DEUTSCHE BÖRSE
GROUP

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Financial report 2017

Excerpt: risk report

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's aggregate risk exposure has increased by 15 per cent. This can mainly be attributed to increased risks in the fields of taxes and cybercrime.

The first section of this risk report explains the risk strategy and demonstrates how the 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 Clearstream Banking S.A. and Clearstream Banking AG, which are part of the Clearstream Holding Group (referred to as "Clearstream" below), as well as Eurex Clearing AG – all regulated as credit institutions. Furthermore, Eurex Clearing AG and European Commodity Clearing AG are authorised as central counterparties (CCPs) and are subject to the requirements of the European Market Infrastructure Regulation (EMIR). Other entities 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 20 to the consolidated financial statements). Over and above the statutory requirements of EU directives and regulations CRD/CRR, EMIR and MiFID and, where applicable, their implementation into national law, these include the national requirements of the Minimum Requirements for Risk Management (MaRisk) issued by the Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht, BaFin) and of circular 12/552 issued by the Financial Supervisory Authority of Luxembourg (Commission de Surveillance du Secteur Financier, CSSF). In this context, significant parts of the 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) apply to Clearstream Holding AG and Eurex Clearing AG regarding the establishment of recovery plans. Deutsche Börse Group has an enterprise-wide recovery plan in place, beyond this requirement. Deutsche Börse Group follows international standards in its risk management and applies these also without or beyond such 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.

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 the centralised management of their market risk exposure via the Group's clearing house, Eurex Clearing AG. In this way, Deutsche Börse Group contributes to the efficiency and systemic stability of the capital markets.

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 EBIT. 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.

Interlocking business strategy and risk strategy

Business strategy

↓ Implied risks

Risk strategy/risk appetite

Risk analysis

Risk scenarios | **Risk types** | **Internal and external losses**

Root cause → Event → Effect → Loss

↓ Risk mitigation

Risk mitigation

Reduces frequency of events or severity of effect
- Straight-through processing
- Compliance
- Legal
- Information Security
- Business continuity measures
- Internal control system
- Other

Risk transfer
- Insurance
- Other

Risk avoidance
- Changes to business and/or business strategy

↓ Risk acceptance

Risk monitoring

Existing risks
- Aggregated risk measurement
- Stress tests
- Risk metrics

Emerging risks
- Risk map

Long-term developments
- DB1 Ventures
- Deutsche Börse Venture Network®

3. Appropriate risk/return ratio

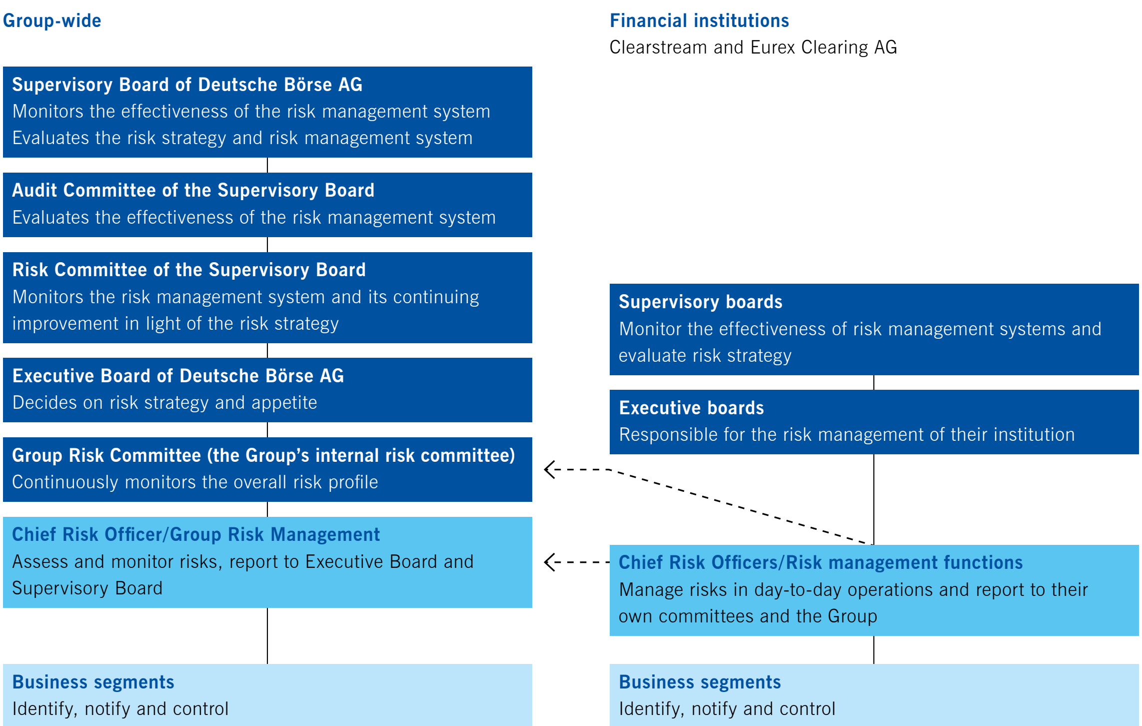
"The return on equity should exceed the cost of equity." Deutsche Börse Group has set itself the goal of ensuring that risk and return should be reasonably balanced, both for specific business areas in general and for individual regions, products and customers.

Internal risk management is based on the Group-wide detection 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 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 and its companies can act just as quickly and effectively in the event that several systems fail simultaneously as if a single system fails.

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.

Risk management – organisational structure and reporting lines



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. It 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, 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, the Group's institutions, 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 and is controlled by the supervisory board of the institute.

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 Auditing is responsible for monitoring compliance with the 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, whilst 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.

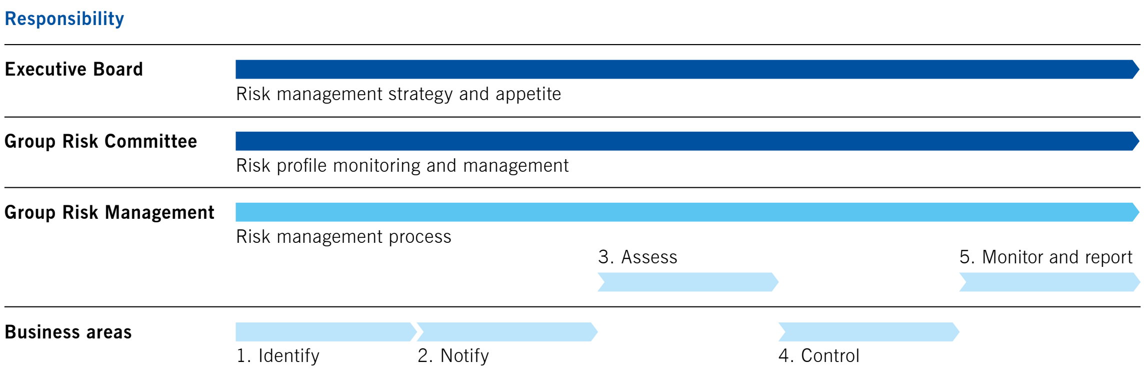
Existing risks

Deutsche Börse Group employs a range of tools to monitor and evaluate its operational, financial and business risk on a continuous basis. Applying the liquidation principle, the going-concern principle, and the regulatory capital requirements of the Group's credit institutions, risks are aggregated at a Group level and quantified using the concept of value at risk (VaR). 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. Risk metrics, which are used as an early-warning system for quantified internal risks, are an additional risk monitoring method.

Aggregate risk measurement

The purpose of the VaR model is to determine the amount of capital – given a confidence interval defined ex ante – required to cover potential losses incurred within one year. In this context, economic capital (EC) in accordance with the liquidation principle, as well as regulatory capital (RC) for credit institutions within Deutsche Börse Group are calculated. Conversely, the going-concern principle is based on earnings at risk (EaR).

The five-stage risk management system



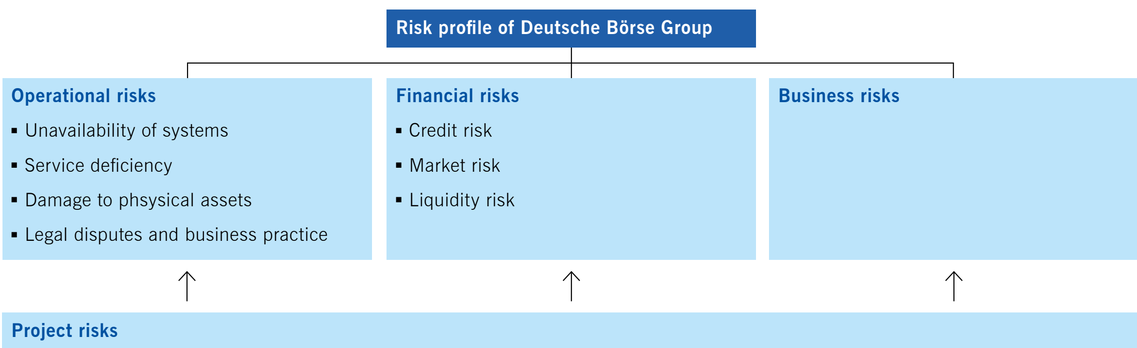
1. Liquidation principle: what risk can the capital cover?
The first part of Principle 1 of its risk strategy specifies that Deutsche Börse Group should not exhaust its risk-bearing capacity in more than 0.02 per cent of all years. For Clearstream and Eurex Clearing AG, EC calculated in this manner also 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 20 to the consolidated financial statements).

For management purposes, GRM regularly determines the ratio of the EC 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 EC 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"). The liquidation concept therefore assumes that the Group will not have to be liquidated.

2. Going-concern principle: what risks can be absorbed by earnings?
Deutsche Börse Group employs the going-concern principle that assumes an orderly continuation of the Group in the event of a crisis, and that 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 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 earnings before interest and tax (EBIT)). 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 EBIT.

3. Regulatory capital requirements
In addition, 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 are applied on the basis of the relevant counterparty ratings.

Deutsche Börse Group's risk profile



The approach taken for operational risk is different: Clearstream has used the significantly more complex 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 EC calculations, the model employed was fundamentally revised and improved in 2016. The method – which has been approved and is regularly tested by BaFin – allows required capital to be allocated to the regulated units. In contrast, Eurex Clearing AG employs the basic indicator approach in order to calculate regulatory capital requirements (for details, see note 20 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 analyse 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. 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 for expected or upcoming regulatory requirements, business risk, as well as for IT and information security risks. Risk maps classify risks by their probability of occurring – and by their financial impact, should they materialise. This is based on a five-year planning horizon, which is equivalent to the development cycle for the operational risk relevant to Deutsche Börse Group: 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 Paper). 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.

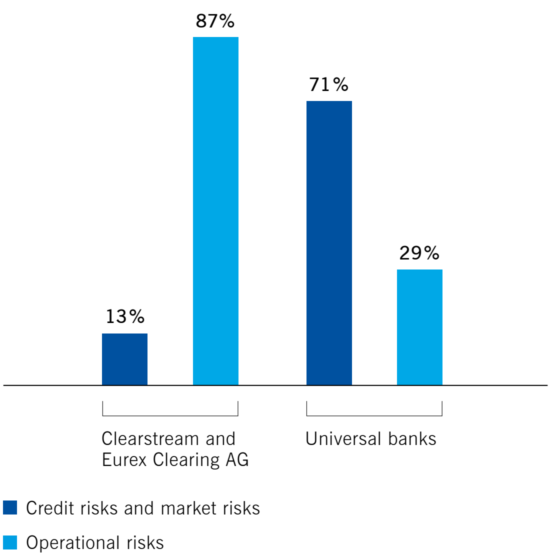
Risk description

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 significantly smaller role for Deutsche Börse Group.

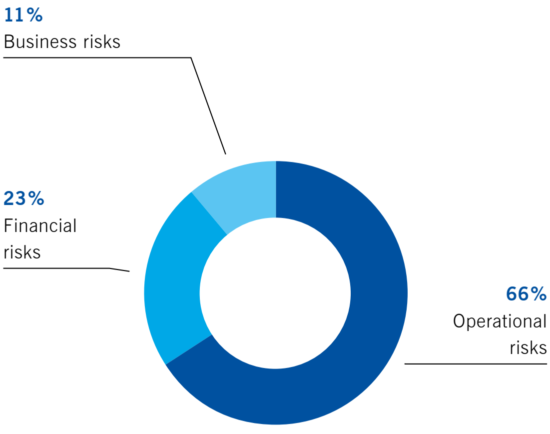
Risk profile
Deutsche Börse Group differentiates between the three standard types of risk: operational, financial and business risk. Project risk also exist but the Group does not specifically quantify these as their impact is already reflected in the three traditional risk types.

Low level of typical bank risk
The risks faced by Deutsche Börse Group's institutions differ fundamentally from those of other financial service providers. Considering credit and market price in particular, Clearstream and Eurex Clearing AG report a structurally lower risk compared with other banks, since they act as intermediaries. Thus, for example, they do not operate a proprietary trading business on financial markets. Consequently, Deutsche Börse Group's institutions do not bear the associated market risks. On the contrary, they offer market participants services such as collateral and risk management to reduce their risk from trading activities. The Group's banking business mainly consists of providing reliable clearing, settlement and custody services, as well as collateral management.

Regulatory capital requirements for Clearstream and Eurex Clearing AG as at 31 Dec 2017



Required economic capital for Deutsche Börse Group by risk type as at 31 Dec 2017



The regulatory capital requirements for Clearstream and Eurex Clearing AG are primarily due to operational risk (see the "Regulatory capital requirements for Clearstream and Eurex Clearing AG as at 31 December 2017" chart). Information on the additional capital requirements of other subsidiaries is provided in note 20 to the consolidated financial statements.

Operational risk greater than financial and business risk

Utilisation of risk-bearing capacity in the liquidation principle and of risk appetite in 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 11 per cent of the total. This makes the third typical risk type all the more important for Deutsche Börse Group: at 66 per cent, operational risk accounts for more than half of the total risk (see the "Required economic capital for Deutsche Börse Group by risk type as at 31 December 2017" chart).

A larger part of the risk is associated with the Clearstream and Eurex segments (see the "Required economic capital by segment as at 31 December 2017" chart), in keeping with the proportion of sales revenue and earnings accounted for by their business. In contrast to the regulatory capital requirements, this calculation also includes business areas that are not covered by banking regulations.

A similar split can be seen for EaR. Here, too, the business segments with the largest proportions of revenues and earnings – Clearstream and Eurex – have the largest shares of earnings at risk (see the "Earnings at risk by segment as at 31 December 2017" chart).

Deutsche Börse Group assigns indicators to each risk exposure to estimate how likely it is to occur and what financial effect it could have. It distinguishes four probability levels (very low, low, medium and high) and four financial impact levels (low, medium, substantial and a risk to the company as a going concern). However, none of the risks assessed reach the fourth impact level either individually or in total; in other words, none jeopardises the existence of the entire Group as a going concern. These categories can be used to assess the risk types given below as examples. The estimated probabilities of the risks occurring are categorised as follows:

- Very low (the probability of the risk occurring is less than 1 per cent)
- Low (the probability of the risk occurring is equal to or greater than 1 per cent but less than 10 per cent)
- Medium (the probability of the risk occurring is equal to or greater than 10 per cent but less than 50 per cent)
- High (the probability of the risk occurring is equal to or greater than 50 per cent)

The estimated financial effects can be classified into the following four categories:

- Low (the financial loss could be up to 10 per cent of EBIT)
- Medium (the financial loss could be up to 50 per cent of EBIT)
- Substantial (the financial loss could be up to 100 per cent of EBIT)
- Risk to the business as a going concern (the financial loss of Deutsche Börse AG could be up to the available risk cover amount)

In the following, the risk types are first 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

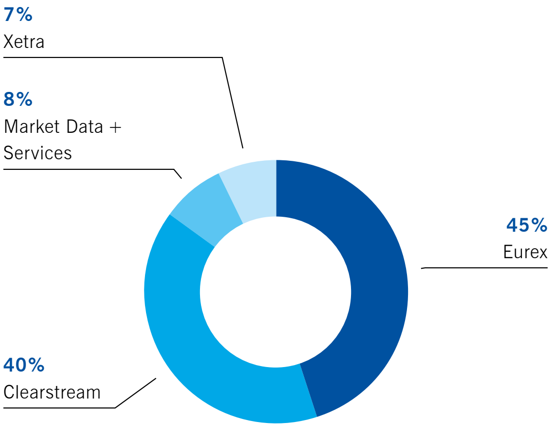
2. Financial risk
- Default of a credit counterparty
- Losses of on-balance sheet and off-balance sheet assets and liabilities, due to market price fluctuations
- Default by a customer and an associated liquidity squeeze

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

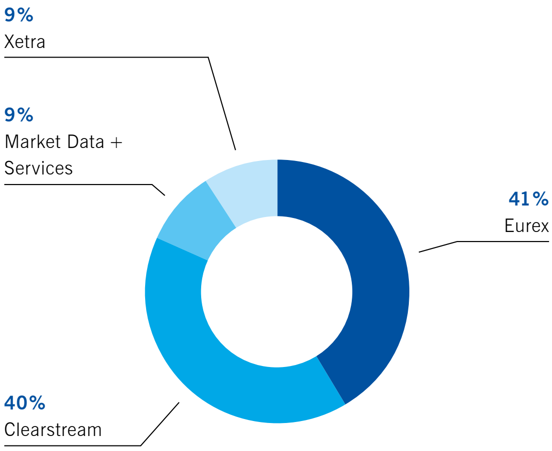
Risks which could jeopardise the Group's continued existence could arise only from a combination of extreme events that have a very low probability:

- Failure of a trading system over several days, in a highly volatile market environment
- Simultaneous default of multiple large banks with systemic relevance

Required economic capital by segment
as at 31 December 2017



Earnings at risk by segment
as at 31 December 2017



- 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 EBIT 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 may represent going concern threats for certain subsidiaries, for example if sanctions were to be deliberately contravened. 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 comprise 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 66 per cent of the total Group risk.

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 terrorist attack. In the past, only limited failures have occurred both with Xetra and with 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 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 stress tests, which check 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. A second example is errors in handling the default of a large clearing customer. To date, defaults are rare, no such handling errors have occurred and 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 or breaches of competition law or of 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 higher-order regulations.

In its 2012 corporate report, Deutsche Börse Group informed about Peterson vs Clearstream Banking S.A., the first Peterson proceeding, initiated by various plaintiffs seeking turnover of certain customer positions held in Clearstream Banking S.A.’s securities omnibus account with its US depository bank, Citibank NA, and asserting direct claims against Clearstream Banking S.A. for damages of US$250 million. That matter was settled between Clearstream Banking S.A. and the plaintiffs and the direct claims against Clearstream Banking S.A. were abandoned.

Operational risk at Deutsche Börse Group

Operational risk

Events			
Unavailability of systems	**Service deficiency**	**Damage to physical assets**	**Legal disputes and business practice**
▪ Trading ▪ Clearing ▪ Settlement	▪ Deficiency of trading-related services ▪ Loss of customer cash	▪ Damages to or destruction of buildings ▪ Damages to or destruction of data centres	▪ Losses from ongoing legal conflicts ▪ Theft of customer cash ▪ Employment practice ▪ Contract risks ▪ Breach of sanctions provisions
↑	↑	↑	↑
Possible root causes			
▪ Software flaws ▪ IT hardware flaws ▪ Inadequate information security ▪ Cyber crime	▪ Human errors ▪ Flawed internal processes ▪ Flawed data supply	▪ Force majeure ▪ Weather catastrophes ▪ Terror	▪ Legal violations ▪ Internal fraud ▪ External fraud

In July 2013, the US court ordered 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 then by the US Supreme Court on 20 April 2016. Once the process of distribution of funds to the plaintiffs is complete, a related case, Heiser vs Clearstream Banking S.A., also seeking turnover of the same assets, should be dismissed.

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. Clearstream Banking S.A. filed a petition for rehearing with the appellate court in December 2017, which the appellate court has rejected, and is now considering a petition to the US Supreme Court.

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.

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

In the context of the ongoing disputes regarding assets of Bank Markazi, Clearstream Banking S.A. was served with a complaint of 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 which are currently subject to US and Luxembourg litigation brought by US plaintiffs, and addresses assets that were previously transferred out of Clearstream Banking S.A. to Banca UBAE S.P.A.

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

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

On 1 February 2017, Deutsche Börse AG announced that the public prosecutor's office in Frankfurt/Main was investigating Deutsche Börse AG in respect of a share purchase by its former Chief Executive Officer Carsten Kengeter which was carried out on 14 December 2015, in implementation of the Executive Board's remuneration programme as approved by the Supervisory Board of Deutsche Börse AG. On 18 July 2017, the public prosecutor's office in Frankfurt/Main issued a notification of hearing to Deutsche Börse AG. According to this notification of hearing, the public prosecutor's office intends to formally involve the company in the ongoing investigation proceedings against Carsten Kengeter. In the notification of hearing, the public prosecutor, with regard to the company, held out the prospect that two fines totalling €10.5 million could be imposed on Deutsche Börse AG in accordance with section 30 of the Gesetz über Ordnungswidrigkeiten (OWiG, German Act on Regulatory Offences) due to an alleged violation of the insider trading prohibition in December 2015 and an alleged failure to disclose an ad-hoc announcement in January 2016. On 13 September 2017, Deutsche Börse AG's Executive Board and Supervisory Board decided to accept the fine which would potentially be imposed by the competent local court (Amtsgericht). On 23 October 2017, however, the local court of Frankfurt am Main refused to approve the closure of the investigation proceedings against the former Chief Executive Officer of Deutsche Börse AG, Carsten Kengeter, subject to conditions in the form of payment of €500,000, as applied for by the public prosecutor. In light of the significance of the proceedings the court considers it appropriate to continue the investigation proceedings at this time. The further investigations could lead from a closure of the proceedings due to lack of adequate suspicion to an indictment. The court has returned the matter, both as relates to the investigation proceedings against Carsten Kengeter as well as to potential actions against Deutsche Börse AG, to the public prosecutor which will now decide upon further procedural steps.

On 26 October 2017, Carsten Kengeter informed the Supervisory Board of Deutsche Börse AG that he would like to step down as the company's Chief Executive Officer with effect from 31 December 2017. The Supervisory Board accepted this request.

Following expert consultation, Deutsche Börse AG continues to believe the allegations made are unfounded in all respects.

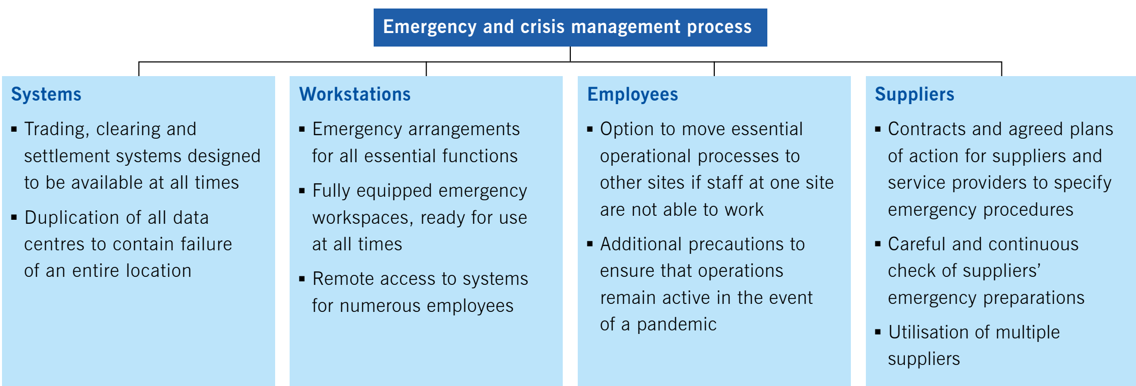
Despite the ongoing proceedings described above, the Executive Board is not aware of any material changes to the Group's risk situation.

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.

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 are 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:

Business continuity management



- 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
Information security attacks and cybercrime represent operational risks for Deutsche Börse Group. Cybercrime is increasingly becoming a focus for organised crime and now features high on the list of crime statistics year after year. It is a threat to all financial services providers, to credit institutions and to Deutsche Börse Group. Due to the growing danger from cyber criminals and increasing regulatory requirements, the Group is focused on mitigating these specific risks and expanding its information security measures. Besides mitigating availability risks, these serve in particular to reduce the risk of loss of confidential information or of transaction integrity, or the risk of the authenticity of information being compromised – hence, to preserve Deutsche Börse Group's integrity as a transaction services provider. In this connection, the Group has extended its procedures to quantify information security risks and has specified them in more detail, in order to facilitate implementation of targeted counter-measures. This also encompasses all measures taken within the scope of cyber security and cyber resilience (i.e. to boost the robustness of procedures, applications and technologies against cyber-attacks).

Besides the traditional "second line of defence" function (that is, to monitor whether requirements concerning information security and the related risk management are being adhered to), information security also monitors the systemic integration of (and adherence to) security functions, 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 cybercrime in cooperation with national and international financial intelligence units at an early stage and coordinates risk mitigation measures in cooperation with the business areas. Moreover, procedures based on the ISO 27001 industry standard and the NIST Cyber Security Framework were established in order to bring Deutsche Börse Group's information security measures continuously into line with growing – and permanently changing – requirements, and to anticipate regulatory requirements at an early stage. Since parts of Deutsche Börse Group (specifically, securities settlement and custody services) are subject to regulations under the *IT-Sicherheitsgesetz* (German IT Security Act), the Group has been conducting a detailed exchange of information in current cyber-risks with the German Federal IT Security Authority (BSI) since 2016.

In 2015, Group Information Security launched an extensive Group-wide programme designed to raise staff awareness for the responsible handling of information and to improve staff conduct in this aspect. 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. Corporate Security has developed an integral security concept to protect the company, its employees and values from external attacks. A highly qualified security staff assess the security situation at Deutsche Börse Group's locations permanently and are in close contact with local authorities and security departments of other companies.

In an increasingly competitive global market environment, know-how and confidential company information bear the potential of a 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. In this context, a world-wide travel security programme was established, supported by a travel-tracking system.

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 are approved by Deutsche Börse AG's Chief Financial Officer.

Compliance

The compliance function, in cooperation with individual business segments, has the task of ensuring as a general matter that regulatory requirements are observed, and of protecting the Group against a variety of monetary and non-monetary risks, such as reputational damage in the markets it serves, in the view of supervisory authorities, or the general public. Whilst endowed with appropriate autonomy from the business units, the compliance function nonetheless fulfils its mandate as an enabler of business, to allow the latter to focus on the clients and markets the Group wishes to serve. Compliance has to take the necessary steps to systematically and pre-emptively mitigate compliance risks. This requires the identification of compliance risks, and a risk-based assessment of appropriate measures.

Deutsche Börse Group pursues an enterprise-wide approach to its compliance function, ensuring that applicable laws and regulatory requirements are followed with respect to individual legal 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, with the objective of ensuring that the related concepts are spread throughout the Group.

Deutsche Börse Group's compliance function has been consistently strengthened over recent years. As a further step in the enhancement of Group compliance over the past few years, in the course of 2017, the Group significantly increased its dedicated compliance personnel in major offices around the world with the objective of coordinating and strengthening the alignment between compliance officers, control functions of individual business areas and other control functions as required by supervisory bodies. This close alignment forms a solid 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 validated data sources, upon which the Group can consistently and appropriately respond to compliance risks. During 2017, the focus was to review trends and patterns in order to identify statistical anomalies that might be indicators of compliance risks.

Deutsche Börse Group also improved its due diligence procedures with respect to clients, market participants, counterparties and business partners. As far as possible, the compliance function follows a strongly centralised approach. This guarantees the continuous monitoring of compliance risks with respect to clients served by multiple legal entities within Deutsche Börse Group.

Since its products and services – as a provider of financial market infrastructures – are often focused on other financial intermediaries, Deutsche Börse Group's cooperative approach seeks to raise the standards throughout the industry and enhance the integrity of financial markets for all participants. One of the results of these efforts was the development of the Financial Crime Compliance Principles for Securities Custody and Settlement, by the International Securities Services Association (ISSA). Deutsche Börse Group and Clearstream continue to promote this project. Senior Group Compliance officers are active participants in national and international working groups such as the above mentioned, seeking to define and promote adoption of consistent industry standards.

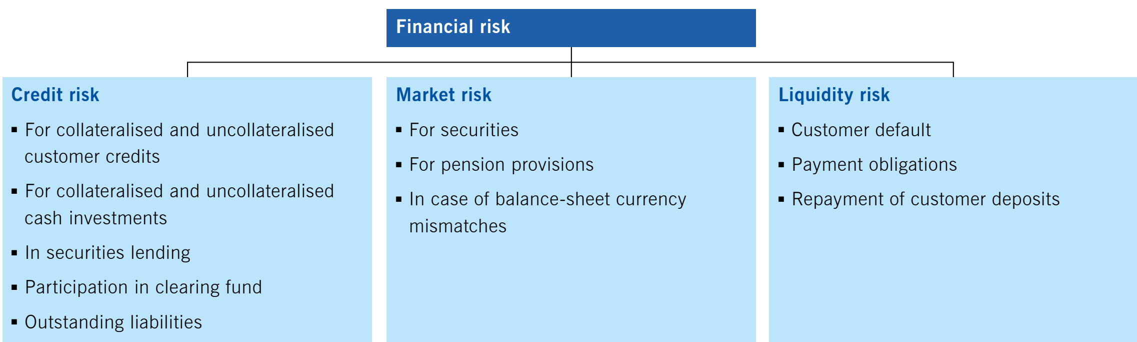
Group Compliance continuously promotes awareness of the importance of regulation-compliant and ethically correct conduct, as well as integrity amongst all Deutsche Börse Group employees. For instance, emphasis and attention regarding compliance-relevant aspects has been increased throughout all business areas, including Deutsche Börse Group's control functions required according to supervisory requirements.

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 chain, particularly from the perspective of a leading global provider of financial markets infrastructure. As a key next step, designed to exploit Group-wide synergies and to go beyond the scope of supervisory requirements, Group Compliance decided in 2017 to align Deutsche Börse Group's compliance management system with the globally recognised ISO 19600 standard.

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 EC; see note 36 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 secured in most cases 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 grants credits to its customers in order to make settlement more efficient. This type of credit business is, however, fundamentally different from the classic lending business. First, credit is extended solely on a very short-term basis, normally for less than a day. Second, it is largely collateralised and granted to clients with high creditworthiness. Furthermore, the credit lines granted can be revoked at any time.

Under its terms and conditions, Eurex Clearing AG only enters into transactions with its clearing members. Clearing mainly relates to defined securities, rights, derivatives and emission allowances 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 that one of its customers could become insolvent and that this could lead to losses for the Group as low. 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 might 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 uncol-lateralised 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 which each clearing member will have to contribute in this manner is the total amount such 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. The companies do this in the same way: 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 capital equal to at least 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. It applies an additional haircut to securities from issuers in high-risk countries or excludes them from being furnished as collateral altogether. 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 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, 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 contributes to a clearing fund, with the contributions based on its individual risk profile. This 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, and its own and Eurex Clearing AG's contributions to the clearing fund. Eurex Clearing AG uses regular stress tests to check whether its clearing fund matches the risks. 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 clearing 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 2017, collateral amounting to €47,912.9 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 €399 million as at 31 December 2017.
- 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 2017.
- Only then would the other clearing members' contributions to the clearing fund be used proportionately. As at 31 December 2017, aggregate clearing fund contribution requirements for all clearing members of Eurex Clearing AG amounted to €3,193.1 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 which exceeds the minimum regulatory equity would be used.
- Finally, the remaining minimum regulatory equity of Eurex Clearing AG would be drawn upon.

- In addition, 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 will not only contribute to the security and integrity of capital markets, but will also protect 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.

Potential losses which may result from a clearing member's default, and which exceed the resources of the defaulted clearing member, are covered via a "waterfall" consisting of multiple lines of defence. Eurex Clearing AG's own contribution is first in line, before the mutual clearing fund – or any other funds segmented along the risk-weighted liquidation groups – are drawn upon to cover losses.

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, all with a 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 (EC, 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 include 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 enough liquidity to meet 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 exclusively in the short term in order 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, and 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 member position is liquidated. If a Clearstream customer defaults, the – generally collateralised and 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, with 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 their liquidity needs which would result from a default of their two biggest clients, 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 2017 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 11 per cent of the Group's total risk. Business risk may result in revenues lagging budget projections or in costs being higher.

Business risk includes the risk that competitors, such as the exchanges CurveGlobal and Intercontinental Exchange (ICE) or Euronext, 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 to be relatively low.

If a state were to leave the eurozone or if a state were to become insolvent, this could mean that government bonds would not be redeemed or only would be redeemed in part. This might have a negative influence on Deutsche Börse Group's customers and reduce their trading volume in the future. Currently, the Group still views the probability of this risk occurring as low, and the possible consequences as medium.

Additional business risk may arise from regulatory requirements, or from the economic environment. For example, the introduction of a financial transaction tax, which continues to be supported by ten European states, might have a negative impact upon Deutsche Börse Group's business activities. Moreover, the UK's exit from the European Union might negatively affect clients' trading activity, or even – depending on the progress of the Brexit negotiations – involve regulatory disadvantages. A sustained period of weak trading activity on the market, after a significant downturn on the equity markets, for example, also represents a risk to the Group. Deutsche Börse Group simulates different scenarios in stress tests. These take into account the simultaneous occurrence of different business risk, such as the negative effects of stronger competition combined with a simultaneous loss of business due to new regulations.

Project risk
Project risk could result from the implementation of ongoing projects (such as the launch of new products, processes or systems) and could have a material impact on one or more of the three other risk categories (operational, financial and business risk). Project risk is not broken down further. Such risks are evaluated by the project owner and GRM and are already taken into account in the initial phase of substantial projects. Throughout 2017, regulatory changes brought about by the amended Markets in Financial Instruments Directive (MiFID II) and the Central Securities Depository Regulation (CSDR) continued to have a major impact on the project portfolio. While these projects need to ascertain Deutsche Börse Group's compliance with new regulatory requirements, initiatives such as the Regulatory

Reporting Hub are designed to support clients in their compliance with the new framework. Ultimately, project risk has an operational, financial and business impact, which is why it is quantified as part of these risk types. 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 2017 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, including in particular increased operational risk in the fields of cybercrime and taxes. That is also why the Group's risk profile increased in total. Deutsche Börse Group's risks were covered by sufficient risk-bearing capacity at all times during the reporting period, i.e. the allocated risk appetite limits were complied with.

As at 31 December 2017, the Group's EC amounted to €2,362 million, a 15 per cent increase year-on-year (31 December 2016: €2,056 million). The available risk-bearing capacity increased by 8 per cent to €4,128 million year-on-year (31 December 2016: €3,810 million). EaR as at 31 December 2017 were €812 million, while risk appetite was €1,399 million, based on the adjusted budgeted EBIT in 2017.

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 stress tests, on the required EC, which was calculated, and 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 2018, the aim is to further strengthen Group-wide risk management – with a focus on further improving collaboration with other central and control functions within the Group. On the one hand, this will be achieved through a harmonisation of Group-wide documentation and control processes, enhancing their efficiency and quality at the same time. On the other hand, a cross-divisional initiative will be launched to strengthen the risk culture within the company – for example, through training courses designed to promote the conscious management of risks. Furthermore, business continuity precautions are set to be expanded, to account for emergencies or crises.

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