cent of annual EBITDA are rated as having a probability of far less than 0.1 per cent. Such extreme events, also known as “tail risks”, have not occurred to date. Tail risks can turn into existential threats for certain subsidiaries, for example, when sanctions are intentionally violated. GRM assesses these risks continuously and reports the results regularly to the Executive Board of Deutsche Börse Group.

Operational risk

For Deutsche Börse Group, operational risk comprises, in particular, the unavailability of systems, service deficiency, damage to physical assets as well as legal disputes and business practice (see the “Operational risk at Deutsche Börse Group” chart). Human resources risks are quantified just like other operational risks. Operational risk accounts for 67 per cent of the total Group risk.

Operational risk at Deutsche Börse Group



Unavailability of systems

Operational resources such as the Xetra® and T7® trading systems are essential for the services offered by Deutsche Börse Group. They should never fail in order to ensure that market participants can trade securities or derivatives at any time and without delay. The Group therefore calculates the availability of these systems as an important risk indicator. In line with the Group’s risk strategy, the business areas are responsible for monitoring the indicators.

The longer the downtime for one of these systems, the larger the potential loss. An outage could be caused by software or hardware issues, or in unlikely cases, the availability of the systems could be affected by acts of cyber crime or a terrorist attack. In the past, only limited failures have occurred with Xetra and T7 and its predecessor system. In practice, there has never been a system failure lasting longer than one day. Deutsche Börse Group has taken a number of measures to further minimise the risk of failure lasting an entire day or longer. This supports the view that the probability of such a system failure lasting a week in an extremely volatile market is very low. However, the potential financial effect of such an event could be significant if claims are justified and asserted.

In general, availability risk represents the largest operational risk for Deutsche Börse Group. The Group therefore subjects its systems to regular tests that simulate not only what happens when its own systems fail but also when suppliers fail to deliver.

Service deficiency

Risks can also arise if a service provided to a customer is inadequate and this leads to complaints or legal disputes. One example would be errors in the settlement of securities transactions due to defective products and processes or mistakes in manual entries. Collateral liquidation errors in the event of the default of a large clearing customer are another example. Such errors have not occurred to date in the rare case of a failure. Related processes are tested at least annually, which is why the probability is considered to be very low. The potential financial loss is put at medium.

Other sources of error may be attributable to suppliers or to product defects or mistakes that may lead to the loss of client assets or mistakes in accounting processes. The Group registers all complaints and formal objections as a key indicator of deficient processing risk.

Damage to physical assets

Natural disasters, accidents, terrorism or sabotage are other operational risks that could, for example, cause the destruction of, or severe damage to, a data centre or office building. Business continuity management (BCM) aims at averting significant financial damage (see the “Business continuity management” chart).

Legal disputes and business practice

Losses can also result from ongoing legal proceedings. Deutsche Börse judges the probability that this operational risk will occur to be medium, although the losses involved could be substantial. As a result, GRM continually monitors ongoing legal proceedings. These can be brought if Deutsche Börse Group breaches laws or other requirements, enters into inadequate contractual agreements or fails to monitor and observe case law to a sufficient degree. Legal risk also includes losses due to fraud and labour law issues. This could entail, for example, losses resulting from insufficient anti-money laundering controls, breaches of competition law or banking secrecy. Such operational risks can also arise if government sanctions are not observed, e.g. in case of conflicting laws of different jurisdictions or in the event of breaches of other governmental or overarching regulations.

In its 2012 corporate report, Deutsche Börse Group provided information about Peterson vs Clearstream Banking S.A., the first Peterson proceeding. This class action lawsuit was initiated by various plaintiffs seeking to have certain customer positions held in Clearstream Banking S.A.'s securities omnibus account with its US depository bank, Citibank NA, turned over and asserting direct claims against Clearstream Banking S.A. for damages of US$250 million. The matter was settled between Clearstream Banking S.A., and the plaintiffs and the direct claims against Clearstream Banking S.A. were abandoned.

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

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

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

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

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

Markazi was a party. The claim also addresses customer assets of approximately US$2 billion, which include assets that are held at Clearstream Banking S.A. and currently subject to US and Luxembourg litigation brought by US plaintiffs, addressing assets that were previously transferred out of Clearstream Banking S.A. to Banca UBAE S.P.A.

On 15 June 2018, Banca UBAE S.p.A. filed a complaint against Clearstream Banking S.A. in front of the Luxembourg courts. The complaint is a recourse action linked to the complaint that Bank Markazi filed against Clearstream Banking S.A. and Banca UBAE S.p.A. on 17 January 2018 and asks that Banca UBAE S.p.A. be indemnified and held harmless by Clearstream Banking S.A. in case it were to lose in the Bank Markazi complaint and ordered by the court to pay damages to Bank Markazi.

On 26 December 2018, two US plaintiffs filed a complaint naming Clearstream Banking S.A. and other entities as defendants. The plaintiffs hold claims against Iran and Iranian authorities and persons amounting to approximately US$28.8 million. The complaint in this case (Levin vs Clearstream Banking S.A.) is based on similar assets and allegations as in the second Peterson case and the Havlish case. The complaint seeks turnover of certain assets that Clearstream Banking S.A. holds as a custodian in Luxembourg. The complaint also asserts direct claims against Clearstream Banking S.A. and other defendants and purports to seek damages of up to approximately US$28.8 million plus punitive damages and interest.

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

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

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

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

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

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

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

Despite the ongoing proceedings described above, the Executive Board is not aware of any material changes to the Group's risk situation.

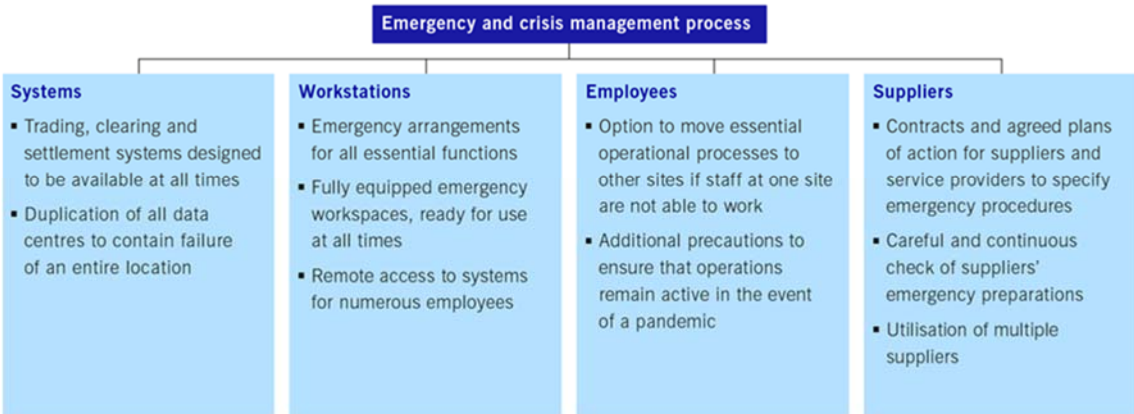
Measures to mitigate operational risk

Deutsche Börse Group takes specific measures to reduce its operational risk. Among them are emergency and contingency plans, insurance policies, measures concerning information security and the physical safety of employees and buildings as well as precautions to ensure that the applicable rules are observed (compliance).

Emergency and contingency plans

It is essential for Deutsche Börse Group to provide its products and services as reliably as possible. The Group has to maintain its business operations and safeguard against emergencies and disasters. If its core processes and resources are not available, this represents not only a substantial risk for the entire Group but also even a potential systemic risk for the financial markets in general. As a result, Deutsche Börse Group has set up a system of emergency and disaster plans covering the entire Group (business continuity management, BCM). This covers all processes designed to ensure continuity of operations in the event of a crisis and significantly reduces availability risk. Measures include precautions relating to all important resources (systems, workstations, employees, suppliers), including the redundant design of essential IT systems and the technical infrastructure, as well as emergency measures designed to mitigate the unavailability of employees or workspaces in core functions at all important locations. Examples of such precautions are listed in the "Business continuity management" chart.

Business continuity management



Preparations for emergencies and crises

The Group has introduced and tested a management process for emergencies and crises that enables it to respond quickly and in a coordinated manner. This is intended to minimise the effects on business processes and on the market and to enable a quick return to regular operations. All business segments have appointed emergency managers to act as central contacts and take responsibility during emergencies and crises. The emergency managers inform the Executive Board or raise the alarm with them in the case of severe incidents. In the event of a crisis, the Executive Board member responsible for the affected business acts as the crisis manager. The emergency and contingency plans are tested regularly by realistically simulating critical situations. Such tests are generally carried out unannounced. The test results are evaluated based on the following criteria:

- Functionally effective: the measures must be technically successful.
- Executable: the employees must be familiar with the emergency procedure and be able to execute it.
- Timely: emergency measures must ensure that operations restart within the intended time period.

Information security

Attacks on information technology systems and their data – especially due to cyber crime – represent operational risks for Deutsche Börse Group, which is continuously confronted with rising threats in this respect, as are other financial services providers and the entire sector. Unauthorised access, change and loss of information, as well as non-availability of information and services, may all arise as a result of these attacks (such as phishing, distributed-denial-of-service/DDoS and ransomware attacks). Please note that there was no successful attack on Deutsche Börse Group's core systems in 2018.

In order to maintain the Group's integrity as a transaction services provider and mitigate and control the risks, Deutsche Börse is continuously implementing measures to increase information security. The aim is to proactively boost the robustness of procedures, applications and technologies against cyber crime in such a way that they are adjusted to the threatening situation and regulatory requirements at an early stage. The foundation for this is formed by an Information Security Management System (ISMS), together with specific control measures based on the established international information security standards ISO/IEC 27000.

The Information Security function checks that the information security and risk management requirements are adhered to; it also monitors the systemic integration of (and adherence to) security standards within the scope of product and application development.

The Group operates a situation centre (Computer Emergency Response Team, CERT), which detects and assesses threats from cyber crime at an early stage in cooperation with national and international financial intelligence units and coordinates risk mitigation measures in cooperation with the business units.

Information Security operates an extensive Group-wide programme designed to raise staff awareness for the responsible handling of information and to improve staff conduct in this aspect. All in all, Deutsche Börse Group's security approach includes overall measures in accordance with ISO 27000 covering both the development phase and the operational phase.

Furthermore, Deutsche Börse Group has been a full member of national associations (Cyber Security Sharing and Analytics, CSSA), trade associations (World Federation of Exchanges) and international networks (Financial Services Information Sharing and Analysis Center, FS-ISAC), which contribute significantly towards a forward-looking stance vis-à-vis cyber threats and the development of strategies to fend off such threats.

Physical security
Deutsche Börse Group places great importance on physical security issues due to the constant change in global security risks and threats. Corporate Security has developed an integral security concept to protect the company, its employees and values from internal and external attacks and threats – in a proactive as well as reactive manner. Highly qualified analysts are continuously assessing the security situation at Deutsche Börse Group's locations and are in close contact with authorities (Federal Criminal Police Office – BKA, Federal Office for the Protection of the Constitution – BVf, etc.), security services providers, and security departments of other companies. Multi-level security processes and controls ensure physical safety at the Group's locations. Physical access to buildings and values is monitored permanently based on the access principle of "least privilege" (need-to-have). Penetration tests, inter alia, are carried out on a regular basis to verify the efficiency and effectiveness (as well as the quality) of the security processes at the locations.

In an increasingly competitive global market environment, access to know-how and confidential company information could turn into a potential major financial advantage to outsiders or competitors. Deutsche Börse applies state-of-the-art technology to prevent its knowledge from being obtained illegally, e.g. through wiretapping.

Furthermore, Corporate Security is tasked with providing support to employees while they are travelling or on foreign assignment, i.e. protecting them from risks in the areas of crime, civil unrest, terrorism and natural disasters. In this context, a worldwide travel security programme was established which guarantees a risk assessment before, during and after travelling, supported by a travel-tracking system and a central 24/7 emergency telephone number.

Insurance policies

Operational risks that Deutsche Börse Group cannot or does not wish to bear itself are transferred to insurance companies if this is possible at a reasonable price. The insurance policies are checked individually and approved by Deutsche Börse AG's Chief Financial Office.

Compliance

Compliance at Deutsche Börse Group is responsible for supporting the individual legal entities in ensuring that regulatory requirements are observed and generally protecting the Group against financial and non-financial risks, such as reputational damage in the markets it serves, in cooperation with supervisory authorities and the general public. Although Group Compliance operates independently of the business units, it still fulfils the task of enabling business areas to establish business relationships, while focusing on the clients and markets the Group wants to serve. Compliance has to take the steps necessary to systematically and pre-emptively mitigate compliance risks, which requires both the identification of compliance risks and a risk-based assessment of the appropriate measures.

Deutsche Börse Group pursues an enterprise-wide approach to its compliance function, ensuring that applicable laws and regulatory requirements are followed by individual Group entities. Under applicable law, the compliance functions of the individual Group entities report to the respective member of the Executive Board responsible for Compliance. Moreover, the compliance functions and their staff report directly to the Group Chief Compliance Officer via a uniform reporting structure. Wherever possible, Deutsche Börse Group's compliance follows a synergistic and holistic approach by applying Group-wide compliance regulations and standards to ensure that the related concepts permeate throughout the Group.

Deutsche Börse Group's compliance function has been consistently strengthened over recent years. During the course of 2018, the Group significantly increased its Compliance personnel in major offices around the world, with the objective of coordinating and enhancing the strength of the individual business segments' compliance function and integrating Compliance officers with the control functions of the individual business segments and other control functions, as required by supervisory bodies. This close alignment strengthened the second line of defence. In order to be able to act pre-emptively and to mitigate the compliance risks referred to above, the Group continues to invest into the acquisition and further development of IT tools. This provides a validated data inventory, which enables the Group to consistently and appropriately respond to compliance risk. In 2018, the focus was on standardising and digitalising the compliance processes that impact the relevant business units. Deutsche Börse Group also improved its due diligence procedures with respect to clients, market participants, counterparties and business partners.

Group Compliance continuously promotes legally compliant and ethically correct conduct, as well as integrity amongst all Deutsche Börse Group employees. For instance, staff have been made aware of (and enhanced emphasis has been placed on) compliance-relevant aspects throughout the respective business units and Deutsche Börse Group's regulatory required control functions. The new code of business conduct comprises the aforementioned activities and creates a holistic regulatory environment for Deutsche Börse Group.

Over the last few years, Deutsche Börse Group has devoted itself to the development of market-leading compliance standards. The Group promotes and reflects these standards across its entire product-related value creation chain, particularly from the perspective of a leading global provider of financial markets infrastructure. At the end of 2018, Deutsche Börse AG decided to align its compliance management system with the globally recognised ISO 19600 standard. This is a crucial next step designed to exploit Group-wide synergies and go beyond the scope of supervisory requirements. These efforts will continue in 2019. A special focus lies on compliance monitoring and controls based on a Group-wide procedural approach.

Financial risk

Deutsche Börse Group classifies its financial risk into credit, market and liquidity risk (see the "Financial risk at Deutsche Börse Group" chart). At Group level, these risks account for about 23 per cent of the entire risk profile (this information only includes credit and market risk; liquidity risk is not quantified as part of the REC; see note 25 to the consolidated financial statements). They primarily apply to the Group's institutions. As a result, the following explanation focuses on Clearstream and Eurex Clearing AG.

Financial risk at Deutsche Börse Group

Credit risk

Credit risk describes the danger that a counterparty might not meet its contractual obligations, or not meet them in full. Measurement criteria include the degree to which the credit line has been utilised, the collateral deposited and concentration risk. Although Clearstream and Eurex Clearing AG often have short-term claims against counterparties totalling several billion euros overall, these are generally secured by collateral deposited by the market participants. Moreover, the Group regularly evaluates the reliability of its emergency plans at Clearstream and Eurex Clearing AG in the event of client defaults and the resulting credit risk.

Furthermore, Clearstream Banking S.A. is exposed to credit risk arising from its strategic securities lending transactions (ASLplus). Only selected banks act as borrowers. All borrowing transactions are fully collateralised. Only selected bonds may be used as collateral; these must be rated at least BBB – by the Standard & Poor's rating agency or the equivalent from other agencies. In the case of short-term securities without individual ratings, the issuers must be rated at least A–1.

Clearstream extends credit to customers in order to make settlement more efficient. This type of credit business is fundamentally different, however, from the classic lending business. First, credit is extended solely on a very short-term basis and generally for less than a day. Second, it is generally collateralised and granted to those clients with high creditworthiness. Furthermore, the credit lines granted can be revoked at any time.

Under its terms and conditions, Eurex Clearing AG enters into transactions only with its clearing members. Clearing mainly relates to defined securities, rights and derivatives that are traded on specific stock exchanges. Eurex Clearing AG also offers this service for some over-the-counter (OTC) products such as interest rate swaps and forward rate agreements. As a central counterparty, it steps in between transactional counterparties. Through offsetting mutual claims and requiring clearing members to post collateral, Eurex Clearing AG mitigates its clients' credit risk exposure.

To date, no default by a client with a secured credit line has resulted in financial losses. Deutsche Börse Group continues to view the probability as low that one of its customers could become insolvent and that this could lead to losses for the Group. It considers the impact of such an event to be low if the credit line in question is collateralised and medium if it is uncollateralised. The probability of a counterparty to an uncollateralised credit defaulting is considered to be very low. If several large, systemically relevant banks were to default simultaneously, the financial impact may be significant. The probability of this scenario is considered to be very low.

Credit risk can also arise from cash investments. The Treasury department is responsible here and has Group-wide authority. Treasury largely makes collateralised investments of funds belonging to Group companies as well as Clearstream and Eurex Clearing AG customers. To date, counterparty default has not led to any loss for the Group. The probability that the default of a counterparty to an uncollateralised cash investment could lead to a loss is considered to be low; the financial loss itself could have a medium impact.

Investment losses on currencies for which Eurex Clearing AG has no access to the respective central banks, will be borne on a pro-rata basis by Eurex Clearing AG and by those clearing members active in the currency where losses were incurred. The maximum amount each clearing member will have to contribute in this manner is the total amount that the clearing member has pledged with Eurex Clearing AG as cash collateral in this currency. The maximum amount to be borne by Eurex Clearing AG is €50 million.

Reducing credit risk

Clearstream and Eurex Clearing AG assess the creditworthiness of potential customers or counterparties to an investment before entering into a business relationship with them in a uniform manner: they determine the size of individual customers' credit lines based on regular creditworthiness checks, which they supplement with ad hoc analyses if necessary. They define haircuts for securities posted as collateral depending on the risk involved, and continually review their appropriateness. They include all relevant risk factors when determining the haircut and allocate a specific deduction to each. The total haircut is calculated by adding together the individual margins for the risk factors concerned.

Given the size and volatility of its clients' liabilities, Eurex Clearing AG has developed a leading-edge collateral management system, which is described in detail in the following section.

Safety for both participants and the clearing house

Each clearing member must prove that it has liable capital equal at least to the amounts that Eurex Clearing AG has defined for the different markets. The amount of capital for which evidence must be provided depends on the risk. To mitigate Eurex Clearing AG's risk that clearing members might default before settling open transactions, members are obliged to deposit collateral in the form of cash or securities (margins) on a daily basis and, if required, to meet additional intraday margin calls.

Eurex Clearing AG only permits securities with a high credit quality to be used as collateral. It continually reviews what collateral it will accept and uses haircuts with a confidence level of at least 99.9 per cent to cover market risk. As a result, securities of issuers with lower credit quality receive higher haircuts than securities with the highest credit quality. When in doubt, collateral with insufficient quality will be excluded. Risk inputs are checked regularly and the safety margins are calculated daily for each security. In addition, a minimum safety margin applies to all securities.

Margins are calculated separately for clearing member accounts and client accounts. Gains and losses resulting from intraday changes to the value of financial instruments are either settled in cash by the counterparties (variation margin) or deposited with Eurex Clearing AG as collateral by the seller due to the change in the equivalent value of the item (premium margin). In the case of bond, repo or equity transactions, the margin is collected from either the buyer or the seller (current liquidating margin), depending on how the transaction price performs compared to the current value of the financial instruments. The purpose of these margins is to offset accumulated gains and losses.

In addition, Eurex Clearing AG uses additional collateral to protect itself in the case of default by a clearing member against any risk that the value of the positions in the member's account will deteriorate in the period before the account is settled. This additional collateral is known as the initial margin. The target confidence level here is at least 99.0 per cent (with a minimum two-day holding period) for exchange-traded transactions, or 99.5 per cent (with a five-day holding period) for OTC transactions. Eurex Clearing AG checks regularly whether the margins match the requested confidence level: initial margin is currently calculated using the legacy risk-based margining method and the Eurex Clearing Prisma® method, which is already available for all derivative contracts traded. The method takes the clearing member's entire portfolio – as well as historical and stress scenarios – into account when calculating margin requirements. The objective is to cover market fluctuations for the entire liquidation period until the account is settled. At present, the risk-based margining method is still used for cash market products and physical deliveries, as well as for securities lending and repo transactions. The Prisma method is set to fully replace risk-based margining in the future.

In addition to the margins for current transactions, each clearing member makes contributions to a default fund, based on the member's individual risk profile. The default fund is jointly liable for the financial consequences of a default by a clearing member to the extent that this cannot be covered by the member's individual margin, or the contributions it or Eurex Clearing AG make to the default fund. Eurex Clearing AG uses regular stress tests to check whether its default fund is adequate enough to absorb a default of its two largest clearing members. This involves subjecting all current transactions and their collateral to market price fluctuations at a confidence level of at least 99.9 per cent. In order to be able to determine potential losses in excess of a clearing member's individual margins, the impact on the clearing fund of a potential default is simulated. Eurex Clearing AG has defined limits which, when exceeded, trigger an immediate adjustment to the size of the default fund if necessary. The following lines of defence are available in case a clearing member is unable to meet its obligations to Eurex Clearing AG due to a delay in performance or a default:

- First, the relevant clearing member's outstanding positions and transactions can be netted and/or closed from a risk perspective by entering into appropriate back-to-back transactions, or they can be settled in cash.
- Any potential shortfall that might be incurred in connection with such a closing or cash settlement, as well as the associated costs, would be covered in the first instance by the collateral provided by the clearing member concerned. As at 31 December 2018, collateral amounting to €52,623.1 million had been provided for the benefit of Eurex Clearing AG (after haircuts).
- After this, the relevant clearing member's contribution to the clearing fund would be used to cover the open amount. Contributions ranged from €1 million to €414 million as at 31 December 2018.
- Any remaining shortfall would initially be covered by a contribution to the clearing fund by Eurex Clearing AG. Eurex Clearing AG's contribution amounted to €150 million as at 31 December 2018.
- Only then would the other clearing members' contributions to the clearing fund be used proportionately. As at 31 December 2018, aggregate clearing fund contribution requirements for all clearing members of Eurex Clearing AG amounted to €4,076.4 million. After the contributions have been used in full, Eurex Clearing AG can request additional contributions from each clearing member, which can be at most twice as high as their original clearing fund contributions. In parallel to these additional contributions, Eurex Clearing AG provides additional funds of up to €300 million, provided via a letter of comfort from Deutsche Börse AG (see below). These additional funds will be used together with the additional clearing member contributions, on a pro-rata basis.
- Next, the portion of Eurex Clearing AG's equity would be used that exceeds the minimum regulatory equity.
- Finally, the remaining minimum regulatory equity of Eurex Clearing AG would be drawn upon.
- Deutsche Börse AG has issued a letter of comfort in favour of Eurex Clearing AG. With this letter of comfort, Deutsche Börse AG commits to provide the funds to Eurex Clearing AG required to fulfil its duties – including the duty to provide additional funds of up to €300 million, as mentioned before. The maximum amount to be provided under the letter of comfort amounts to €600 million, including payments already made. Third parties are not entitled to any rights under the letter of comfort.

In the event of default by a clearing member, Eurex Clearing AG triggers its tried-and-tested default management process (DMP), in order to rebalance the central counterparty. This process not only contributes to the security and integrity of capital markets but also protects non-defaulted clearing members from any negative effects resulting from the default.

Essentially, within the DMP framework, products which share similar risk characteristics are assigned to liquidation groups that are liquidated using the same process. Within a liquidation group, Eurex Clearing AG will balance its position by transferring defaulted positions to other clearing members either via an auction or by way of bilateral independent sales.

Historically, the DMP of Eurex Clearing AG has been used four times, involving the defaults of Gontard & MetallBank (2002), Lehman Brothers (2008), MF Global (2011) and Maple Bank (2016).

In all of the cases mentioned above, the funds pledged as collateral by the defaulted clearing member were sufficient to cover losses incurred upon closing out positions – in fact, a significant portion of resources was returned to the defaulted clearing member.

Deutsche Börse Group reduces its risk when investing funds belonging to Group companies and client funds by distributing investments across multiple counterparties with high credit quality by defining investment limits for each counterparty and by investing funds primarily in the short term and in collateralised form if possible. Investment limits are established for each counterparty on the basis of regular credit checks and using ad hoc analyses, as necessary. Since extending its licence as an investment and credit institution under the Kreditwesengesetz (German Banking Act), Eurex Clearing AG can also use Deutsche Bundesbank's permanent facilities.

Clearstream and Eurex Clearing AG run stress tests to analyse scenarios such as the default of their largest counterparty. The figures determined in this way are compared with the limits defined as part of the companies' risk-bearing capacity. In addition, the impact of several clearing counterparties defaulting at the same time is calculated for Eurex Clearing AG. A special stress test examines Clearstream Banking S.A.'s credit risk exposure from the settlement procedure with Euroclear. Moreover, inverse stress tests are run to determine the number of counterparties that would have to default for losses to exceed the risk cover amount. In the course of the stress tests run in financial year 2017, the identified risks have been further analysed and appropriate measures to reduce risk have been implemented.

Deutsche Börse Group tracks a variety of risk indicators in addition to its risk measures (REC, EaR and the credit risk stress tests performed). These include the extent to which individual clients utilise their credit lines, and credit concentrations.

Market risk

Market risk includes risks of a reverse development of interest rates, exchange rates or other market prices. Deutsche Börse Group measures these risks using Monte Carlo simulations based on historical price data, as well as corresponding stress tests.

Clearstream and Eurex Clearing AG invest parts of their equity in securities with the highest credit quality. The majority of these securities have a variable interest rate, with a low sensitivity to interest rate fluctuations. The Group avoids open currency positions whenever possible. Furthermore, market risk could result from Deutsche Börse Group's ring-fenced pension plan assets (Contractual Trust Arrangement (CTA), Clearstream pension plan in Luxembourg). The Group reduced its risk of extreme losses by deciding to invest a predominant proportion of the CTA on the basis of a value preservation mechanism.

Liquidity risk

Liquidity risk applies if a Deutsche Börse Group company is unable to meet its daily payment obligations or if it can only do so at a higher refinancing cost. Operational liquidity requirements are met primarily internally by retaining funds generated. The aim is to maintain liquidity at about the same level of operating costs for one quarter (currently between €150 million and €250 million). An intra-Group cash pool is used to pool surplus cash from subsidiaries on a Deutsche Börse AG level, as far as regulatory and legal provisions allow. Liquid funds are invested in short-term investments to ensure that they are available. Short-term investments are also largely secured by liquid bonds from first-class issuers.

Deutsche Börse AG has access to short-term external sources of financing, such as agreed credit lines with individual banks or consortia, as well as through a commercial paper programme. In recent years, Deutsche Börse AG has leveraged its access to the capital markets to issue corporate bonds in order to meet its structural financing needs.

Since Clearstream's investment strategy aims to be able to repay customer deposits at all times, liquidity limits are set carefully. In addition, extensive sources of financing are available at all times, such as ongoing access to the liquidity facilities at Deutsche Bundesbank and Banque Centrale du Luxembourg.

Due to its role as a central counterparty, Eurex Clearing AG has strict liquidity guidelines, and its investment policy is correspondingly conservative. Regular analyses ensure the appropriateness of the liquidity guidelines. In addition, Eurex Clearing AG can use Deutsche Bundesbank's permanent facilities.

The key liquidity risk for Deutsche Börse Group lies in customer default. If a clearing member of Eurex Clearing AG defaults, its membership is liquidated. If a Clearstream customer defaults, the generally collateralised, intraday credit line granted to increase settlement efficiency would be called in, and the collateral provided by the client could then be liquidated. Deutsche Börse Group estimates the probability of this liquidity risk to be low when there is the possibility of medium financial losses. A decline in market liquidity, following a counterparty default, would further increase Deutsche Börse Group's liquidity risk exposure. On a daily basis, Clearstream and Eurex Clearing AG calculate the liquidity needs that would result if two of their biggest clients would default and maintain sufficient liquidity in order to cover the liquidity needs determined.

To consider different scenarios, regular stress tests are being carried out to examine the liquidity risk exposure of Clearstream and Eurex Clearing AG. Risks identified in the course of stress tests carried out during the 2018 financial year were analysed further, and corresponding risk-reduction measures initiated.

Business risk

Business risk reflects the fact that the Group depends on macroeconomic developments and is influenced by other external events, such as changes in the competitive environment or regulatory initiatives. It therefore expresses the risks associated with the Group's business environment and sector. It also includes business strategy risk, i.e. the impact of risks on the business strategy and possible adjustments to it. These business risks are represented as variance analyses of planned and actual EBIT and are monitored constantly by the divisions. They account for about 10 per cent of the Group's total risk. Business risk may result in revenues lagging budget projections or in higher costs.

Business risk includes the risk that competitors, such as the exchanges Euronext, Singapore Exchange (SGX), ICE Futures Europe and Mercado Español de Futuros Financieros (MEFF), as operators of derivatives markets, might increase their market shares on the European trading markets (both on- and off-exchange). Deutsche Börse Group estimates the probability of a minor loss in market share as medium but the resulting impact as rather low.

Additional business risk may arise from regulatory requirements or the geopolitical or economic environment – for example, in the event of an intra-Europe crisis affecting monetary union, or a tariff conflict with an adverse effect on trading activity.

This might have a negative influence on Deutsche Börse Group's clients and reduce their trading volume in the future. While the Group still views the probability of this risk occurring as low, and the possible consequences on client business as medium, there is a significant residual macroeconomic risk which would materialise if political or financial turmoil was to trigger declining prices on equity markets.

The United Kingdom's exit from the European Union ("Brexit") was analysed in terms of the risks to customers, products and internal processes. To mitigate these risks, licences were requested for the UK domestic market and a Steering Committee convened to assess the risks on a regular basis. Deutsche Börse Group believes it is well prepared for Brexit and, among others, considers the OTC clearing of interest rate swaps to be an opportunity. Eurex Clearing AG has already admitted the majority of its clearing mambers located in the UK via a unit of the Group located inside EU-27; the remainder is currently being admitted and will be admitted until the end of March 2019.

The introduction of a financial transaction tax, which continues to be supported by some European states, might have a negative impact upon Deutsche Börse Group's business activities. Likewise, a sustained period of weak trading activity on the market following a significant downturn on the equity markets (whatever the reasons), for example, also represents a risk to the Group.

Project risk
Projetct risk is a risk driver with a significant impact on one or more of the three other risk categories (operational, financial and business risk) described above. Project risk is not broken down further. Ongoing monitoring and checks ensure that project risk is continually analysed and evaluated.

Overall assessment of the risk situation by the Executive Board

Deutsche Börse AG's Executive Board is responsible for risk management throughout the Group and regularly reviews the entire Group's risk situation. Its summary of the situation in 2018 is given here and is followed by a brief look at the coming financial year.

Summary
Additional external risk factors emerged for Deutsche Börse Group's business in the past financial year, particularly higher operational risk in the fields of cybercrime and taxes. Deutsche Börse Group's risks were covered by sufficient risk-bearing capacity at all times during 2018, i.e. the allocated risk appetite limits were complied with. The Group's risk profile has not changed significantly.

As at 31 December 2018, the Group's REC amounted to €2,573 million, a 9 per cent increase year-on-year (31 December 2017: €2,362 million). The available risk-bearing capacity increased by 12 per cent to €4,619 million year-on-year (31 December 2017: €4,128 million). EaR as at 31 December 2018 were €1,121 million, while risk appetite was €1,941 million, based on the adjusted budgeted EBITDA in 2018.

Deutsche Börse AG's Executive Board is convinced that the risk management system is effective. The Board continues to strengthen the system and the control function responsible for it. The Group-wide strategy to capture and manage risk, which focuses on risk appetite, forms the basis for internal risk management. It is codified in the three principles described in the "Risk strategy and risk management" section.

Outlook
Deutsche Börse Group continually assesses its risk situation. Based on the calculated REC in stress tests and based on the risk management system, Deutsche Börse AG's Executive Board concludes that the available risk cover amount is sufficient. Furthermore, it cannot identify any risk that could endanger the Group's existence as a going concern.

In 2019, the Group intends to further strengthen Group-wide risk management, as well as the control functions within the Group, supported by additional personnel and structural improvements. In addition, a cross-divisional initiative regarding the risk culture within the company will be carried out. Business continuity precautions should also be expanded to ensure that the company can continue in the case of an emergency or crisis and to ensure an orderly process in cases of restructuring and liquidation of regulated institutions.

Report on opportunities

Organisation of opportunities management

Deutsche Börse Group's opportunities management aims to identify, evaluate and assess opportunities as early as possible and to take appropriate measures in order to transform opportunities into business success.

Deutsche Börse Group evaluates organic growth opportunities in the individual business areas both on an ongoing basis throughout the year and systematically at the Group level as part of its annual budget planning process. Suggestions from the Group's business areas for new products, services or technologies serve as the starting point for the evaluation. The process begins with a careful analysis of the market environment that considers both customer wishes as well as market developments, competitors and regulatory changes.

Ideas for growth initiatives are developed further using uniform, Group-wide templates and subjected to a profitability analysis. Qualitative aspects are documented in a business plan, and revenues and expenses are projected in detail for several years in the future.

Once a business plan and profitability analysis have been prepared for a specific growth initiative, the Executive Board of Deutsche Börse AG decides on its implementation. This decision is either taken as part of the annual budget planning process or as part of the regular budget review meetings that happen throughout the year.

Once a growth initiative has been approved and the budget has been made available, the initiative's progress against the presented business plan is tracked as part of the Group's general budget steering mechanisms. Regular reporting on the progress of the initiatives is an important steering tool, which is coordinated by central functions and created in cooperation with the individual projects from the business areas. Through these reports, if required, the financial planning is adjusted, forecasts are updated and changes to the scope of the project are made transparent. These reports also serve as a control mechanism to determine whether milestones have been reached and if project-specific risks have been described and if countermeasures have been implemented.

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