

# Pillar III Disclosure Report of Clearstream Group 2012

Disclosures as of 31 December 2012

## **Pillar III Disclosure Report of Clearstream Group 2012 - According to § 26a Banking Act (Kreditwesengesetz, KWG) in conjunction with §§ 319–334 Solvency Regulation (Solvabilitätsverordnung, SolvV)**

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## Foreword

The purpose of the document is to fulfil regulatory disclosure requirements based on the “Basel II” rules, implemented in the European Union (EU) by the directives 2006/48/EC and 2006/49/EC (commonly known as “Capital Requirement Directives” or “CRD”).

Clearstream Holding AG (CH) has been classified as a financial holding company as defined in the German Banking Act (Kreditwesengesetz, KWG) and, together with its other subordinated companies, notably Clearstream International, S.A., Luxembourg (CI), Clearstream Banking S.A., Luxembourg (CBL) and Clearstream Banking AG, Frankfurt/ Main (CBF), forms a financial holding group under German law.

This Group (hereafter called Clearstream Group, CH-Group or Clearstream) is subject to consolidated supervision by the Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht, BaFin).

Clearstream Holding AG is, according to German law, a superordinated company of the regulatory Clearstream Group and therefore responsible for publishing this disclosure report.

The figures for the Clearstream Holding group (CHG) follow the consolidation provisions set out in § 10a (6) KWG and the German Generally Accepted Accounting Principles (GAAP) rules based on the German Commercial Code (Handelsgesetzbuch, HGB). As all Clearstream companies - regardless of accounting and/or regulatory consolidation - are included in the consolidated annual accounts/annual report of the ultimate parent company Deutsche Börse AG, Frankfurt/Main (DBAG), Clearstream Holding AG is, according to § 291 of the HGB, exempted from the obligation to draw up consolidated statutory accounts. Consolidated financial figures are therefore set up for regulatory purposes only.

In the following, we always refer to the respective laws in place during the reporting period.

# Foreword

## How this document is organised

The report is presented over eight chapters, as follows:

1. Introduction;
2. Implementation of Basel II at Clearstream;
3. Risk management overview;
4. Management of operational risk;
5. Management of credit risk;
6. Management of market risk, including interest rate risk in the banking book;
7. Management of liquidity risk;
8. Capital structure and solvency ratio.

An explanatory list of the abbreviations used is provided as an appendix to this document.

## Contact details

For further information or if you have specific questions regarding this report, please contact us at [clearstreamholding@clearstream.com](mailto:clearstreamholding@clearstream.com).

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# 1. Introduction

The information in this chapter is presented in the following sections:

[1.1 Background](#) below;

[1.2 The Basel II “Three Pillars” framework](#) on page 1-3;

[1.3 Information about Clearstream Group](#) on page 1-11.

## 1.1 Background

### 1.1.1 “Basel II” framework

On 4 July 2006, the Basel Committee on Banking Supervision (BCBS)<sup>1</sup> issued a comprehensive version of the Basel II Framework<sup>2</sup>.

The requirements expressed in the Basel II framework were transposed into European legislation as the Capital Requirements Directive (CRD), comprising Directive 2006/48/EC and Directive 2006/49/EC. CRD was consequently transposed into German and Luxembourg Law.

In Germany, the implementation is reflected mainly in the German Banking Act, the German Solvency Regulation (Solvabilitätsverordnung, SolvV) and the regulation governing large exposures and million loans (Großkredit- und Millionenkreditverordnung, GroMiKV). In Luxembourg, the Basel II framework was incorporated into the Law of 5 April 1993 and CSSF circular 06/273.

For the Clearstream Group (see [1.3.1 Group structure](#) on page 1-11), these national rules only are relevant in the “Basel II” context.

The Basel II framework itself does not apply to any of the Clearstream units. Nevertheless, the term “Basel II” is used throughout this document as it has become the commonly used synonym also for the national rules.

Due to ongoing permanent work to optimise banking supervision, and partly driven by the financial crisis starting in 2007, the BCBS issued, for public comment, Guidelines for Computing Capital for Incremental Risk in the Trading Book as well as Proposed Revisions to the Basel II Market Risk Framework<sup>3</sup> in July 2008. The final package with first major amendments to the Basel II regulation was published in July 2009.

1. Current members of the BCBS are the European Central Bank and the central banks or monetary authorities of: Algeria, Argentina, Australia, Austria, Belgium, Bosnia and Herzegovina, Brazil, Bulgaria, Canada, Chile, China, Croatia, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Latvia, Lithuania, Luxembourg, Macedonia, Malaysia, Mexico, the Netherlands, New Zealand, Norway, Peru, the Philippines, Poland, Portugal, Romania, Russia, Saudi Arabia, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Thailand, Turkey, the United Arab Emirates, the United Kingdom and the U.S.A. (see also <http://www.bis.org/about/orggov.htm>).

2. International Convergence of Capital Measurement and Capital Standards - A revised framework <http://www.bis.org/publ/bcbs128.htm>.

3. Guidelines for Computing Capital for Incremental Risk in the Trading Book, <http://www.bis.org/publ/bcbs141.htm>; Proposed Revisions to the Basel II Market Risk Framework, <http://www.bis.org/publ/bcbs140.htm>.

# Introduction

The July 2009 package<sup>1</sup>, with updates in 2010 and 2011, also known as “Basel 2.5”, enhanced the measurement of risks related to securitisations and the trading book. At EU level, the “Capital Requirements Directives CRD II+III”<sup>2</sup>, containing the above-mentioned enhancements and additionally new remuneration rules, was adopted in 2010 and incorporated into German and Luxembourg law. The changes were completed in 2010 and 2011 respectively.

## 1.1.2 Recent developments

After the first major amendment package to the Basel II regulation, the BCBS published in December 2010 the second major amendment package and a revised version in June 2011, also known as Basel III<sup>3</sup>.

In particular, Basel III includes a revised definition of capital, additional risk buffers for expected losses, the introduction of anticyclical capital buffers, the introduction of a leverage ratio (put simply, a minimum ratio of capital to unweighted total assets plus off-balance-sheet risk positions), stricter liquidity management requirements and closer monitoring of liquidity by supervisory authorities (in particular the introduction of two quantitative minimum ratios for short-term and medium-term liquidity) and credit valuation adjustments (CVA) for Over-The-Counter (OTC) derivatives counterparties.

The Basel III package also comprises a general revision of the capitalisation requirements for exposures to central counterparties (CCPs). This topic has been looked into further and the revised rules were finally published in July 2012<sup>4</sup>.

The Basel III rules contain partially transitional rules starting 2013 and lasting up until 2019.

Certain details with regard to liquidity and leverage ratios are foreseen to be adjusted and fine-tuned up until 2019.

Having finalised the Basel III framework, the BCBS is continuing the development of the regulatory framework. Meanwhile, rules for a fundamental review of the trading book<sup>5</sup>, systematically important banks (SIBs)<sup>6</sup> and on intraday monitoring of liquidity<sup>7</sup> have been issued. Some of these topics are sometimes called “Basel 3.5”. Furthermore, a consultation for internationally harmonised rules to limit concentration of large exposures<sup>8</sup> has started. In addition, the BCBS has indicated a broader review of the treatment of sovereign risk in the future.

The Basel III rules are in a process of being implemented in the EU by means of a regulatory package replacing the current CRD (EU directives 2006/48/EC and 2006/49/EC as amended). This package is commonly known as “CRD IV”, consisting of CRD (Capital Requirements Directive) and CRR (Capital Requirements Regulation).

The European transposition of Basel III is not only transforming the Basel III rules as such but also implementing additional components. These components include dedicated rules for capital requirements related to systematic risk and systematically important institutions (partially “Basel 3.5”), limits on the variable part of the remuneration, strengthened corporate governance rules and, by means of CRR being valid directly in all EU (EEA) countries, a more or less fully harmonised so called “single rule book” in the EU. A general agreement on the new rules was reached by the end of March 2013 and is now in process to be formally approved until mid 2013. The new rules are targeted to enter

1. Enhancements to the Basel II Framework, <http://www.bis.org/publ/bcbs157.htm>; Revision to the Basel II Market Risk Framework, <http://www.bis.org/publ/bcbs158.htm>; Guidelines for Computing Capital for Incremental Risk in the Trading Book, <http://www.bis.org/publ/bcbs159.htm>.
2. “CRD II Directives 2009/111/EC (regarding banks affiliated to central institutions, certain own funds items, large exposures, supervisory arrangements and crisis management), 2009/27/EC and 2009/83/EC (regarding technical provisions concerning risk management) and CRD III Directive 2010/76/EU (regarding capital requirements for the trading book and for re-securitisations, and the supervisory review of remuneration policies).
3. The main documents of this package are: “Basel III: A global regulatory framework for more resilient banks and banking systems”, <http://www.bis.org/publ/bcbs189.htm>, and “Basel III: International framework for liquidity risk measurement, standards and monitoring”, <http://www.bis.org/publ/bcbs188.htm>.
4. Capital requirements for bank exposures to central counterparties: <http://www.bis.org/publ/bcbs227.htm>.
5. Fundamental review of the trading book - consultative document: <http://www.bis.org/publ/bcbs219.htm>.
6. A framework for dealing with domestic systemically important banks - final document: <http://www.bis.org/publ/bcbs233.htm>; Global systemically important banks: Assessment methodology and the additional loss absorbency requirement - final document: <http://www.bis.org/publ/bcbs207.htm>.
7. Monitoring tools for intraday liquidity management - final document: <http://www.bis.org/publ/bcbs248.htm>.
8. Supervisory framework for measuring and controlling large exposures: <http://www.bis.org/publ/bcbs246.htm>.

into force in 2014. While the provisions of CRR are valid throughout the EU directly, the provisions of CRD together with a few rules of national discretion out of CRR need to be implemented into national law. Furthermore, the current national provision needs to be adjusted in order to reflect the direct validity of CRR.

Finally, certain technical standards in the course of the implementation need to be developed by the European Banking Authority (EBA) and put in place by the European Commission (EC). The remaining legal implementation steps are supposed to be finalised in 2013. However, practical implementation remains a challenge.

Whereas the Basel III rules only apply directly to global commercial banks with an international remit, the EU rules apply - as for Basel II - to all banks that operate in the EU. CRD IV therefore partly addresses both regional- and size-related issues and provides specific or modified regulations for certain types of business.

Clearstream has monitored the entire international (mainly Basel III) and EU (CRD IV) process in detail. The Group participates actively in the consultations, being in constant dialogue with the political rule setters and regulators, and will continue to be actively involved in this process in the coming years, including its incorporation in national law, making sure that political decision makers are aware of potential negative consequences for the market as a whole and ensuring that its business activities are taken into account as appropriately as possible.

Given the current status of the legislative package including its national implementation, the Group does not expect any material effect on the equity base of its regulated companies. Since specific issues - including the concrete application of the rules concerning the leverage ratio and liquidity ratios - have not yet been resolved, the ultimate impact on its business activities cannot be assessed as yet.

## 1.2 The Basel II “Three Pillars” framework

Basel II differentiates between three so-called pillars, which complement each other. [Figure 1-1](#) illustrates the “three pillars” model. In particular, for Pillar I, Basel II offers banks the possibility to use different risk measurement approaches, from simple (standardised) to sophisticated methods according to their business model.

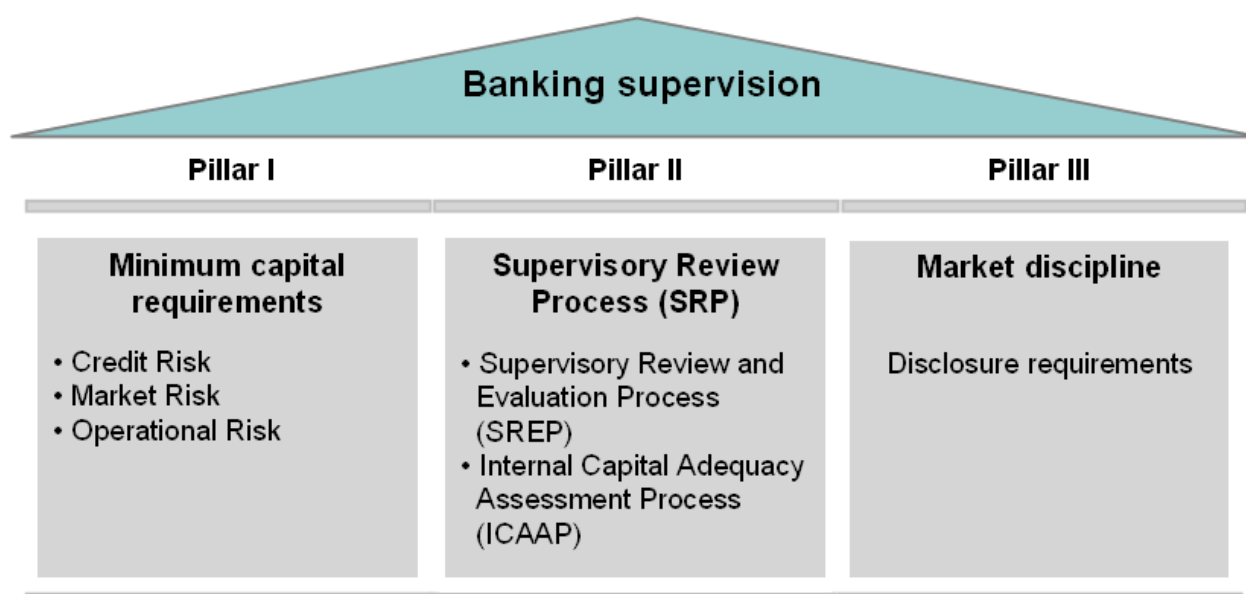


Figure 1-1. “Three pillars” model of Basel II

# Introduction

## 1.2.1 Pillar I

The first pillar deals with the minimum capital requirements. Capital requirements are to be calculated for credit risk, market risk and operational risk. The capital charge for each of the three risk categories has to be calculated using an approach that is suitable and sufficient for the individual bank. For the sake of an evolutionary approach, both simple and more refined measurement methods have been defined for each risk category.

The minimum capital requirements (capital ratio) must be at least 8%. The capital ratio is calculated by dividing the eligible regulatory capital by the capital requirements of the operational and market risks, multiplied by a specified factor (12.5) and added to the risk-weighted assets (RWA) for credit risk. The calculation of the RWA is fully described in [Credit risk](#) on page 1-4.

[Figure 1-2](#) gives a simplified overview of the calculation of the minimum capital requirements (capital ratio).

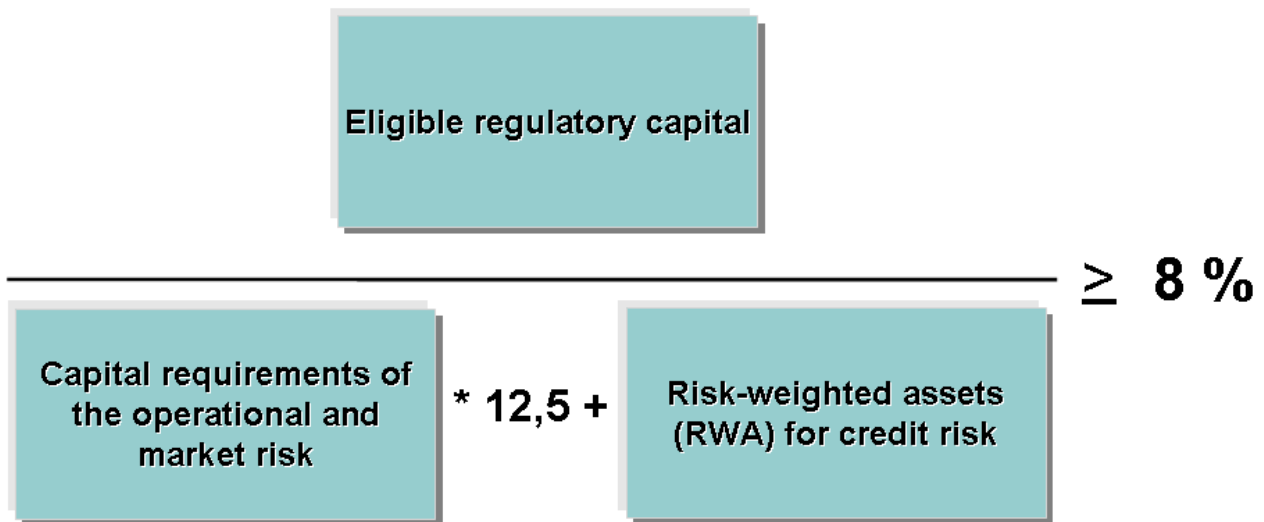


Figure 1-2. Calculation of the minimum capital requirements (capital ratio)

If the supervisory authority concludes that application of the risk measurement method is not adequate or appropriate (for example, the method is not sufficient for the particular bank or specific type of business, or the business risk is not appropriately reflected in the method), the supervisory authority may ask for additional capital requirements via Pillar II.

## Credit risk

To measure the credit risk, one simple approach (Standardised Approach - StA) and two advanced approaches (Foundation Internal Rating Based Approach (FIRB) and Advanced Internal Rating Based Approach (IRBA)) are available. The Standardised Approach is based on external credit risk assessments and the two advanced approaches are based on internal ratings.

The calculation of the Risk-Weighted Assets (RWA) for credit risk is shown in [Figure 1-3](#).



Figure 1-3. Calculation of the RWA

The basis for assessment is, in principle, the asset value taking into account the eligible credit risk mitigation techniques (see [Credit Risk Mitigation \(CRM\)](#) on page 1-6). The basis for assessment must be multiplied by a regulatory risk weight that depends on predefined regulatory asset classes.

[Figure 1-4](#) illustrates the choices regarding the assessment of credit risk. In general the capital charge decreases and the risk sensitivity increases with the complexity of the approach. Furthermore, the implementation and running efforts and costs are also increasing with complexity.

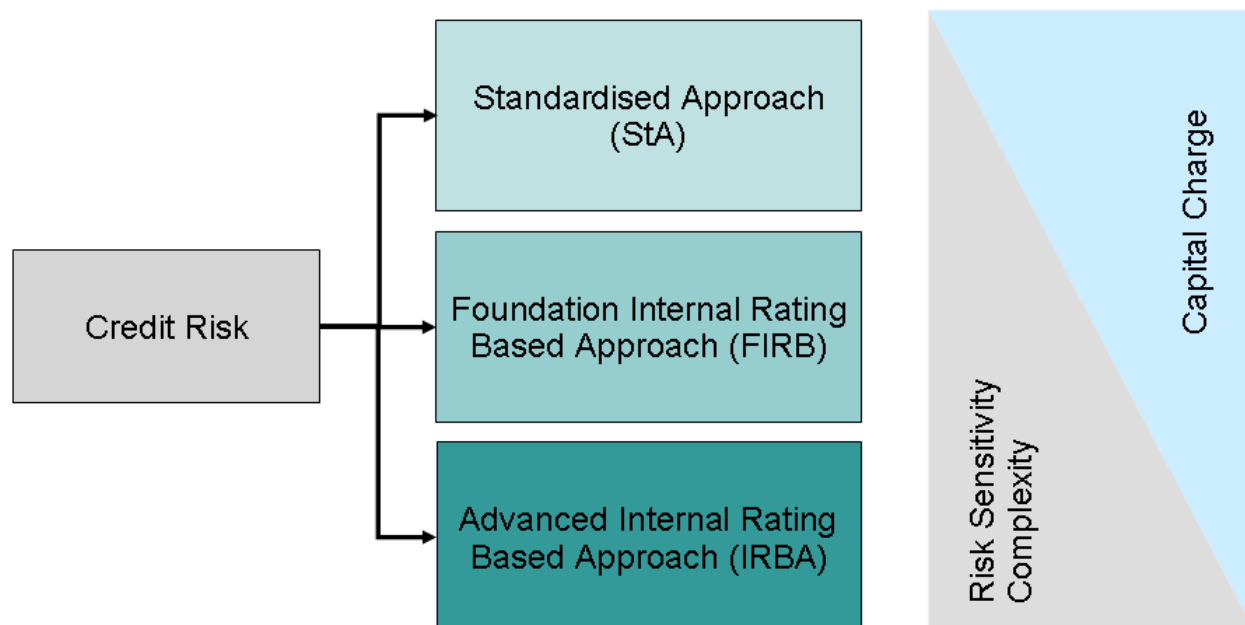


Figure 1-4. Possible calculation methods for the credit risk

The Standardised Approach defines 15 regulatory asset classes<sup>1</sup> that relate partially to counterparty type only and partially to a specific type of business. The risk weights of each of these classes (for example, central governments, public sector entities, corporate institutions, securitisations, covered bonds, participations etc.) are fixed (for example, 0%, 20%, 50%, 100% etc.); or depend on ratings given by an accepted external credit assessment institution (ECAI), such as Moody's, Standard & Poor's, Fitch etc.; or are based on credit assessments by Export Credit Agencies (for example, Euler Hermes Kreditversicherungs AG, the Organisation for Economic Cooperation and Development (OECD) etc.) for the purposes of exposures for central governments and central banks.

Credit institutions may use these Export Credit Agencies' credit assessments if the chosen Export Credit Agency participates in the OECD "Arrangement for Officially Supported Export Credits" or the Export Credit Agency publishes its credit assessment and subscribes to the OECD agreed methodology.

Furthermore, the credit assessment of the Export Credit Agency must be associated with one of the minimum export insurance premiums (MEIP) that the OECD establishes under this methodology. In Germany and Luxembourg, the risk weights for banks, local and regional governments and other public sector entities are in general derived from the risk weighting of the respective country of residence.

In order to use the FIRB or the IRBA, banks must fulfil a number of additional requirements. A detailed review of processes, estimates and documentation, as well as explicit permission from the respective supervisor, is necessary to be allowed to use one of the Internal Rating Based Approaches for the calculation of the risk-weighted asset amounts.

1. CRD defined 16 exposure classes and CSSF 06/273 14 classes. The different number of exposure classes leads only to a different presentation of calculation results, not to a different total.

# Introduction

Even further developments of the advanced risk measurement systems must be approved by the respective supervisory authority. Using these approaches, the bank does not rely on information provided by an external rating agency but carries out its own assessments, which form the basis for determining potential future losses. These calculated potential losses are in turn used as the basis for the corresponding capital requirements.

The permission of the supervisory authority may be granted:

- In general, for probability of default (PD<sup>1</sup>) estimates (Foundation Internal Rating Based Approach - FIRB); or
- For probability of default estimates and own estimates of loss given default (LGD<sup>2</sup>) and maturity adjustment for effective maturity based on PD (Advanced Internal Rating Based Approach (IRBA)).

## Credit Risk Mitigation (CRM)

It is at the discretion of each institution whether to use credit risk mitigation techniques or not.

If an institution decides to use any credit risk mitigation techniques, the institution must consider various operational and procedural requirements besides quantitative requirements. The pool of possible collateral to be used is in principle enlarged in the two advanced credit risk approaches compared with the standardised credit risk approach.

Basel II defines two methods to calculate the credit risk mitigation of financial collaterals: the Simple Approach and the Comprehensive Approach. Depending on the calculation method used, only predefined financial collateral types can be considered.

The Simple Approach is a substitution approach. The risk weight that would be assigned under the provisions of the standardised credit risk approach, if the lender institution had a direct exposure to the issuer of the collateral instrument, shall be assigned to those portions of claims collateralised by the market value of generally eligible financial collateral. The remainder of the exposure shall receive the risk weight that would be assigned to an unsecured exposure to the counterparty under the provisions of the standardised credit risk approach.

In the Comprehensive Approach, institutions must calculate their adjusted exposure to a counterparty in order to take account of the effects of that collateral. Using haircuts, banks are required to adjust both the amount of the exposure to the counterparty and the value of any collateral received in support of that counterparty to take account of possible future fluctuations in the value of either, occasioned by market movements. This will produce volatility adjusted amounts for both exposure and collateral.

Additionally where the exposure and collateral are held in different currencies an additional downwards adjustment must be made to the volatility adjusted collateral amount to take account of possible future fluctuations in exchange rates. Institutions have two ways of calculating the haircuts:

- Standard supervisory haircuts;
- Own-estimate haircuts, using own internal estimates of market price volatility.

Supervisors allow banks to use own-estimate haircuts only when they fulfil certain qualitative and quantitative criteria.

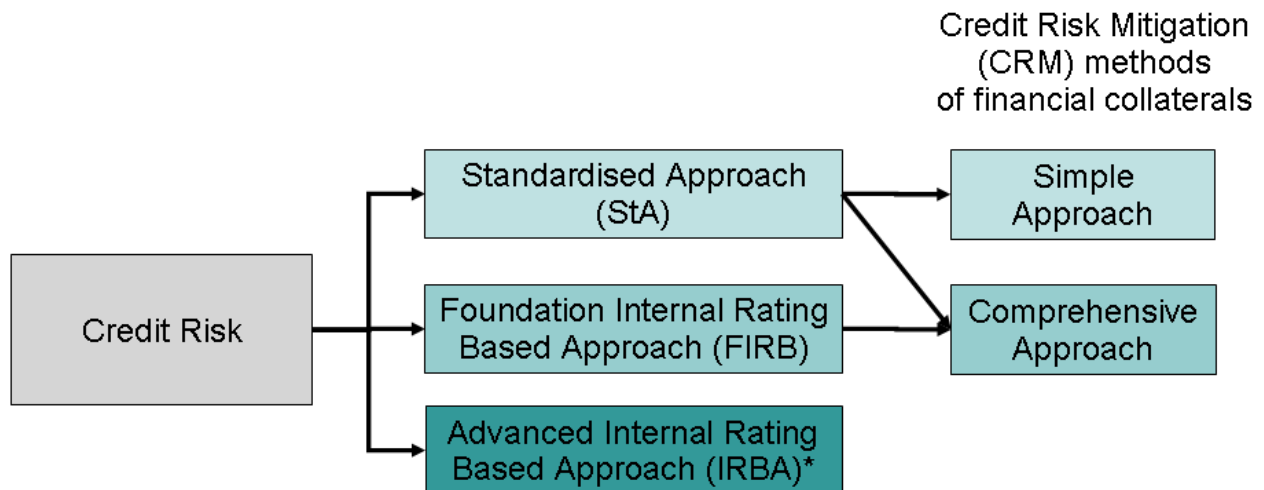
In summary, it can be noted that the comprehensive approach for credit risk mitigation allows taking into account many more financial collateral types with only a slight increase in the complexity of the calculation method.

[Figure 1-5](#) gives a simplified overview of the calculation methods of financial collaterals under Basel II.

1. PD: the probability (as a percentage) of default by a counterparty over a one-year period.

2. LGD: the ratio (as a percentage) of the loss on an exposure due to the default of a counterparty to the amount outstanding at default.





\* Credit Risk Mitigation is taken into account as part of the LGD assessment.

Figure 1-5. Overview of calculation methods of financial collaterals

## Market risk

Market risk is typically defined as the uncertainty about future earnings and about the value of assets and liabilities (on or off balance sheet items) due to changes in interest rates, foreign exchange rates, security prices or commodity prices.

Basel II distinguishes between the bank's trading book (held with trading intent [short-term] and typically valued marked-to-market) and the non-trading or banking book (typically held for a longer term or to generate permanent earnings [hold or income-making intention]) and attaches different requirements accordingly.

Certain positions cannot be allocated by the nature of the position but need dedication. The institution needs to have a clear policy for allocation and must document the current allocation. If the positions finally allocated to the trading book exceed certain thresholds, capital requirement rules for the trading book apply. If the thresholds are not surpassed, those rules are not relevant. This corresponds with a classification as Non-Trading book institution according to § 2 (11) German Banking Act (Kreditwesengesetz, KWG) and under Luxembourg law with the "simplified ratio" (CSSF circular 06/273 part V, chapter 2).

Market risk under the perspective of Pillar I is defined as the risk of losses in positions (on and off balance sheet) arising from movements in market prices. The risks subject to this requirement are as follows:

- The risks pertaining to interest rate related instruments and equities in the trading book only;
- Foreign exchange risk and commodities risk independent of trading book allocation.

The interest rate risks of the banking book are taken into account under Pillar II (in the context of other or further risks).

Basel II defines two methods to calculate the capital requirements for market risk (standardised approach and internal models).

# Introduction

## Operational risk

The main drivers of operational risk in banks are the growing dependence of banking operations on IT systems, the enlarged use of electronic banking, the progressive development of risk systems and, especially, the increasing complexity of business processes in banking.

In this context, operational risk is by nature very different from credit risk and market risk. Operational risk is far more difficult to capture because it is inherent to many activities and is still nearly inevitable. Recent events have shown that operational risk can be significant, and resulting losses can even threaten a bank's existence.

Basel II defines three methods to calculate the capital requirements for operational risk as shown in [Figure 1-6](#).

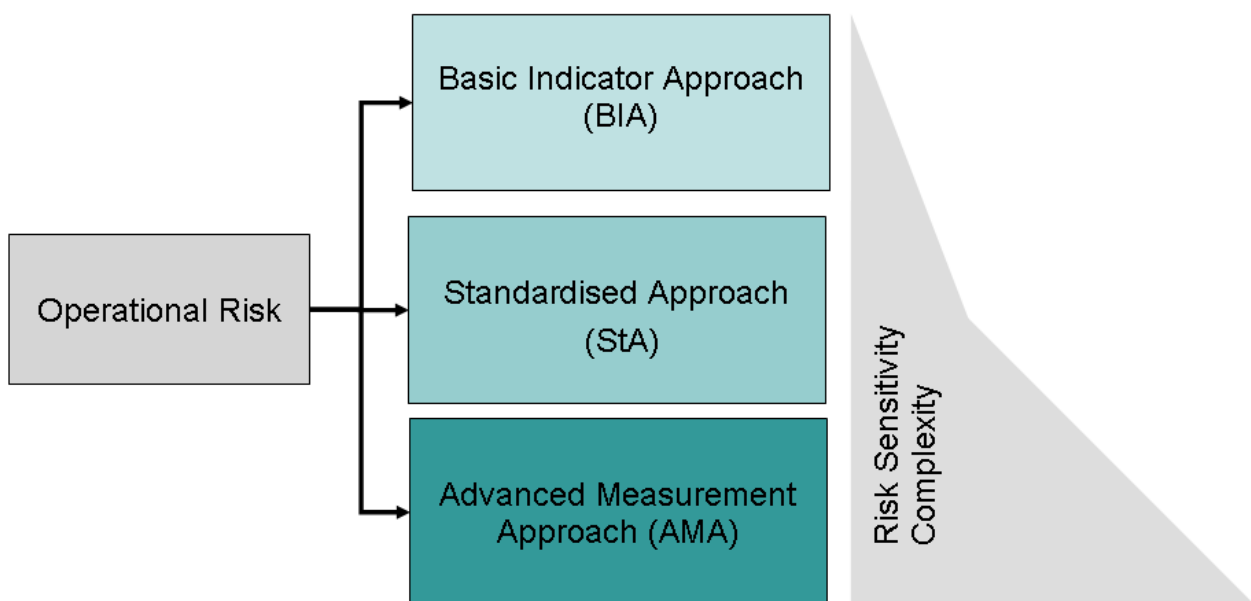


Figure 1-6. Possible calculation methods for the operational risk

Complexity and risk sensitivity in the two more simple approaches are similar, whereas it is much higher in the advanced approach.

First of all, there is the **Basic Indicator Approach (BIA)**, in which a bank's operational risk is estimated as a percentage (alpha factor 15%) of the gross income<sup>1</sup>. This approach involves a simple calculation but is not very risk sensitive.

Next is the **Standardised Approach (SA)**, which splits business into predefined business lines. The operational risk is estimated as a specified percentage (beta factor 12%, 15% or 18%) of "gross income" per business line. This can be seen as a basic indicator approach applied to each business line.

The **Advanced Measurement Approach (AMA)** requires internal loss data and model-based methods to calculate the regulatory capital requirements. Comparable to the Advanced Internal Rating Based approaches, explicit permission as well as a detailed review of processes, estimates and documentation by the respective supervisory authority is necessary to be allowed to use the AMA to calculate the operational risk amounts. The application of advanced measurement approaches will be subject to both qualitative and quantitative criteria, and banks will be allowed to recognise the risk mitigating impact of insurance.

1. The "gross income" is calculated as a three-year average. Details of how to calculate the "gross income" are defined in the German Solvency Regulation and CSSF circular 06/273.

1.2.2 Pillar II

The risks of Pillar I and further significant and substantial risks must be included in an integrated capital management and risk management consideration. The following figure gives a basic overview of one possible integrated risk profile.

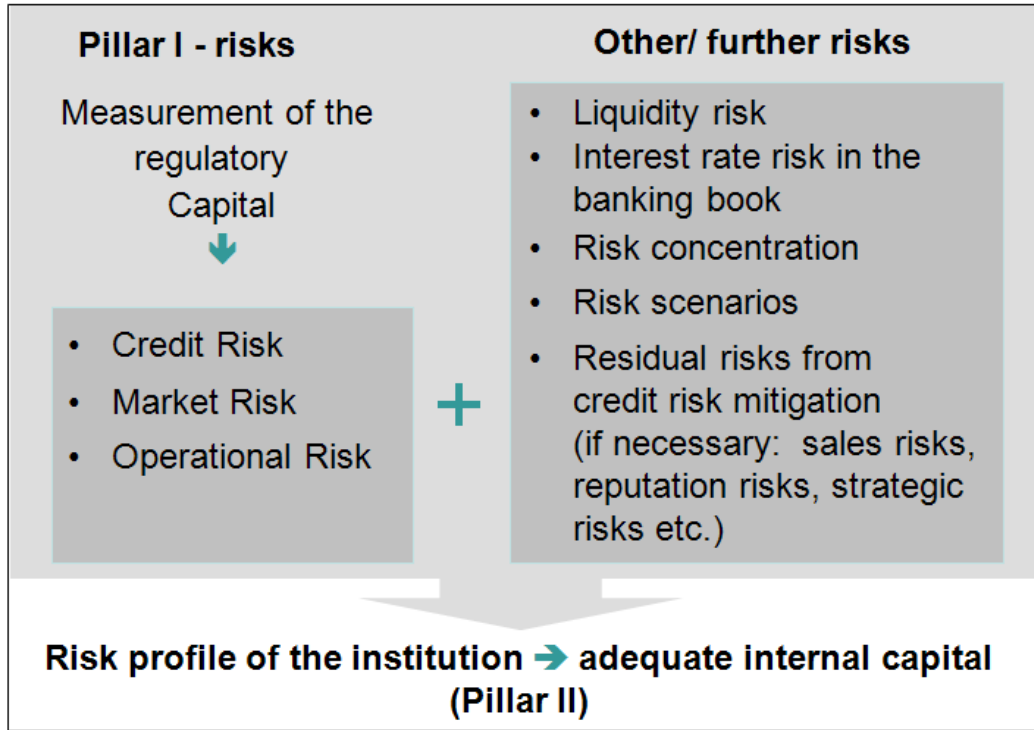


Figure 1-7. Integrated risk consideration (Pillar II)

The Basel Committee has summarised the goals of the second Pillar in four principles of prudential supervision. These four principles relate, on the one hand, to the bank's internal procedures and strategies to identify and to maintain sufficient equity (principle 1 - Internal Capital Adequacy Assessment Process [ICAAP]) and, on the other hand, to the Supervisory Review and Evaluation Process (principles 2, 3 and 4 - SREP) adapted to it. All together are called the **Supervisory Review Process (SRP)**.

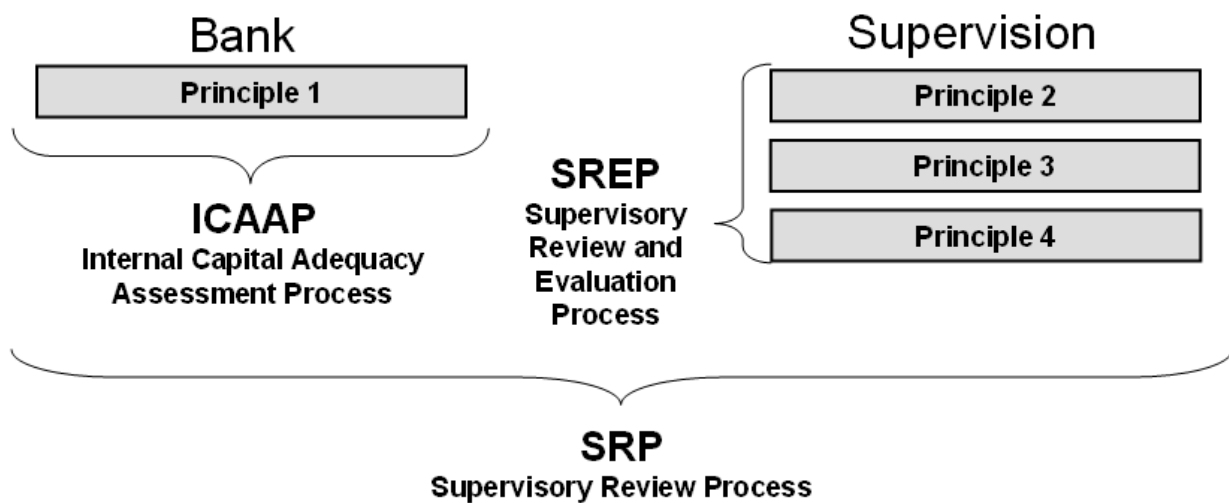


Figure 1-8. Prudential supervision principles

# Introduction

The four principles of prudential supervision are as follows:

**Principle 1:**

Banks should have a process for assessing their overall capital adequacy in relation to their risk profile and a strategy for maintaining their capital levels.

**Principle 2:**

Supervisors should review and evaluate banks' internal capital adequacy assessments and strategies, as well as their ability to monitor and ensure their compliance with regulatory capital ratios. Supervisors should take appropriate supervisory action if they are not satisfied with the result of this process.

**Principle 3:**

Supervisors should expect banks to operate above the minimum regulatory capital ratios and should have the ability to require banks to hold capital in excess of the minimum.

**Principle 4:**

Supervisors should seek to intervene at an early stage to prevent capital from falling below the minimum levels required to support the risk characteristics of a particular bank and should require rapid remedial action if capital is not maintained or restored.

In summary, it can be stated that the SRP requires banking supervisory authorities to carry out qualitative reviews in order to ensure that the internal processes necessary for assessing the bank's specific risk situation and that appropriate capital resources exist, function and undergo constant improvement in each bank.

Under Pillar II, banks are obliged to have a process for assessing their overall capital adequacy in relation to their risk profile and a strategy for maintaining their capital levels (ICAAP). On the other hand, Pillar II lays out the interaction between the banks' own assessments and processes as well as the response of the banking supervisors. If the capital adequacy is deemed unsatisfactory, regulators may require the bank to raise additional capital immediately or to prepare and implement a capital restoration plan.

## 1.2.3 Pillar III

The third pillar, named Market Discipline, is also known as "regulatory disclosure" requirements. The disclosure requirements are a basic prerequisite for sound information standards among all market participants. This in turn allows market forces to take effect without obstructions, thus indicating the prevalence of market discipline.

The accord contains disclosure requirements and recommendations for various areas of banking operations, including the methods a bank uses to estimate its risks or how the bank determines its capital adequacy (that is, the relationship between equity and overall risk). The bulk of these disclosure requirements will apply to all banks, and more detailed requirements have to be fulfilled from banks using internal methods.

The present report serves the purpose of meeting these requirements and providing interested parties with further essential information about the business and risk situation of Clearstream Group.

## 1.3 Information about Clearstream Group

### 1.3.1 Group structure

Clearstream Holding AG and its subsidiaries are fully owned by DBAG and are highly integrated into Deutsche Börse Group. The ownership and structure of the group is shown [Figure 1-9](#).

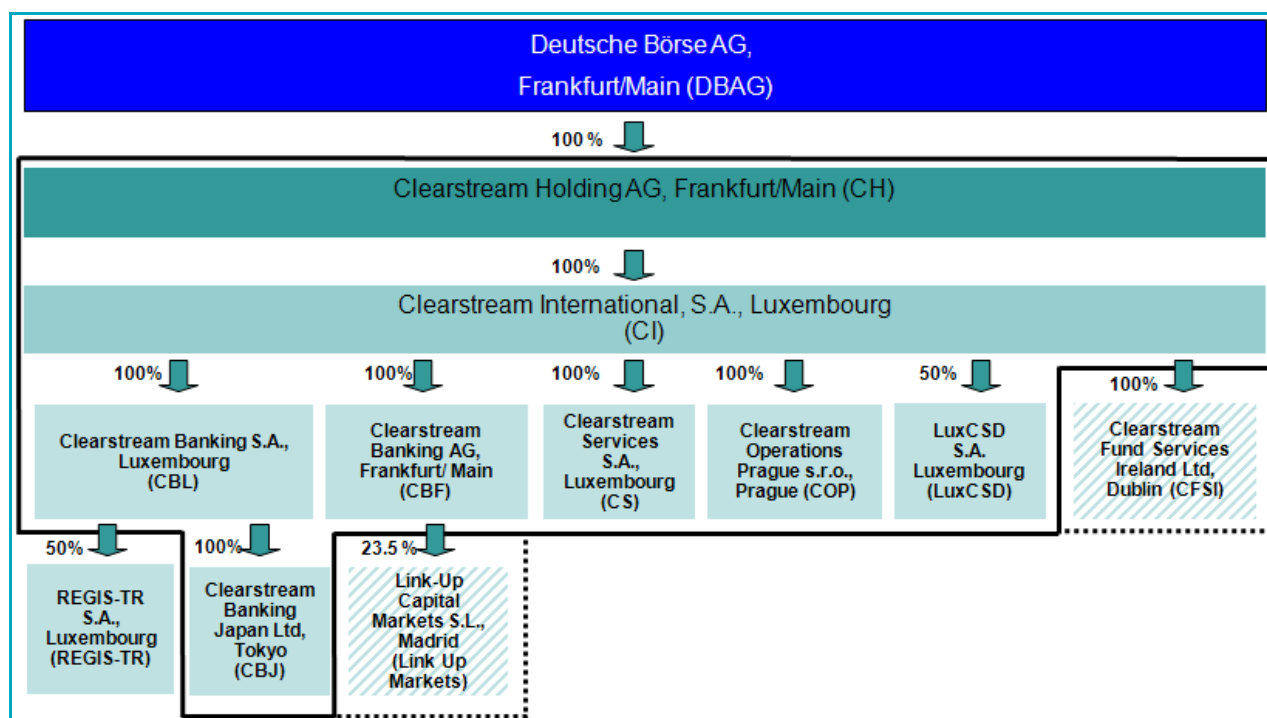


Figure 1-9. Structure and ownership of Clearstream Group

Clearstream Holding AG acts as a pure holding company for the shareholding in Clearstream International, S.A. and as a financial holding company under German banking law being recognized by BaFin as the superordinated company according to § 10a (3) sentence 8 KWG.

Within the subsidiaries of Clearstream International, S.A. there are companies which are not included in the regulatory consolidation.

Clearstream International, S.A. and its main subsidiaries act in the securities settlement and custody area. Clearstream Banking S.A., Luxembourg (CBL), thereby acts as an International Central Securities Depository (ICSD) and Clearstream Banking AG, Frankfurt/Main (CBF), as the German Central Securities Depository (CSD).

CBL and CBF are both supported by Clearstream Services S.A., Luxembourg (CS), Clearstream Operations Prague s.r.o., Prague (COP), and Clearstream International, S.A., Luxembourg (CI), which perform supporting tasks like IT, both development and operations, settlement and custody operations, central functions and other services. Clearstream Banking Japan Ltd, Tokyo (CBJ), provides customer liaison in Japan and support accessory business activities.

Clearstream International, S.A., Luxembourg, and Banque centrale du Luxembourg, the Grand Duchy's central bank, jointly own LuxCSD S.A., which operates a central securities depository for Luxembourg securities and connects the Grand Duchy of Luxembourg's financial industry to the future TARGET2-Securities (T2S) platform. The company acts under the regulatory status as Professional of the Financial Sector (PSF) and as SSS (Securities Settlement System).

# Introduction

Clearstream Banking S.A., Luxembourg, and Sociedad de Gestión de los Sistemas de Registro, Compensación y Liquidación de Valores S.A.U., Madrid, Spain (Iberclear) jointly own REGIS-TR S.A., Luxembourg, a trade repository that has applied for a licence according to Article 55 in connection with Article 56 of Regulation (EU) No 648/2012 [EMIR]<sup>1</sup> on 5 April 2013.

Accordingly, REGIS-TR will operate as the trade repository for all asset classes in line with the EMIR provision once the European Securities and Markets Authority (ESMA) has granted the respective licence.

REGIS-TR is currently licensed as a PSF according to the general provisions of the Luxembourg Law of April 1993, which is the preliminary regulatory framework for its future operation. Once the EMIR licence is granted, the CSSF will withdraw the PSF status as it is not seen necessary in parallel to the EMIR licence.

Clearstream Banking AG, Frankfurt/Main, participates in the international joint venture of central securities depositories Link-Up Capital Markets S.L., Madrid, Spain (Link Up Markets). The participation share as at 31 December 2012 amounts about 23.5%.

Clearstream International, S.A. operates a branch in London and Clearstream Banking S.A. operates a branch in Singapore as well as a network of representative offices in New York, London, Tokyo, Hong Kong, Singapore and Dubai.

In July 2012, CBL registered a branch in Dublin under EU-passporting regulations to extend its post-trade offering in the area of investment funds to hedge funds. The branch started its first activities on 1 September 2012. It extends the company's investment funds business to alternative funds and enables Clearstream to service the entire range of funds: mutual funds, exchange-traded funds and hedge funds.

In addition to the branch, CI acquired, in 2012, 100% voting shares of Clearstream Fund Services Ireland Ltd (CFSI). CFSI, which currently has no regulatory status, is intended to provide operational support for the activities of CBL's investment fund business.

The composition of the regulatory Clearstream group is shown in Figure 1-9 within the black frame. REGIS-TR has been classified as an "other undertaking" by BaFin and is therefore not included in regulatory consolidation.

According to § 10a (4) of the German Banking Act, Link Up Markets and CFSI must, in principle, each be consolidated under regulatory terms. Due to the small size of operations Clearstream Holding has requested an exemption from consolidation according to § 31 (3) sentence 4 German Banking Act, which has been granted by BaFin for both companies.

## 1.3.2 Business operations and supervision

### **Clearstream Holding AG, Frankfurt/Main (CH):**

CH is classified as a financial holding company according to §1 (3a) KWG.

CH acts solely as a holding company for the interest in CI and its subsidiaries and does not have material additional business activities and therefore risk positions. Moreover CH is the superordinated company of the financial holding group according to §10a (3) KWG. CH in its role as superordinated company is responsible to fulfil the regulatory obligations on a consolidated/group level towards the German supervisory authorities and the college of supervisors.

### **Clearstream International, S.A., Luxembourg (CI):**

CI is authorised in Luxembourg as an "other Professional of the Financial Sector" (specific type of PSF) according to article 26 of the Luxembourg law of 5 April 1993 on the financial sector.

Moreover, CI is defined as "financial holding company" (CI Group) in accordance with article 48 of the Luxembourg Law of 5 April 1993.

1. Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:201:0001:0059:EN:PDF>.

The purpose of the Company is, among other things, to undertake financial services related to the safekeeping, administration, clearing and settlement of securities, precious metals, derivatives and other financial instruments within the Grand Duchy of Luxembourg and abroad. CI acts mainly as collateral agent and guarantor for securities lending transactions.

In the context of the Clearstream Group, CI delivers support services to its subsidiaries. The main support services relate to finance, human resources, internal control, risk management etc.

### **Clearstream Banking S.A., Luxembourg (CBL):**

CBL's mission is to deliver to financial institutions competitive and high-quality settlement, custody and related services across markets.

These services include:

- Delivery versus payment and delivery free of payment settlement transactions;
- Comprehensive custody management;
- Value-added services, such as securities lending, collateral management etc.; and
- Transactional information distribution.

CBL currently accepts over 850,000 securities for custody and settlement, including:

- Debt instruments, such as:
  - Eurobonds (for example, straight, floating rate, convertible);
  - government bonds (Bunds);
  - mortgage bonds;
  - municipal bonds;
  - money-market instruments, including short-term and medium-term notes, commercial paper and certificates of deposit;
  - corporate bonds;
  - international bonds;
  - convertible bonds;
- Equities, such as bearer shares and registered shares, as well as depository receipts;
- Warrants and certificates;
- Investment fund units;
- Other securities, such as international securities held in collective safe custody, for example, German certificates representing international securities;
- Gold bullion (traded on the Luxembourg Stock Exchange).

Clearstream Banking S.A. is licensed as a securities settlement system (SSS) according to Title V of the Luxembourg Law of 10 November 2009 relating to payment services. The Banque centrale du Luxembourg (BCL) is responsible for the prudential supervision of SSSs (in accordance with article 110 of the law of 10 November 2009). The focus of the supervision is the operational and financial stability of each system and participants in systems as well as the stability of the financial system as a whole.

Furthermore, specific regulations for SSSs must be taken into account (for example, Circulars BCL 2001/163 and 2001/168).

The CSSF continues to be the competent authority for the supervision of CBL as credit institution according to articles 42 and 43 of the Luxembourg law of 5 April 1993 and, in addition, BCL has a shared responsibility for liquidity supervision on the basis of article 2 (4) of the Law of 23 December 1998 concerning the monetary status and the Banque centrale du Luxembourg.

CBL maintains relationships with around 2,500 customers in over 110 countries. Its global network extends across 52 domestic markets.

# Introduction

CBL established a branch in Singapore that obtained a banking licence on 23 November 2009. The activities of the branch are supervised by the Monetary Authority of Singapore (MAS). The following CBL activities related to the Asian Pacific region are, among others, handled via Singapore: Credit, Treasury, new issues, account administration, securities settlement, certain asset services, the management of the custodian and cash correspondent bank (CCB) network.

In September 2012, Clearstream Banking S.A. opened a hedge funds processing centre in Dublin, comprising a CBL branch, under the host supervision of the Central Bank of Ireland, and a subsidiary of CI performing the processing tasks on an outsourcing basis. The services provided to hedge funds include sending orders and receiving confirmations, instructing on customers' account at the register, receiving account statements and all shareholder information, as well as other administrative support activities.

Representative offices of CBL are subject to the limited supervision of the local regulators, according to and to the extent provided by the local legislation.

## **Clearstream Banking AG, Frankfurt/Main (CBF):**

CBF offers settlement, custody and related services in both the Collective Safe Custody (CSC, mainly German domestic) and the Non-Collective Safe Custody (NCSC) businesses. The focus of the settlement business is thereby on the settlement of stock exchange transactions.

CBF is the only central securities depository in Germany. It operates a large vault where most of the securities issued in Germany and even securities issued elsewhere are stored. Within the frame of individual or collective safe custody, the settlement and asset servicing of domestic and international securities are offered. These services include:

- Delivery versus payment and delivery free of payment settlement transactions;
- Comprehensive custody management;
- Value-added services like securities lending, collateral management etc.; and
- Transactional information distribution.

CBF currently accepts the same securities as CBL in the NCSC business (over 850,000 securities) and 990,000 securities in the CSC business for custody and settlement.

Related to the NCSC business, all instruments eligible in CBL (except Gold bullion) are also eligible in CBF.

Owing to the different customer base (mainly European banks at CBF; many international banks at CBL), the number of different securities held by customers in NCSC is nevertheless lower at CBF.

For the CSC business, the securities eligible include:

- Debt instruments, such as:
  - government bonds (Bunds);
  - mortgage bonds;
  - municipal bonds;
  - money-market instruments, including short-term and medium-term notes, commercial paper and certificates of deposit;
  - corporate bonds;
  - international bonds;
  - convertible bonds;
- Equities, such as bearer shares and registered shares;
- Warrants and certificates;
- Investment fund units.

Beyond that, CBF acts as trustee to cover specific types of asset-backed bonds. With respect to commodity-backed bonds, the commodity (Gold) is stored physically in the vaults of CBF. For bond issues covered by securities, CBF performs safekeeping as Central Securities Depository and, as trustee, offers an increased level of protection for investors by virtue of its significantly low-risk business and operational model. Moreover, CBF offers its customers the Global Securities Financing (GSF) service, through which market participants can lend and grant securities and cash against collateral.



CBF is subject to German supervision and is supervised as credit institution (according to § 1 (1) German Banking Act) by BaFin and the Bundesbank; as securities settlement system (SSS) (according to § 24 b German Banking Act) by the Bundesbank; and as a central securities depository (according to § 1 (3) German Securities Deposit Act) by the competent federal state authorities.

### **Clearstream Services S.A., Luxembourg (CS):**

CS is responsible for IT development and production. It develops and maintains the hardware and software and operates the IT systems. Furthermore, CS acts as IT operator and offers third-party IT services.

CS offers IT services to non-group financial entities and is supervised in Luxembourg as a “PSF connexe” (specific type of PSF) according to articles 29-2 to 29-4 of the Luxembourg law of 5 April 1993.

### **Clearstream Operations Prague s. r. o., Prague (COP):**

COP is not a regulated entity. Since COP insources services directly or indirectly from CBL, based on a memorandum of understanding between the BCL and the Czech National Bank (CNB), the Czech National Bank performs local oversight on behalf of the BCL.

COP operates services for the Clearstream Banking units. As these arrangements are governed by outsourcing contracts according to Luxembourg and German regulatory standards, the services performed are fully monitored and managed by Clearstream management structures and processes. Therefore, they are an integral part of all required supervision processes.

### **LuxCSD S.A., Luxembourg (LuxCSD):**

LuxCSD was created within the context of the future implementation of the Eurosystem’s TARGET2-Securities (T2S) initiative. T2S will bring a single integrated process across Europe for delivery versus payment (DVP) settlement in EUR central bank money. The development of T2S coupled with other significant market and regulatory initiatives were the key drivers for introducing central bank money settlement in Luxembourg and for preparing a national access point to T2S.

In addition, LuxCSD also provides issuing, central settlement and custody services for securities of all types, including shares in investment funds.

LuxCSD started operations in 2011 and, as the focus is currently related to the start of T2S, there are currently only limited business transactions.

### **REGIS-TR S.A., Luxembourg (REGIS-TR):**

REGIS-TR is a European central register where all contracts agreed over a wide variety of derivative financial instruments traded, OTC or on-exchange, can be recorded, giving market participants and regulators a consolidated view of positions. REGIS-TR will facilitate administrative tasks and will help to improve operational management of these transactions. The trade repository is targeted to comply with the new regulatory requirements as laid down in the proposed regulation on OTC derivatives, central counterparties and trade repositories proposed by EMIR, which aims at increasing the transparency in the OTC derivatives markets. A respective licence application was submitted to ESMA on 5 April 2013.

Since 2010, REGIS-TR is fully included in the consolidated financial statements. With regard to the consolidation provisions set out in the KWG, REGIS-TR has been classified by BaFin as an “other undertaking” and is therefore not included in regulatory consolidation (see [Figure 1-9.](#) on page 1-11).

### **Clearstream Banking Japan Ltd, Tokyo (CBJ):**

The purpose of CBJ is to engage in marketing, information providing service and advertising; holding financial seminars and other education and trainings; support of existing customers of group companies and any other business activities relating to any of the preceding.

## Introduction

### **Link-Up Capital Markets S.L., Madrid (Link Up Markets):**

Since the launch of Link Up Markets in 2008 by seven CSDs, CBF participates in a joint venture to improve efficiency and reduce costs of post-trade processing of cross-border securities transactions.

Link Up Markets has established a common infrastructure enabling the easy implementation of links between CSD markets and introducing efficient cross-border processing capabilities. By connecting to the common infrastructure, each participating CSD has access to the services of the other participating CSD markets across all available asset classes.

Currently, 11 CSDs are partners in the joint venture, based in Madrid, Spain. Each participating CSD took an equity stake.

### **Clearstream Fund Services Ireland Ltd (CFSI):**

Clearstream Fund Services Ireland Ltd (CFSI) was founded in March 2012 as Hedge Fund Investment Services Ltd. The company provides the technical platform and operational support allowing CBL to complete and forward orders received from its clients to agent of the hedge or alternative fund. Moreover, CFSI collects alternative fund specific reference data and statistical information for CBL.

Clearstream International, S.A. currently holds 100% of the voting rights of CFSI.

## 2. Implementation of Basel II at Clearstream

The information in this chapter is presented in the following sections:

[2.1 Pillar I: Minimum capital requirements](#) below;

[2.2 Pillar II: Supervisory Review Process \(SRP\) and Internal Capital Adequacy Assessment Process \(ICAAP\)](#) on page 2-2;

[2.3 Pillar III: Market discipline](#) on page 2-2;

[2.4 Regulatory environment](#) on page 2-4.

### 2.1 Pillar I: Minimum capital requirements

According to its business operations and the associated risks, Clearstream has selected for each risk category the most appropriate and efficient approach for measurement.

Granting loans is not Clearstream's core business. Credit risk mainly arises in the short term and with credit institutions or governmental counterparties. Therefore, Clearstream has selected the standardised approach to assess the credit risk under Pillar I.

Credit risk is derived from short-term money-market investments (without trading intent), exposures on interbank operational accounts and investments in government or other eligible securities. Treasury counterparties as well as Cash Correspondent Banks for the operational network are selected based on a high degree of creditworthiness and operational reliability. Furthermore, overdrafts to customers are given based on credit assessment and, in general, on a collateralised basis (see also [5. Management of credit risk](#) on page 5-1).

As both investments and overdrafts to customers are collateralised to a high degree, Clearstream has selected the comprehensive approach for credit risk mitigation.

Contrary to credit risk, operational risk is much more important to Clearstream compared to conventional commercial banks.

All of Clearstream's operations rely on a complex IT system that connects a variety of financial markets, instruments and various currencies across different time zones around the world. This needs a continuous, 24 hours a day, 7 days a week operation. Furthermore, due to the huge variety of instruments and volumes of settlement transactions, reconciliation of proper master data, movements and balances is crucial to the business.

113.9 million settlement transactions were processed in the year under review. Even with a high degree of straight-through processing, manual interventions are occasionally necessary and need careful management. The potential risks of loss resulting from inadequate or failed internal processes or systems, or from human error or external events, are therefore significant. Clearstream accordingly selected the **Advanced Measurement Approach (AMA)** to assess and manage its individual scale of operational risk.

# Implementation of Basel II at Clearstream

Since having received regulatory approvals as of January 2008, Clearstream Banking S.A. and Clearstream Banking AG apply the AMA to calculate their capital requirements for operational risk. In October 2010, Clearstream Holding AG received BaFin's approval to use the approach at group level. This followed a restructuring of the group where previously Clearstream International, S.A., as the former mother company of the group, had also been using the AMA based on regulatory approval.

Clearstream uses the standardised approach for assessing market risk. The complete business activity belongs to the banking book. Market risk, according to the regulatory classification, is currently derived from foreign currency risks only.

The following table gives an overview of the calculation methods chosen by Clearstream:

Risk Category	Calculation Method
Credit Risk	Standardised Approach
Credit Risk Mitigation (CRM) of financial collaterals	Comprehensive Approach
Operational Risk	Advanced Measurement Approach
Market Risk	Standardised Approach

Table 2-1. Calculation methods chosen by Clearstream

## 2.2 Pillar II: Supervisory Review Process (SRP) and Internal Capital Adequacy Assessment Process (ICAAP)

Clearstream Group has implemented all necessary organisational and methodological requirements for the Internal Capital Adequacy Assessment Process and Supervisory Evaluation and Review Process.

The Executive Management of Clearstream Group is informed at least on a quarterly basis about all significant and substantial risks. If necessary, risks are reported ad hoc. This reporting includes also risk that is not in the scope of Pillar I and is the basis for Clearstream's internal capital planning.

Clearstream's economic capital (EC) is determined using the Value-at-Risk method (VaR, see [3.2 Risk management methodology](#) on page 3-3). EC measures the amount of capital that is required in order to be able to cover even extreme events over a period of 12 months. Economic capital is calculated at a confidence level of 99.98%. This means that losses within the next 12 months will not exceed the calculated EC with a probability of 99.98%. Up until 2012, a correlation of "0" between individual risk types was assumed. As of 2013, the required economic capital will take into account a correlation of "1" between individual risks types. This is the most conservative approach for this purpose.

As part of the Supervisory Evaluation and Review Process, the management of Clearstream Group is in a constant dialogue with all its supervisors.

## 2.3 Pillar III: Market discipline

Clearstream Holding AG (CH) is the superordinated company of the financial holding group according to §10a (3) KWG. CH in its role as superordinated company is responsible to fulfil the regulatory obligations on a consolidated/group level towards the German supervisory authorities and presents this report in compliance with the disclosure requirements pursuant to § 26a (4) KWG and §§ 319 et sqq. German Solvency Regulation (Solvabilitätsverordnung, SolvV).

## Implementation of Basel II at Clearstream

Based on Luxembourg regulation, especially CSSF circular 06/273, part XIX, Chapter 2, CBL is not obliged to issue a stand-alone disclosure report. Similar to the Luxembourg regulation, § 319 (3) of German Solvency Regulation exempts CBF from the requirement to issue a stand-alone disclosure report, as it is included in the consolidated CH Group disclosure report. No other group entity is obliged to disclose a Pillar III-report.

All information provided in this report refers in principle to the companies included in the regulatory basis of consolidation. The regulatory consolidated group differs slightly from the consolidated group under accounting rules (see [Figure 1-9](#) and [Table 2-2](#)).

As all Clearstream companies - regardless of accounting and/or regulatory consolidation - are included in the consolidated annual accounts/annual report of the ultimate parent company DBAG, Clearstream Holding AG is, according to § 291 German Commercial Code (Handelsgesetzbuch (HGB)), exempted from the obligation to draw up consolidated statutory accounts.

The following table shows both the scope of regulatory and accounting consolidation including the description of the type of the enterprise.

Type of enterprise	Company	Regulatory consolidation		Accounting consolidation	
		Consolidation § 10a KWG	Deduction	Full Consolidation	At equity
		Full Consolidation			
Credit Institutions	Clearstream Banking S.A., Luxembourg (CBL)	X		X	
	Clearstream Banking AG, Frankfurt am Main (CBF)	X		X	
Financial Holding Company	Clearstream Holding AG, Frankfurt am Main (CH)	X		X	
	Clearstream International, S.A., Luxembourg (CI) <sup>1</sup>	X		X	
Investment Firm <sup>2</sup>	LuxCSD S.A. Luxembourg (LuxCSD)	X		X	
Regulated Ancillary Services Undertaking	Clearstream Services S.A., Luxembourg (CS) <sup>3</sup>	X		X	
Ancillary Services Undertaking	Clearstream Operations Prague s.r.o., Prague (COP)	X		X	
	Clearstream Banking Japan Ltd, Tokyo (CBJ)	X		X	
	Clearstream Fund Services Ireland Ltd, Dublin (CFSI)		X	X	
	Link-Up Capital Markets S.L., Madrid (Link Up Markets)		X		X
"Other" Undertaking	REGIS-TR S.A., Luxembourg (REGIS-TR) <sup>4</sup>			X	

1. PSF, according to article 26 of the Luxembourg Law of 5 April 1993.

2. PSF status, according to article 26 of the Luxembourg Law of 5 April 1993, received in March 2011.

3. PSF according to Articles 29-2 to 29-4 of the Luxembourg Law of 5 April 1993.

4. PSF according to general provisions of the Luxembourg Law of April 1993.

**Table 2-2. Accounting and prudential consolidation**

The assignment of the companies to the types of enterprise is mainly based on the definitions contained in § 1 KWG. Clearstream has no company that was consolidated proportionately at the reporting date.

# Implementation of Basel II at Clearstream

Link Up Markets is accounted for under the equity method for statutory accounting purposes. In the year under review, CBF's participation in Link Up Markets is about 23.5% and, according to § 10a (4) KWG, that company is, in principle, subject to full regulatory consolidation. Pursuant to § 31 (3) sentence 4 KWG, BaFin has Clearstream Holding revocably exempted from consolidation duties regarding Link Up Markets. Clearstream Holding also notified BaFin that Clearstream Fund Services Ireland Ltd (CFSI) is not consolidated because its balance sheet total is below the minimum limit as defined by § 31 (3) sentence 1 KWG. In turn, also CFSI is not consolidated for regulatory purposes for the time being. See also [5.7 Disclosures on equities in the banking book](#) on page 5-13.

## 2.4 Regulatory environment

The Clearstream Group fulfils the "Basel II" regulatory equity requirements based on the EU directives as implemented in Germany (on a consolidated level as well as, for CBF, on a stand-alone level) and in Luxembourg (for CBL on a stand alone basis). These rules include the 2009 / 2010 amendments under CRD II + III.

Currently, the regulatory environment is characterised to a great extent by the reform of the legal framework for the banking business in general and large exposure regulations, equity requirements, revised risk weights for credit and market risk, liquidity risk management and measures to create more efficient and more effective supervision. Furthermore, handling of "systemic" risk, "systemic important banks", recovery and resolution plans, segregation of proprietary trading / high risk business and "commercial" banking, deposit protection and a more EU-wide centralised banking supervision ("Banking Union") are items on the regulatory agenda. This is, among other things, a consequence of the global financial market crisis but also a reflection of the Euro crisis. To some extent, it is ultimately part of a routine examination of current regulations that had been previously set in motion (see [1.1.2 Recent developments](#) on page 1-2).

During 2012, a lot of changes on international, European and national levels were discussed and a variety of legislative documents prepared, but none of the initiatives led to effective changes for the Clearstream entities. However, in Germany the revised Minimum requirement for risk management (MaRisk) were issued and, for Luxembourg, CSSF circular 12/552 was issued on 11 December 2012. These two regulations were partially already transposing corporate governance / risk management topics from CRD IV and, in combination with the EBA guidelines on suitability of management (for Luxembourg transposed with CSSF circular 13/563 into national regulation), these will have impact on the Clearstream entities as of 2013/2014.

However, taking into account the complexity of the Basel III rules and the additional elements of the CRD IV package, the finalisation of the package took longer than targeted and will now come into effect in 2014. Further legislative packages on all levels with regard to recovery and resolution, rules for financial market infrastructures (for example, CPSS-IOSCO) and the future EU regulation on CSDs (CSD-R) will bring further substantial changes to the regulatory environment for Clearstream. This is also true for the next wave of regulations coming from the BCBS, starting with the intraday liquidity management and monitoring rules and continuing with further revised large exposure rules. Also, the future supervisory structure within the "Banking Union" will most likely affect Clearstream in one way or another.

The information required to be disclosed for remuneration system purposes were published on the website of the Clearstream Group<sup>1</sup> in the course of 2012 and are not part of this disclosure report.

This entire process of international and national adjustments to the regulatory framework is being followed closely by the Clearstream Group, which participates actively in consultations and ensures that political decision makers are aware of the potential negative consequences for the market as a whole and the affected company in particular. In this way, Clearstream counters undue ramifications for the Group or any of its subsidiaries.

1. [http://www.clearstream.com/ci/dispatch/en/kir/ci\\_nav/about\\_us/041\\_regulatory\\_disclosures/050\\_Compensation](http://www.clearstream.com/ci/dispatch/en/kir/ci_nav/about_us/041_regulatory_disclosures/050_Compensation).

## 3. Risk management overview

The information in this chapter is presented in the following sections:

- [3.1 Strategy and organisation](#) below;
- [3.2 Risk management methodology](#) on page 3-3;
- [3.3 Risk structuring and assessment](#) on page 3-5;
- [3.4 Risk mitigation](#) on page 3-9;
- [3.5 Group-wide risk reporting and monitoring](#) on page 3-10.

### 3.1 Strategy and organisation

Risk management is a fundamental component of the management and control of Clearstream. Effective and efficient risk management is vital to protecting Clearstream's interests and it enables Clearstream to achieve its corporate goals and safeguards its continued existence. Clearstream has therefore established a group-wide risk management system comprising roles, processes and responsibilities applicable to all staff and organisational units of Clearstream. This concept is designed to ensure that emerging risks can be identified and dealt with as early as possible.

Clearstream's risk strategy is based upon the group's business strategy and regulates the extent of risk taken within the various business activities carried out by Clearstream. The group risk strategy does this by determining conditions for risk management, control and limitation. The group gives considerable attention to its risk mitigation process and ensures that appropriate measures are taken to avoid, reduce and transfer risk or intentionally accept it.

Clearstream's risk strategy ensures and enables the timely and adequate control of risks. The information required for controlling risks is assessed using structured and consistent methods and methodologies. The results are collated and incorporated into a reporting system enabling measurement and control of the risks. Risk reporting is based on reliable information and is carried out on a regular basis and ad-hoc for existing and potential risks.

All members of Executive Management of Clearstream are ultimately responsible for the risk strategy of Clearstream or of relevant legal entities. The group risk strategy reflects the risk appetite that defines the maximum loss that Executive Management is willing to assume in one year, the tolerance in light of the risk as well as the desired performance levels. It is Clearstream's intention to maintain risk at an appropriate and acceptable level (see also [3.4 Risk mitigation](#) on page 3-9).

The members of Executive Management ensure that the group risk strategy is integrated into the business activities throughout the entire group and that adequate measures are in place to implement the strategies, policies and procedures.

Risk awareness and a corresponding risk-conscious culture are encouraged, amongst other things, through appropriate organisational structures and responsibilities, adequate processes and the knowledge of the employees. The appropriateness of the risk management and controlling systems is continuously checked.

# Risk management overview

Risks are openly and fully reported to the responsible level of management. The responsible management body is informed fully and in a timely manner about the unit's risk profile, relevant risk(s) as well as about relevant losses. Internal reporting and communication is amended by external reporting, that is, interim and annual reports.

Clearstream has developed its own corporate risk structure and distinguishes between operational, financial, business and project risks (see also [3.3 Risk structuring and assessment](#) on page 3-5).

The members of Executive Management of Clearstream are responsible for the management of all risks. Clearstream's risk management organisation is decentralised. The market areas are responsible for identifying risks and for reporting them promptly to Group Risk Management, a central function unit with group-wide responsibilities.

Group Risk Management assesses all new and existing risks. It also reports on a quarterly basis and, if necessary, ad-hoc to the particular Executive Management. Risk control is performed in the decentralised business areas, that is, in the areas where the risks occur.

Risk control in the Clearstream operational units is ensured by nominating "Operational Risk Representatives", who are responsible, as mentioned above, for identifying, notifying and controlling any risk in their area whereas Group Risk Management is responsible for the assessment and reporting of risks.

The risk management framework of Clearstream, as stated in the Group Risk Management Policy, aims at ensuring that all threats, causes of loss and potential disruptions are properly identified as soon as possible, centrally recorded, assessed (that is, quantified in financial terms to the largest possible extent), reported in a timely manner and consistently, together with suitable recommendations to the respective Executive Management, and controlled.

These five key processes, as well as adequate quality standards, have been established in the Group Risk Management Policy and are reviewed on an ongoing basis.

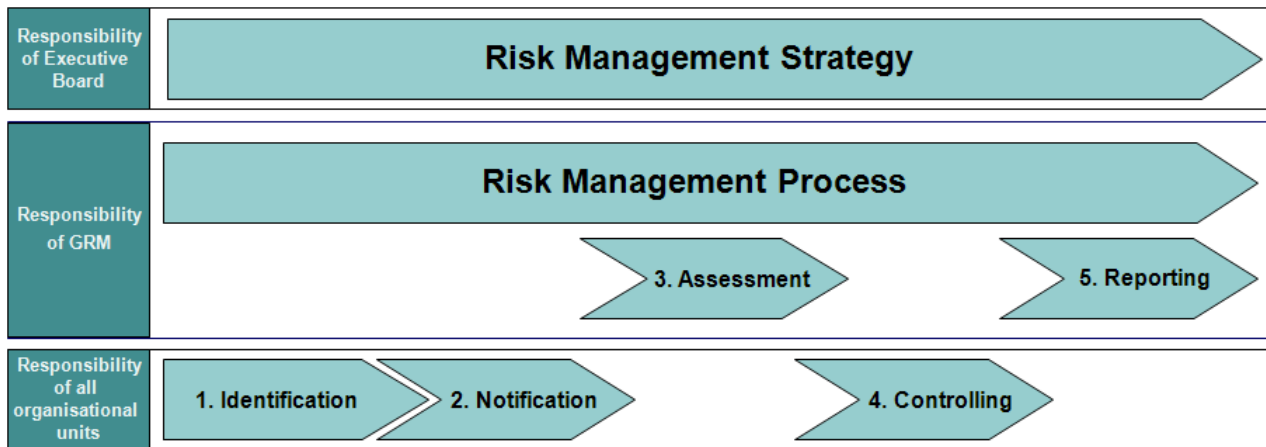


Figure 3-1. Five-level risk management system with central and decentralised responsibilities

## 3.1.1 Risk identification

Risk identification consists in the identification of all threats to Clearstream, as well as causes of loss and potential disruptions. Risks may arise as a result of internal activities or external factors and the risk examination must be performed with regard to existing or new processes, when concluding new business or entering new service areas.

The risk identification process is on the one hand proactive, based on regular review of processes in order to identify weak areas and points of failure (manual input required, process without double keying or four eyes controls in place, specific procedures subject to high volumes or tight deadlines etc.) or based on scenarios of disruption or failure taking into consideration all sources of issues (unavailability of systems, human error etc.). On the other hand, the risk identification process is also reactive, following an incident and, where appropriate, learning from this event.



Risk identification also involves a phase of quantification involving the definition of parameters that can be based either on statistical data, in the case of actual process monitoring, or on subjective expert appraisal when insufficient statistics are available.

All organisational units and individual employees must themselves identify and quantify potential risks in their area of responsibility.

### 3.1.2 Risk notification

Risk notification is the step in the risk management process that ensures that risks are centrally recorded.

All organisational units and individual employees must notify Group Risk Management, in a timely manner, of the risks that they have identified and quantified. Where a Clearstream entity, however, oversees its own risk management function, the timely notification of risks pertaining to that entity is made, in the first instance, to that dedicated risk management function, which in turn and without delay must notify Group Risk Management of matters of relevance.

### 3.1.3 Risk assessment

The assessment of an incident or a potential risk development aims at quantifying the risk in financial terms using the "Value at Risk" methodology and comparing the result with the available risk cover. It takes into account mitigation measures currently in place, such as business continuity measures, insurance policies etc. (see also [3.2 Risk management methodology](#) on page 3-3 and [3.3 Risk structuring and assessment](#) on page 3-5).

A qualitative assessment may be used whenever it adds value or is deemed more adequate.

The risk assessment phase is carried out by Group Risk Management based on data and information collected and produced either in a periodic or ad-hoc report by the relevant area or upon request of Group Risk Management.

Moreover, low frequency / high impact risks are assessed by identifying scenarios of threats to which the group is exposed. The evolution of their probability is monitored by using input from internal and external experts.

### 3.1.4 Risk control

Risk control involves determining and implementing the most appropriate treatment for the identified risk. It encompasses risk avoidance, risk reduction, risk transfer and intentional risk acceptance.

All organisational units and employees must perform risk control and implement mitigating actions according to the established escalation process.

### 3.1.5 Risk reporting

The relevant boards and committees are informed consistently and in a timely manner about material risks - whether existing or potential - and about the related risk control measures in order to take appropriate action. Group Risk Management is in charge of providing this information to the relevant boards and committees (see also [3.5 Group-wide risk reporting and monitoring](#) on page 3-10). Moreover, upon request of the relevant boards, Group Risk Management will issue reports to external parties.

## 3.2 Risk management methodology

Clearstream has installed a standardised approach for measuring and reporting all operational and financial business and project risk across its organisation: the concept of "Value at risk" (VaR). The purpose is to allow the overall risk appetite to be expressed in a comprehensive and easily understandable way and to facilitate the prioritisation of risk management actions.

## Risk management overview

The VaR quantifies the risks to which a company is exposed. It indicates the maximum cumulative loss that Clearstream could face if certain independent loss events materialise over a specific time horizon for a given probability. Clearstream's models are based, in line with the Basel II framework, on a one-year time horizon and correlations between individual risk estimates are recognised when calculating the capital charge for operational risk.

The VaR is calculated at a confidence level of 99.0% (Management VaR), 99.9% (Regulatory VaR) as well as 99.98% (Economic Capital). Clearstream also performs VaR calculations in order to detect potential risk concentrations, as well as stress test calculations, which consider even more conservative model parameters than the regular VaR calculations.

In addition to classical stress tests, which analyse the impacts of predefined stress scenarios, Clearstream calculates so-called reverse stress tests since 2011. With the help of this instrument, stress scenarios that would exceed the risk bearing capacity are identified. The findings in the reverse stress tests can give rise to further analyses and implementations of measures to reduce risks.

In the example in the following figure, there is a 99% probability that the cumulative loss within the next year will be below EUR 2.5 million and, conversely, that there is consequently a 1% probability of a loss incurred through one or more incidents within the next year that, in total, will be equal to or greater than the VaR calculated.

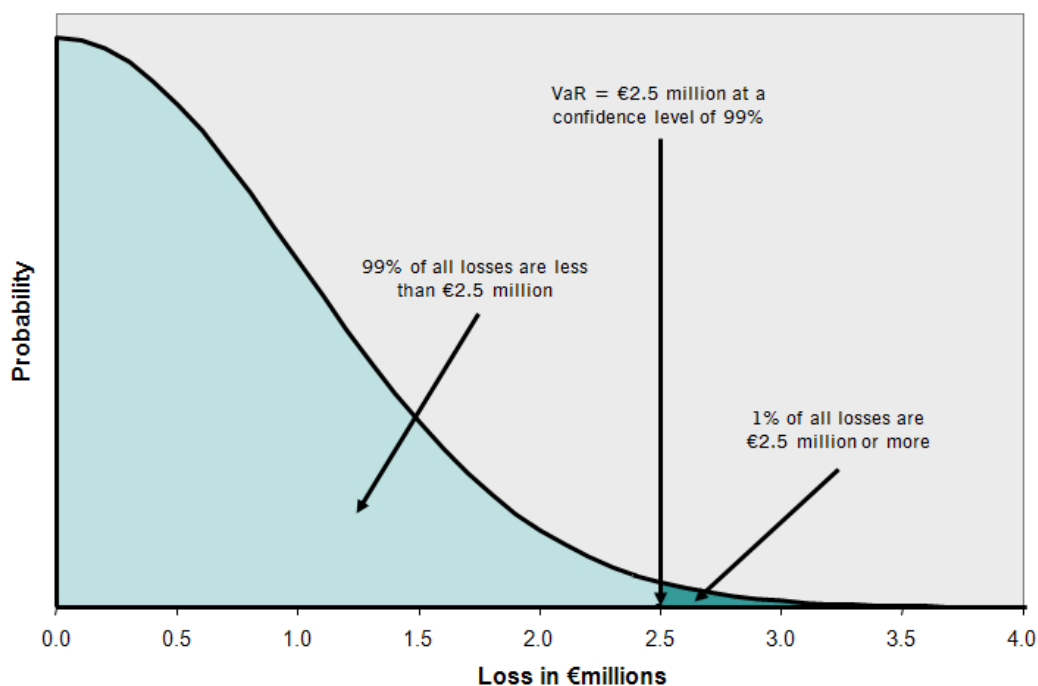


Figure 3-2. Example of VaR allocation

The calculation of the VaR is a three-step process:

1. Determination of the loss distributions for every single risk: This is performed for each risk on the basis of historical data (such as market data, default, claim or outage history) or risk scenarios. This distribution may be, for example, a Log-Normal distribution (often used for operational risk of processing errors) or a Bernoulli distribution (used, for example, for credit risk where a counterparty either defaults or fulfils).
2. Simulation of losses using the Monte Carlo method: A Monte Carlo simulation is used to run multiple trials of all random loss distributions at the same time in order to achieve a stable VaR calculation. This produces a spread of possible total losses.
3. Calculation of VaR on the basis of the Monte Carlo simulation: The losses calculated by the Monte Carlo simulation are arranged in descending order of size and the corresponding losses are determined for the specified confidence levels.

## 3.3 Risk structuring and assessment

The following sections describe the relevant individual risks in more detail.

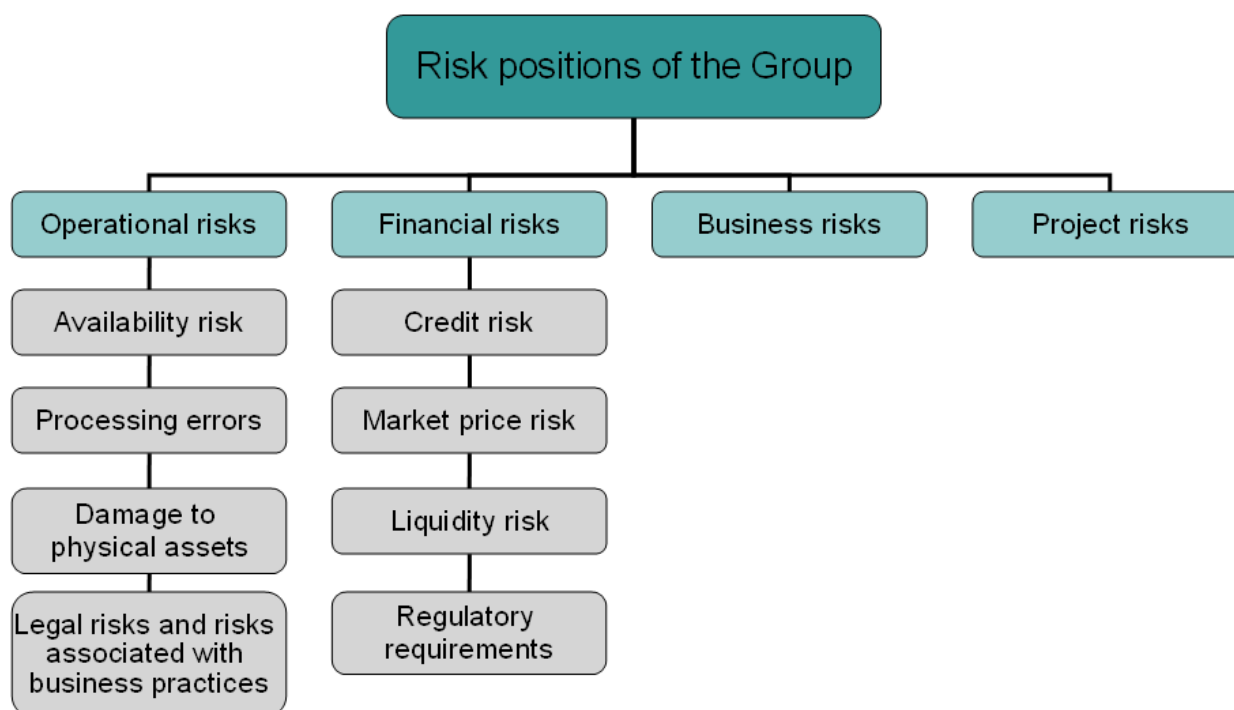


Figure 3-3. Risk structure of Clearstream

### 3.3.1 Operational risks

Operational risk encompasses all existing and newly arising risks in the context of the ongoing provision of services by Clearstream. In accordance with the Basel II framework<sup>1</sup>, operational risk is defined as the risk of loss resulting from inadequate or defective systems and internal processes, from human or technical failure, from inadequate or defective external processes, from damage to physical assets as well as from legal risks<sup>2</sup> and risks associated with business practices.

Operational risks that Clearstream does not want to run and that can be insured against at reasonable cost are transferred by closing insurance policies. All insurance policies are coordinated centrally for the entire Deutsche Börse Group, thereby ensuring uniform risk/cost benefit insurance cover.

#### Availability risk

Availability risk results from the fact that resources essential to Clearstream's service offering could fail, thereby making it impossible to deliver services in a timely manner or at all. Possible triggers include hardware and software failures, operator and security errors, physical damage to the data centres, loss of buildings and non-availability of staff.

In particular, Clearstream manages availability risk through intensive activities in the field of business continuity management (BCM). BCM encompasses all the processes that ensure that business continues as normal, even if a crisis occurs, and therefore substantially reduces availability risk. BCM relates to arrangements to ensure the availability of all key resources (systems, space, staff, suppliers/service providers), including the redundant design of all critical IT systems and technical infrastructure, as well as backup workspaces for mission-critical employee functions in each of the main operational centres (see also [4.3.2 Business Continuity Management](#) on page 4-8).

No significant losses were incurred as a result of unavailability of resources in the year under review.

1. No. 644 "International Convergence of Capital Measurement and Capital Standards" (see <http://www.bis.org/publ/bcbs128.htm>).  
 2. Legal risk includes, but is not limited to, exposure to fines, penalties or punitive damages resulting from supervisory actions, as well as private settlements.

# Risk management overview

## Processing errors

In contrast to availability risk, the occurrence of processing errors does not prevent Clearstream from providing services to its customers. However, errors or omissions may occur that relate mainly to manual input and suppliers' errors.

Despite all the automated systems and efforts aimed at delivering straight-through processing (STP), there is still a requirement for manual activity. In addition, manual intervention in market and system management is, in special cases, necessary.

In previous years, sustained improvements were made on an ongoing basis to reduce the potential risk of processing errors, either through a reduction in the amount of necessary manual intervention or through better protection.

Nevertheless, it should be noted that risk mitigation measures do not guarantee that incidents, claims and resulting loss will not occur, nor can they predict the specific occurrence of particular risk events. Despite all the risk mitigation measures deployed, Clearstream remains exposed to the risk of inadequate handling of customer instructions, which could, in extreme circumstances, result in significant losses.

No significant losses occurred as a result of service deficiency in the year under review.

## Damage to physical assets

This category includes risks due to accident and natural hazard, as well as to terrorism and sabotage.

In the year under review, no significant losses occurred as a result of damage to physical assets.

## Legal risks and risks associated with business practices

Risk from legal offences include losses that could arise as a result of non-compliance or inappropriate compliance with new or existing laws, losses from inadequate contract terms or from court decisions not adequately observed in customary business practice, as well as risks from fraud.

Risks associated with business practices include losses resulting from money laundering, violations of competition regulations or breaches of banking secrecy. Clearstream has established a Compliance function that seeks to protect Clearstream from any prejudice that may result from failures to comply with applicable laws, regulations and standards of good practice, with a particular focus on the following topics:

- Prevention of money laundering and terrorist financing;
- Compliance with professional and banking secrecy;
- Prevention of insider dealing;
- Prevention of market manipulation;
- Prevention of fraud;
- Prevention of conflicts of interest and corruption;
- Data protection.

Following a civil action against Iran, plaintiffs obtained a default judgment against Iran in September 2007 in the U.S. courts. In June 2008, plaintiffs commenced enforcement proceedings in the U.S. District Court for the Southern District of New York to satisfy this judgment by restraining certain client positions held in Clearstream Banking S.A.'s securities omnibus account with its U.S. depository bank, Citibank NA. The restrained positions are alleged to be beneficially owned by an Iranian government entity.

Consistent with its custodial obligations, Clearstream Banking S.A. defended against the restraints and filed a motion to vacate the restraints on various grounds. In October 2010, plaintiffs commenced a lawsuit that seeks to have the restrained positions of approximately USD 2 billion turned over to plaintiffs.

An amended complaint was received by Clearstream Banking S.A. in Luxembourg on 7 January 2011 that includes a cause of action directly against Clearstream Banking S.A. alleging USD 250 million in connection with purportedly fraudulent conveyances related to the restrained positions.

In summer 2011, Citibank NA interpleaded other potential judgment creditors of Iran into the litigation. At the direction of the court, Clearstream Banking S.A. renewed its motion to vacate the restraints. This renewed motion remains pending before the court.

On 7 December 2011, the plaintiffs filed a second amended complaint, adding claims for damages against Clearstream Banking S.A. and others of USD 2 billion, plus punitive damages to be determined at trial plus attorney's fees. Clearstream Banking S.A. considers the plaintiffs' claims against it to be legally and factually without merit, as Clearstream Banking S.A. will establish at the appropriate time in the litigation.

Should the case proceed, Clearstream Banking S.A., consistent with its custodial obligations, intends to defend itself vigorously to the fullest extent.

The U.S. Treasury Department Office of Foreign Assets Control (OFAC) has contacted Clearstream Banking S.A. regarding OFAC's investigation, under U.S. Iran sanctions regulations, of certain securities transfers within the Clearstream settlement system in 2008 and, upon invitation, to pursue closure of the matter through substantive discussions and settlement in accordance with OFAC's standard procedures. Clearstream commenced settlement discussions in January 2013.

OFAC has communicated to Clearstream its preliminary views on the investigation. On 9 January 2013, Deutsche Börse AG reported, in an ad-hoc announcement, that OFAC's preliminary views are that (i) apparent violations of U.S. sanctions may have occurred in 2008 in connection with the aforementioned securities transfers and (ii) if OFAC were to issue a civil pre-penalty notice based only on information currently available to it, such notice would indicate an amount of approximately USD 340 million. These views were shared for discussion purposes only and are subject to potential significant change in favour of Clearstream depending on the outcome of discussions with OFAC. OFAC has not taken any final decision, either on a finding of any violation or on any amount. Any settlement with OFAC would not constitute a finding of a violation.

Clearstream continues to believe that its actions were in compliance with any applicable U.S. sanctions regulations and considers OFAC's preliminary figure to be unwarranted and excessive. Clearstream appreciates the opportunity to engage in substantive discussions with OFAC on the facts and reasons why a penalty should not be imposed or, if a settlement payment is agreed upon, why it should be in a far lesser amount.

No significant losses occurred as a result of legal risks or risks associated with business practices in the year under review.

### 3.3.2 Financial risks

Clearstream is exposed to financial risks mainly in the form of credit risk. On a smaller scale, there is also market price risk from cash investments and liquidity risks. The exposure to the above-mentioned risks is mitigated through the existence of effective control measures.

#### Credit risk

Credit risk consists in the risk that a counterparty may default and be unable to meet its liabilities against Clearstream in full or at all.

CBL and CBF within Clearstream Group grant loans to their customers in order to increase the efficiency of securities transaction settlement. However, these lending operations cannot be compared with those of other credit institutions. Firstly, the loans are extended solely on an extremely short-term basis. Secondly, they are extended solely for the purposes of increasing the efficiency of securities settlement and are largely collateralised and granted to creditworthy customers with very good credit ratings. Furthermore, credit lines granted can in general be revoked at any time. The main credit products offered are the "Technical Overdraft Facility" (TOF) and the "intraday Technical Overdraft

## Risk management overview

Facility” (iTOF). These overdraft facilities are credit arrangements to facilitate the settlement of securities transactions even when cash balances in the relevant currency are, for one reason or another, (technically) unavailable at the right time. A TOF is an overnight arrangement and an iTOF is only granted intraday. The conversion from TOFs to iTOFs was begun in 2012 and is planned to be completed during 2013 for all customers. No TOFs shall remain in place after 31 December 2013.

Clearstream is also exposed to credit risk arising from its strategic securities lending activity (ASLplus - CBL's automated securities lending programme). Only selected banks are approved as counterparties. All lending transactions are fully collateralised. During the reporting year, only selected securities are permitted as collateral. The minimum country and issue rating permitted for selected bonds is A+. Short-term bonds and equities without an issue rating are allowed as collateral in cases where the issuer has a short-term rating of at least A-1.

The creditworthiness of potential customers is assessed before entering into a business relationship. CBL and CBF within Clearstream Group establish customer-specific credit lines on the basis of both regular reviews of the customer's creditworthiness and ad-hoc analyses as required.

Additional credit risks are associated with cash investments and cash holdings at CCBs. Clearstream reduces this risk by spreading placements in the money market across a number of counterparties with very good credit ratings, by defining investment limits for each counterparty and by largely making short-term, collateralised placements. Clearstream establishes maximum investment limits on the basis of regular assessments of creditworthiness and ad-hoc analyses as required. The creditworthiness of Clearstream's CCBs is also assessed on a regular or, if necessary, ad-hoc basis.

### Market price risk

Market risk may arise in the form of interest rate risk (as a result of fluctuations in interest rates in connection with cash investments or borrowing) or currency risk (in the operating business, when recognising net revenues denominated in foreign currencies).

Clearstream is exposed to interest rate risk in connection with cash investments. Interest rate risk is mitigated using a limit system that only permits maturity transformation to a small extent. In the year under review, currency risk was largely hedged using forward foreign exchange transactions. This entailed selling planned foreign currency positions at a price fixed in advance for delivery on the date of the expected cash inflows. Regular reviews ensure the effectiveness of these hedges.

CI and CBF have entered into a Contractual Trust Agreement (CTA), shared within Deutsche Börse Group, that serves to cover fund pension plans of employees. The funds put into the CTA are invested into a special investment fund that is exposed to interest rate risk, currency risk and equity risk. Since the overall amount invested is limited and the Market VaR is low, the market risk from investing in the CTA's investments is seen as immaterial.

### Liquidity risk

Clearstream is exposed to liquidity risk in that it may lack sufficient liquidity to meet its daily payment obligations or incur increased refinancing costs in the event of liquidity bottlenecks. Daily and intraday liquidity is monitored closely by the Treasury and Credit sections and managed with the help of a limit system. Extensive credit lines are available to provide cover in extreme situations (see also [7. Management of liquidity risk](#) on page 7-1).

In the year under review, Clearstream had excess liquidity at all times as a result of which no liquidity bottlenecks occurred.

### Regulatory requirements

The risk of regulatory requirements is defined as risk of loss arising from the inability to meet all current regulatory financial requirements in all relevant legislations, for example, solvency and liquidity ratios.

During the year under review and in the period up to the publication of this disclosure report, the regulatory minimum requirements were, in principle, complied with at all times by CH group as well as by CBL and CBF.

The situation on the money markets, especially in Swiss francs, has brought about a change in customer behaviour: cash receipts stay with the Clearstream companies for longer than usual and, as a result, credit balances accumulate in Clearstream Banking S.A.'s nostro accounts, which are maintained for securities settlement. In combination with the strict large-exposure rules for the interbank business in force since 31 December 2010, this led to isolated short-term breaches of the large-exposure limits, both at Clearstream Banking S.A. and at the level of the Clearstream Group. Given the difficult market environment, the Group took appropriate countermeasures.

### 3.3.3 Business risks

The business risk reflects the sensitivity of Clearstream to macroeconomic developments and its vulnerability to event risks arising from other external threats. It is translated in EBIT<sup>1</sup> terms, reflecting both a potential revenue decrease and a potential increase of its cost base.

Clearstream's financial performance is directly or indirectly subject to the evolution of a number of macroeconomic factors and the related effects. Revenues are directly or indirectly impacted, for example, by the level of interest rates, economic growth, equity market valuations and trading volumes, the level of issuance of securities, but also investor confidence in the economic environment.

In the context of the current Euro crisis and a related potential deterioration of the economic environment, Clearstream's profitability could be negatively impacted.

In addition, Clearstream could be affected by other external threats, like changes in the competitive or regulatory environment. Scenarios are established around the most significant risk events and quantitatively assessed. The respective departments monitor developments closely in order to take early mitigation actions if possible.

European and national regulatory evolutions and controversies are continuously monitored by Clearstream. Potential changes are analysed and appropriate measures are initiated in due time to fulfil all current and prospective regulations (see also [2.4 Regulatory environment](#) on page 2-4).

### 3.3.4 Project risks

Project risks can arise as a result of project implementation (launches of new products, services, processes or systems), which may have a significant impact on any of the three other risk categories (operational, financial and business).

Project risks are assessed by Group Risk Management as described in the above sections and are addressed in the early stages of major projects. Risks connected with the delivery of projects, such as budget risk, quality/scope risk and deadline risk, are monitored and reported by the units running the projects.

None of the projects planned and implemented in the year under review triggered a change in the overall risk profile of Clearstream.

## 3.4 Risk mitigation

It is Clearstream's intention to confine risk to an appropriate and acceptable level. Depending on the risk characteristics, there are basically four types of management strategy further elaborated at the level of the single risk type:

- Risk acceptance: a deliberate decision to take risks and monitor their development;
- Risk reduction or elimination: measures to reduce either the severity or the frequency of losses;
- Risk transfer: contracts to give risks to the market;
- Risk avoidance: changes to the businesses that anticipate and prevent built-in risks.

The latter three management strategies are risk mitigating. Within Clearstream, several mechanisms are used to reduce both the frequency and impact of incidents according to the type of risk.

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1. EBIT: Earnings Before the deduction of Interest and Tax.

## Risk management overview

### 3.5 Group-wide risk reporting and monitoring

Monitoring and reporting are essential parts of Clearstream's risk management, designed to give Executive Management and the Board of Directors timely, consistent and accurate information about the material risks that Clearstream Holding and its subsidiaries may encounter or have encountered.

All relevant data and information is collected, assessed and prepared by Group Risk Management, who assemble the relevant information and prepare the regular management reports according to the principles set down in this document (see also [3.1 Strategy and organisation](#) on page 3-1).

#### 3.5.1 Regular reports

Risk reports are issued to the relevant Executive Management of Clearstream on a regular basis. These reports provide the status of a new risk situation and/or updates on existing risk developments covering causes, potential early mitigation measures, assessment and recommendations.

#### 3.5.2 Ad-hoc reports

Group Risk Management may issue ad-hoc reports when a new risk situation or the development of an existing risk should be reported to the relevant Executive Management of Clearstream, because of the material impact it has on the risk profile of the relevant units.

#### 3.5.3 Monitoring

Internal auditing ensures, through independent audits, that the adequacy of the risk control and risk management functions is monitored. The results of these audits are also fed into the risk management system.



## 4. Management of operational risk

The information in this chapter is presented in the following sections:

[4.1 Strategy, process, structure and organisation](#) below;

[4.2 Measurement](#) on page 4-2;

[4.3 Operational risk mitigation](#) on page 4-7;

[4.4 Monitoring and reporting](#) on page 4-9.

### 4.1 Strategy, process, structure and organisation

Operational risk represents a major risk class for Clearstream and one that is systematically managed and controlled. Clearstream decided to cover business needs and regulatory requirements through the same approach to the largest extent possible. Therefore, Clearstream follows an **Advanced Measurement Approach (AMA)** for calculating the regulatory capital charge for operational risk. Thus, Clearstream established a comprehensive framework and set of instruments meeting the requirements from both a regulatory and a business perspective.

Since having received regulatory approvals as of January 2008, Clearstream Banking S.A. and Clearstream Banking AG apply the AMA to calculate their capital requirements for operational risk. In October 2010, Clearstream Holding AG received BaFin's approval to use the approach at group level in the course of the introduction of the supervision on Clearstream Holding AG group level.

Clearstream's risk strategy, as described in [3.1 Strategy and organisation](#) on page 3-1, also applies to the management of operational risk. In this risk strategy also, the risk capital dedicated to cover losses resulting from operational risk is defined, setting a limit for this risk type.

Operational risk can be differentiated according to the severity and frequency of losses. As operational risk management depends on the risk position of Clearstream, the general principles are as follows:

- All main risks are identified and continuously analysed with regard to the expected or real effect on frequency and severity.
- For risks with low frequency but high severity, risk transfers are considered, for example, through insurance contracts.
- For risks with high frequency but low severity, risk reduction is considered, for example, by optimising processes.

The ultimate responsibility for operational risk management lies with the members of Executive Management of Clearstream, who are supported by different units and functions. Clearstream has established a segregation of duties into the predominately central operational risk management, the mostly local operational risk control and an independent review function.

The five steps of the risk management process (as described in [3.1 Strategy and organisation](#) on page 3-1) are required to be taken into account.

# Management of operational risk

It is the responsibility of line management to control operational risk within their area on a day-to-day basis. This includes the identification of suitable measures to mitigate operational risk and to improve the effectiveness and efficiency of the operational risk management. Line management also appoints an "Operational Risk Representative" for their respective area.

The Operational Risk Representative is the key contact for both the employees in the respective organisational unit as well as for Group Risk Management. They also support their line management with all tasks regarding operational risk and are especially responsible for the collection of operational risk event data within their organisational unit. In addition to this, the Operational Risk Representatives take an active role in further developing operational risk tools and instruments. They also coordinate operational risk training for their respective organisational unit.

It is the responsibility of any single employee to support Group Risk Management, line management and the Operational Risk Representative of their organisational unit regarding any operational risk matters. Every employee is especially required to participate in the collection of operational risk event data. In addition, individual employees may be asked by line management, their Operational Risk Representative or Group Risk Management to take an active role also in the operational risk management process, for example, as experts within scenario analysis.

## 4.2 Measurement

Operational risk capital is intended to represent the required risk capital for unexpected operational risk losses. As part of the AMA within Clearstream, a model for calculating operational risk capital requirements has been developed, based on the individual risk profile of the bank.

In line with common practice in other risk areas, capital requirements are calculated using the Value at Risk (VaR) concept. Based on a statistical analysis of relevant data, a loss distribution is determined, which enables calculation of the required figures.

The model has been designed to have the following properties:

- Capital requirements reflect the risk profile of Clearstream Group and individual group entities.
- Confidence levels can be adjusted according to the risk appetite of the bank.
- Incentives for proper risk management can be included into the model.
- Major risk drivers can be identified.
- Risk mitigation effects (such as insurance) can be taken into account.

Input data for the model are internal loss data, results of a structured scenario analysis or external loss data. If loss data is sufficiently available, the application of a statistical model gives a reliable estimate of the underlying risk represented by the data. However, operational risk losses are very rare and not sufficiently available for all risk drivers. Additionally, internal loss data usually does not cover extreme events as such cases have not occurred in the bank so far.

It is assumed that banks doing similar business have also a similar risk profile. If this assumption holds, publicly available losses or losses from a banking consortium could be used to fill the gap of missing internal loss information.

However, Clearstream has a unique business model that, as of today, is not sufficiently represented in any bank consortium or public database. Therefore, Clearstream decided to use external loss data only where appropriate. Furthermore, in cases where appropriate internal or external loss data is available, Clearstream decided to apply a statistical model to scenario losses that are created in a structured process by business experts.

During this process, experts from all areas of the bank estimate the potential impact and the likelihood of a scenario loss. These losses are modelled in a similar way as the internal loss data. Where the loss data history for a particular risk class becomes sufficiently large, the basis for modelling this risk class can be switched from scenario losses to internal losses without changing the operational risk model.

The soundness and reliability of the model and its results could therefore increase as the data basis broadens over time.

## 4.2.1 General concept

The overall objective of the operational risk model is to simulate a loss distribution for a given time frame, which is one year for regulatory purposes (according to the regulatory requirements the so-called "holding period").

In theory, this distribution could be determined directly based on the data. For such a model, one would either need hundreds of years of loss history or scenarios that cover aggregate annual losses rather than single events. Since neither of these is available, an actuarial technique is applied that models the likelihood of the occurrence of an event (that is, the frequency) independent of its severity. Combining these two distributions by Monte Carlo simulation gives the required aggregate loss distribution.

Due to the discrete nature of the occurrence of loss events, the frequency is modelled using a discrete probability distribution. In loss distribution approach (LDA) models, typically three different distributions are taken into account to model the frequency: the Poisson distribution, the negative binomial distribution and the binomial distribution. The latter two each have two parameters that need to be determined. One major difference of the two binomial distributions from the Poisson distribution is that the variance compared to the mean is larger or smaller, respectively.

The impact of an event - that is, the accumulated loss amount - can assume any value larger than zero and hence has to be modelled with a different approach compared to the frequency. Operational risk losses are usually modelled using an asymmetric, right-skewed distribution. A characteristic of operational risk is that the capital requirements are mainly driven by individual high losses. Severity distributions describing the size of losses are an important part of the operational risk capital model.

However, modelling the severity is very cumbersome. The main reason is the lack of information about large events. Even with a long and large data history (internal or external loss data) or a sound scenario analysis process, it is always necessary to extrapolate beyond the highest relevant data point. The technique chosen by Clearstream, in line with best practice, is to fit a parametric distribution to the losses or to the scenarios, respectively, and to assume that the parameters also provide a realistic model for potential events beyond the current experience.

Typical distributions to model such a population are Log-Normal, Log-Gamma, Weibull, Gamma, Pareto and Generalised Pareto. The decision as to which distribution should be applied is based on the results of the "fitting results" and "goodness-of-fit" tests.

The overall severity distribution is determined by two types of loss: the high-frequency, low-impact (HF-LI) losses that can be represented by internal loss data; and the low-frequency, high-impact (LF-HI) losses that are very rare and hardly found in the internal loss database.

The development of each of these types of event is usually very different. HF-LI are very process dependent and occur regularly with different outcomes (that is, losses) each time. LF-HI events usually occur only once due to a severe malfunction of the control or business continuity system. It is not feasible to model both severity ranges with a single distribution. Therefore, these two types of events are modelled separately as body (HF-LI) and tail (LF-HI) of the severity distribution.

The operational risk model is applied to Clearstream Group as a whole. The aggregate loss distribution for Clearstream Group covers the operational risk of all legal entities. In the model, each risk driver is treated separately. The data is modelled in the following structure:

- Frequency distribution: Modelled for each risk driver individually. Depending on availability of internal data, the frequency can be estimated from the historic losses. Otherwise, it is based on the results of the scenario analysis.

For a sound estimation of a Poisson frequency, a history of relevant data of at least 12 quarters is required.

# Management of operational risk

- Body severity distribution: Modelled for each risk driver individually. Depending on availability of internal data, the body severity is estimated from the historic losses. Otherwise, a stochastic model is applied to the results of the scenario analysis.

For a sound estimation of the body severity distribution, the number of relevant data points should, as a rule, exceed 100. The stability of the estimation depends significantly on the number of data points. Therefore, it needs to be decided, for each risk driver individually, whether a loss data model or a scenario model should be applied.

- Tail severity distribution: Modelled for CH Group as a whole. The tail is modelled on the extreme scenarios as a result of the structured scenario analysis.
- Catenation point  $x_c$ : The body and tail distributions are combined at a catenation point, which is determined by the body distribution for each risk driver. Therefore, each risk driver is individually modelled with a combined severity distribution.

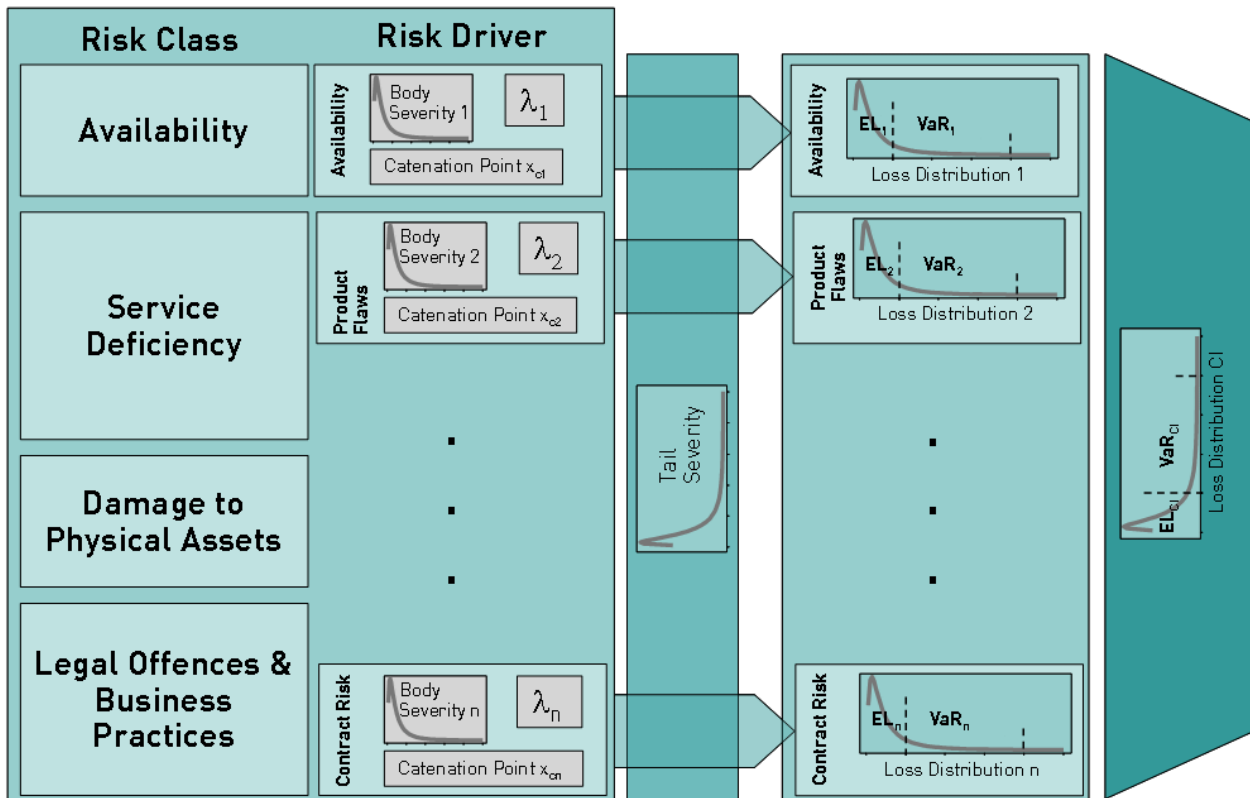


Figure 4-1. Overview of model structure

The body severity distribution, the frequency distribution and the catenation point are determined per risk class and combined with the group-wide tail severity distribution. An aggregate loss distribution is calculated for each risk driver for the group.

## 4.2.2 Parameter estimation

Frequency estimation is based on internal loss data (if available to a sufficient degree) or the average number of events per year is estimated as part of the scenario analysis. The frequency model covers the entire severity range and does not differentiate between the body and the tail of the severity.

The distribution of loss amounts is based on two distinct datasets: either on internal loss data or scenarios covering the high frequency body part of the distribution, or on scenarios covering very rare events. The latter distribution is modelled for the group as a whole but combined with the body severity distribution on risk driver level. This approach considers potentially severe events properly for every risk driver and enables diversification effects between different risk drivers to be taken into account.

Since internal loss data will never be sufficient to model extreme operational risk events, the tail of the severity distribution is modelled on the basis of scenario data only. For the tail, scenarios for all risk drivers with a probability of one or less in 100 years are used and combined in one dataset. The tail distribution is modelled using all relevant data.

The parameters of the fitted distribution are obtained according to the above-described fitting process for the scenarios. Since only scenarios describing very rare events are taken into account for the tail model, it is offset by the lowest bound of the scenarios: hence, the implementation of a truncation on the lower end of the distribution. The relevant appropriate distributions are heavy tailed distributions (Generalised Pareto, Log-Gamma, Weibull etc.).

The body severity and tail severity distributions are taken together to form the combined severity distribution for a risk driver. For modelling the body distribution, all scenarios or loss data are taken into account in order to use as much loss information as possible.

However, the fit is focused on the bulk part of the distribution and the part of severe losses is usually underestimated. Therefore, this part of the body distribution is not used for the capital calculation and is substituted by the tail severity distribution.

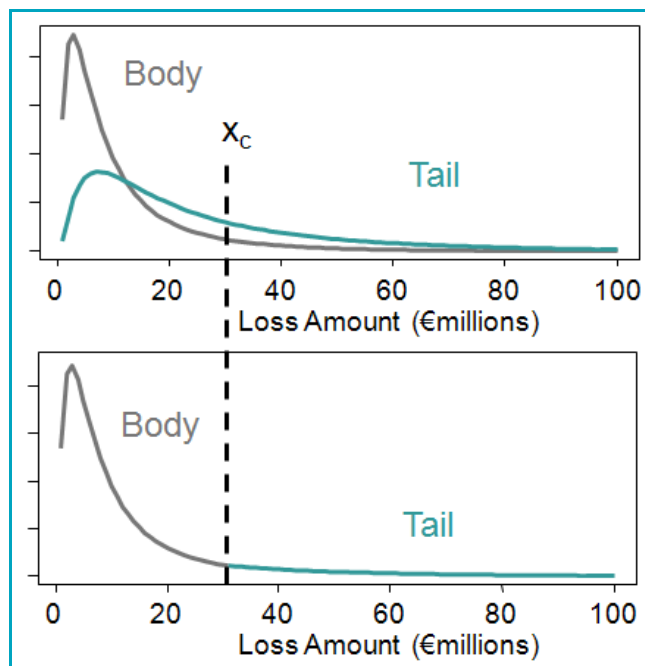


Figure 4-2. Example for substitution of the body distribution by the tail severity distribution

# Management of operational risk

## 4.2.3 Insurance

Clearstream has insurance cover for different operational risks through multiple insurance policies and this is considered when calculating operational risk capital requirements.

The relevant insurance policies are analysed with respect to the terms and conditions, inclusions, exclusions and clauses. Following this analysis, the insurance policies are mapped to the specific risk drivers and a coverage ratio is estimated taking into consideration the possibility of uncovered losses. The objective is to evaluate the likelihood of the losses or scenarios within a risk driver being covered by the insurance policies.

In order to adequately reflect the insurance programme, with respect to limits purchased and deductibles carried as well as aggregate and stop loss conditions, Clearstream has implemented a modelling structure that enables the assessment of the likelihood of insurance payment for “each and every loss”, that is, per individual simulated loss.

The insurance coverage calculation uses the obtained coverage ratios. The individual losses per risk driver generated in the Monte Carlo simulation are transferred into the insurance model and a Bernoulli trial is used to perform a random check to see whether the loss amount is covered.

## 4.2.4 Monte Carlo simulation

The distributions discussed so far (that is, the annual frequency and combined severity distributions) must be convoluted in order to derive the aggregate loss distribution for a risk driver and, based on that, the total loss distribution for operational risk. Clearstream implemented a Monte Carlo simulation, which enables the numerical determination of the loss distribution with high precision.

A single Monte Carlo simulation cycle is carried out in three steps:

1. Generate a random number for the number of events for the body with  $\lambda_B$  and the respective loss amounts from the body severity distribution that is capped at  $x_C$ .
2. Generate a random number for the number of events for the tail with  $\lambda_T$  and the respective loss amounts from the tail severity distribution truncated from above at  $x_C$ .
3. Sum all loss amounts in order to calculate the total loss amount of one year.

Repeating the Monte Carlo cycles many times gives a loss distribution for a risk driver with the required accuracy.

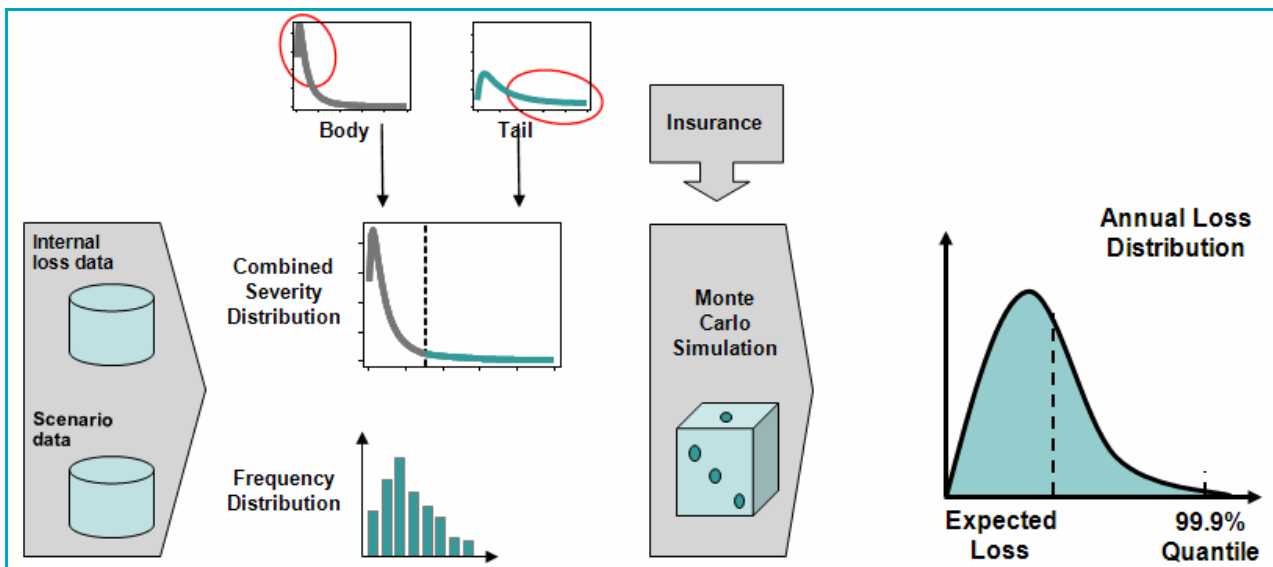


Figure 4-3. Steps of single Monte Carlo simulation

## 4.2.5 Stress testing of operational risks

Stress tests are performed to generate insights into the effectiveness of extreme event scenarios and to validate capital adequacy. Such stress includes the occurrence of several severe losses within one particular year. Given the fact that, in principle, any combination of existing risk scenarios is possible, the focus is on plausible stress events, considering the respective frequency of occurrence of the individual risk scenarios. Thus, for instance the combination of two extreme scenarios with a frequency of one loss in 1000 years is not considered, given the extremely limited likelihood.

Three particular stress tests are examined.

- The risk scenario with the biggest maximum loss is benchmarked with the Risk Bearing Capacity for Operational Risk.
- The combined maximum loss of the two extreme scenarios with the biggest maximum loss and a frequency not lower than one loss in 100 years is benchmarked with the Risk Bearing Capacity for Operational Risk.
- Three non-extreme risk scenarios (that are used when modelling the body distribution but are not considered when modelling the tail) with the biggest maximum loss are combined and the total loss amount is benchmarked with the Risk Bearing Capacity for Operational Risk.

In 2011, none of the stress tests exceeded the available risk bearing capacity for Regulatory operational risk (OpRisk).

In addition to the stress tests defined above, Group Risk Management performs, since 2011, a so-called reverse stress tests for operational risk, which assume that several risk scenarios materialise at once. As many operational risk scenarios are chosen as are needed so that the losses would exceed the regulatory own funds (risk bearing capacity (RBC)). For some operational risk scenarios, a recovery rate is available based on the operational business expert information provided. Scenarios that are mutually exclusive are not taken into account.

The following steps are performed to calculate the Reverse Stress Test for Operational Risk:

1. Take the operational risk scenario with the largest maximum loss.
2. If a loss would not consume the whole RBC, add the next largest operational risk scenario.
3. The Reverse Stress Test for Operational Risk is complete once the RBC is consumed completely.

## 4.3 Operational risk mitigation

As laid out in its risk strategy, Clearstream gives considerable attention to its risk mitigation process. The aim is to reduce the frequency and the severity of potential operational risk events. The process comprises several quality and control initiatives whose objective is to ensure that Clearstream's operations have sufficient controls to prevent any fraud or operational service deficiency. If an event of this kind occurs in Clearstream's operations, a thorough analysis is performed in order to be in the position to define measures to reduce the probability of recurrence.

The key preventive measures of risk mitigation consist of strong internal control processes and ongoing initiatives to further reduce errors and omissions. This is supported by a number of measures that will take effect at the time or after an incident, such as business continuity management (BCM) and insurance programs

### 4.3.1 Internal Control System

The Executive Management of Clearstream has implemented an internal control system, designed to ensure the effectiveness and profitability of the business operations, prevent or detect financial loss and thus protect all its business assets. Clearstream's internal control system, an integral part of the risk management system, continuously developed and adjusted to reflect changing conditions, comprises both integrated and independent control and safety measures.

Internal Auditing carries out risk-oriented and process-independent controls to assess the effectiveness and appropriateness of the internal control system.

# Management of operational risk

## 4.3.2 Business Continuity Management

Because the unavailability of core processes and resources represents a substantial risk for Clearstream, and a potential systemic risk to the markets as a whole, Clearstream has implemented a comprehensive Business Continuity Management (BCM) approach as a key mitigator of availability risk.

### BCM organisation at Clearstream

The Executive Management is responsible for ensuring the continuity of business at Clearstream. This responsibility is delegated to the various organisational units, which are directly responsible for the operational resilience and disaster tolerance of the respective business areas. Reporting to Executive Management, Group Risk Management is responsible for the overall coordination and monitoring of Clearstream's preparedness to deal with incidents and crises.

The organisational roles and responsibilities, and the guiding principles to ensure operational resilience, are documented in a formal BCM policy.

### BCM arrangements

The implemented BCM arrangements aim to minimise the impact of the unavailability of key resources, addressing not only the unavailability of systems, workspace and suppliers, but also the loss of significant numbers of staff in order to ensure the continuity of the most critical operations even in cases of catastrophe. Thereby, Clearstream is making use of its operational locations at Eschborn, London, Luxembourg, Prague and Singapore to maintain the continuity of its services.

### Systems unavailability

Data centres in the main operating locations are distributed to form active centres, acting as backups of each other. Data is mirrored in real time across the data centres. The infrastructure is designed to ensure the online availability and integrity of all transactions at the time of a disruption.

### Workspace unavailability

Exclusively dedicated work facilities provide backup office space for mission critical staff in the event that an office location becomes unavailable. These backup facilities are fully equipped and networked to the distributed data centres and are operational at all times. In addition, business transfer plans between Clearstream's different operations locations can be used to mitigate workspace unavailability.

### Staff unavailability

Business continuity measures address the loss of significant numbers of staff, covering catastrophe scenarios and potential pandemics. Solutions are designed to ensure that the minimum staff and skills required are available outside the impacted location. Staff dispersal and business transfer plans between Clearstream's different operations locations are employed such that, if one of these locations is impacted, mission critical activities can be continued by staff in other locations.

### Supplier unavailability

Clearstream assures itself of the continuous provision of critical supplier services by a number of means, such as regular due diligence review of suppliers' BCM arrangements, provision of services by alternative suppliers if possible and service level agreements, describing the minimum service levels expected from suppliers, and contingency procedure requirements.

### Incident and crisis management process

Clearstream has implemented a group-wide incident and crisis management process that facilitates coordinated response and rapid reaction to an incident or crisis in a controlled and effective manner. The process aims to minimise business and market impact, as well as enable the speedy return to regular business activity.

Incident Managers have been appointed in their respective business areas in case of incidents and crises. They will also ensure the appropriate escalation up to the Executive Management and notification to customers.



## “Real-life” simulation testing

Clearstream adopts a comprehensive and ambitious business continuity testing approach that simulates scenarios as close as possible to real-life situations while reducing associated risks and avoiding customer impacts. BCM plans are tested on a regular basis, at least annually and mostly unannounced.

Three criteria are applied to validate the BCM test results:

- Functional effectiveness: validating all technical functionalities.
- Execution ability: ensuring that members of staff are familiar with and knowledgeable in the execution of BCM procedures.
- Recovery time: confirming that BCM plans can be executed within a defined recovery time objective.

Findings are reported to Executive Management. Customers are regularly invited to participate in Clearstream's BCM tests to validate their own BCM arrangements.

### 4.3.3 Insurance

An additional tool used by Clearstream to mitigate the impact of operational risk is the transfer of risks above a certain threshold to third parties through a comprehensive insurance programme.

The risk-reducing effect from insurance contracts is taken into account when calculating the capital requirements for operational risk according to the Advanced Measurement Approach (AMA).

In order to achieve the optimum risk/benefit versus premium ratio, insurance policies are negotiated either through highly reputable brokers or directly with prime rated insurers to purchase tailor-made policies reflecting the specificities of our business.

Each major insurance cover is reviewed annually following the evolution of Clearstream's operational risk profile. This review involves all relevant parties and is coordinated by Group Risk Management.

## 4.4 Monitoring and reporting

The reporting approach laid out in [3.1.5 Risk reporting](#) on page 3-3 and [3.5 Group-wide risk reporting and monitoring](#) on page 3-10 also applies to the management of operational risk. A Supplementary Risk Report is also produced annually with the aim of providing the management body with additional background information pertaining to Clearstream's risk management.

This report includes additional summary statistics and trend analyses of operational risk events, but also a summary of major changes to the operational risk model, concept and methodology, and quality improvements in operational risk management.

## Management of operational risk

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## 5. Management of credit risk

The information in this chapter is presented in the following sections:

- [5.1 Strategy, process, structure and organisation](#) below;
- [5.2 Credit risk exposures](#) on page 5-2;
- [5.3 Credit risk mitigation](#) on page 5-7;
- [5.4 Guarantees of the ASL business](#) on page 5-11;
- [5.5 Monitoring and reporting](#) on page 5-12;
- [5.6 Disclosures on derivative credit risk](#) on page 5-12;
- [5.7 Disclosures on equities in the banking book](#) on page 5-13.

### 5.1 Strategy, process, structure and organisation

Clearstream's general risk management structure, organisation and process, as well as the risk strategy, is specified in [3. Risk management overview](#) on page 3-1. The present status and the business direction for credit risk are stated in a credit risk strategy. The Executive Management periodically examines and adjusts the credit risk strategy as necessary.

The credit risk strategy is set in accordance with the Risk Management Policy and is reported annually to the responsible Board of Directors. The credit risk strategy represents the framework and defines, amongst others, the principle credit risk appetite, the credit authorities, possible collaterals, the basic counterparty quality as well as the fundamental country and currency risk categories.

With regard to credit risk, the credit risk strategy is translated into a limit system, which is also monitored on a regular basis and ad hoc.

Clearstream may grant credit limits that serve to facilitate the settlement of securities transactions, support the securities financing business and limit the placement of funds with counterparties. Credit is primarily granted on a collateralised basis. Borrowers in Clearstream are central banks, banks and financial institutions. The credit processing is arranged in guidelines and work instructions.

Credit limits are set in accordance with the customer's financial standing, as indicated by factors such as the customer's credit rating and net worth, as well as having regard for the level of activity on the customer's accounts and the level of collateralisation.

The evaluation of counterparties and the credit risk classification takes place within the "credit assessment", which is performed by the Credit section. Internal ratings are systematically compared with external ratings from Moody's, Standard & Poor's and Fitch and are adjusted where applicable.

Credit lines must be collateralised to the maximum extent possible. The monitoring of recoverability of collateral is also operated by the Credit section.

The sovereign risk of each country is reviewed and allocated to one of three categories according to country risk level (high, medium, low). Credit limit concentration thresholds relating to country group, customer internal ratings and collateralisation levels are established and reported to the Executive Management on a monthly basis. Currency limits are established to cover currency exposure.

# Management of credit risk

Any exception to the Credit Risk Policy must be approved by the Executive Management.

All credit risk exposures are regularly reviewed and monitored. Clearstream also conducts special reviews where information is received from external and internal sources indicating a negative change in the risk assessment of the exposure or of the collateral.

The above-mentioned exposure limits are set to ensure that Clearstream does not take too large an exposure, and therefore risk, on too few participants or counterparties. German and Luxembourg banking regulations also impose risk concentration limits that have to be respected for each applicable exposure.

In principle, exposures after risk weighting and credit risk mitigation techniques towards an individual customer or group of connected customers above 25% of own funds is reported as a breach under the large exposures regulation<sup>1</sup>.

Credit risk control is performed by the Credit section, an independent function reporting to Clearstream's CFO. The Credit section is responsible for issuing the monthly credit reporting to the Executive Management and to Group Risk Management, as well as for the credit exposure reporting to Group Risk Management, which forms the basis of the VaR calculations.

## 5.2 Credit risk exposures

### 5.2.1 Application of the standardised approach

For the year under review, Clearstream did not nominate any external credit assessment institution (ECAI) for the purposes of the standardised approach. The nomination of a rating agency and the associated application of issuer and issue credit assessment represent a possibility offered to credit institutions. Clearstream has decided not to apply this option so far.

Instead, Clearstream uses the credit assessments by OECD<sup>2</sup> for the central governments and central banks exposure class. For the regional governments or local authorities, public sector entities and institutions (credit institutions, investment firms and other dedicated financial counterparties) exposure classes, the risk weighting is derived from that of the respective country of residence. The use of these credit assessments by OECD has been notified to the German and Luxembourg supervisors.

The exposures of Clearstream belong mainly to the exposure class of institutions with a short maturity. For exposures to institutions with an original maturity of less than or equal to three months, the risk weight is 20%. Therefore, this is applied to most exposures. The remaining exposures to institutions achieve, in general, a risk weighting according to the credit quality step to which exposures to the central government of the jurisdiction in which the institution is incorporated are assigned. In principle, this weighting is one category less favourable than that of the central government.

If the exposure of an institution has a residual maturity of not more than three months and it is incurred and refinanced in the obligor's national currency, it may be assigned the risk weight, raised by one category, applicable to the central government of the country in which the obligor is domiciled (mostly 20%).

The risk weighting for multilateral development banks is in most cases 0%.

Covered bonds obtain a risk weighting on the basis of the risk weightings assigned to senior unsecured claims on the credit institution that issues them.

All other exposures in the different exposure classes mostly achieve the prescribed risk weighting of an unrated position ("unrated" implies that no credit rating by an eligible ECAI exists or that no ECAI was nominated).

1. Revised as of 31 December 2010, the limitations and modalities to calculate large exposures are described in detail in §§ 13 and 13b German Banking Act (Kreditwesengesetz, KWG) in conjunction with the regulation governing large exposures and loans of EUR 1.5 million or more (Gross- und Millionenkreditverordnung, GroMiKV) as well as in CSSF circular 06/273. With regard to interbank exposures, the exposure value shall not exceed 25% of the credit institution's own funds or EUR 150 million, whichever is higher, provided that the sum of exposure values, after taking into account the effect of the credit risk mitigation to all connected clients that are not institutions, does not exceed 25% of the credit institution's own funds. For institutions with own funds less than EUR 150 million, interbank exposures are limited to 100% of the institution's own funds (see also Article 111 of Directive 2009/111/EC).
2. [http://www.oecd.org/document/49/0,2340,en\\_2649\\_34171\\_1901105\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/49/0,2340,en_2649_34171_1901105_1_1_1_1,00.html).

Clearstream complies with the risk weighting as defined by the German Federal Ministry of Finance in the German Solvency Regulation or the CSSF in circular 06/273 respectively.

The following table shows the respective total credit risk exposure values in the standardised approach, before and after applying credit risk mitigation techniques, that have been allocated to each exposure class, as well as credit quality step prescribed in Annex 1 of the German Solvency Regulation and in Part VII of CSSF circular 06/273. On the level of CH, the participation in Link Up Markets and in Clearstream Fund Services Ireland Ltd (CFSI) is deducted from own funds; other than this, no other exposure values are deducted from own funds.

31 December 2012 (€ '000)		Exposure value			Exposure value after CRM			Exposure value after considering Credit Conversion Factor (CCF)		
Exposure class	Risk weight class	CH-Group (*)	CBL(*)	CBF (*)	CH-Group (*)	CBL (*)	CBF (*)	CH-Group (*)	CBL (*)	CBF (*)
Central governments and central banks	0%	6,659,521	6,709,542	2,893	6,659,521	6,709,542	2,893	6,659,521	6,709,542	2,893
	20%	2,052	2,052	-	2,052	2,052	-	2,052	2,052	-
	50%	482	574	-	482	574	-	482	574	-
	100%	336	4,017	-	336	4,017	-	336	4,017	-
	150%	55	26	-	55	26	-	55	26	-
	<b>Total</b>	<b>6,662,446</b>	<b>6,716,211</b>	<b>2,893</b>	<b>6,662,446</b>	<b>6,716,211</b>	<b>2,893</b>	<b>6,662,446</b>	<b>6,716,211</b>	<b>2,893</b>
Regional governments, local authorities and other public bodies	0%	750,480	731,873	15,448	750,480	731,873	15,448	750,480	731,873	15,448
	10%	-	-	-	-	-	-	-	-	-
	20%	-	-	-	-	-	-	-	-	-
	35%	-	-	-	-	-	-	-	-	-
	100%	-	-	-	-	-	-	-	-	-
	<b>Total</b>	<b>750,480</b>	<b>731,873</b>	<b>15,448</b>	<b>750,480</b>	<b>731,873</b>	<b>15,448</b>	<b>750,480</b>	<b>731,873</b>	<b>15,448</b>
Multilateral development banks and international Organisations	0%	467,649	470,902	-	467,649	470,902	-	467,649	470,902	-
	20%	-	-	-	-	-	-	-	-	-
	50%	-	-	-	-	-	-	-	-	-
	100%	-	-	-	-	-	-	-	-	-
	150%	-	-	-	-	-	-	-	-	-
	<b>Total</b>	<b>467,649</b>	<b>470,902</b>	<b>-</b>	<b>467,649</b>	<b>470,902</b>	<b>-</b>	<b>467,649</b>	<b>470,902</b>	<b>-</b>
Institutions (banks)	0%	295,539	275,529	20,010	295,539	275,529	20,010	295,539	275,529	20,010
	20%	140,261,050	132,095,463	9,304,742	99,314,001	91,270,437	9,304,742	3,833,197	3,631,390	1,327,707
	50%	-	-	-	-	-	-	-	-	-
	100%	-	55,621	-	-	55,621	-	-	55,621	-
	150%	-	-	-	-	-	-	-	-	-
	<b>Total</b>	<b>140,556,589</b>	<b>132,426,613</b>	<b>9,324,752</b>	<b>99,609,540</b>	<b>91,601,587</b>	<b>9,324,752</b>	<b>4,128,736</b>	<b>3,962,540</b>	<b>1,347,717</b>
Corporates	20%	-	400,047	-	-	18,045	-	-	18,045	-
	50%	-	192	-	-	192	-	-	192	-
	100%	432,249	30,035	2,119	34,590	30,035	2,119	34,590	30,035	2,119
	150%	267	766	-	267	766	-	267	766	-
		<b>Total</b>	<b>432,516</b>	<b>431,040</b>	<b>2,119</b>	<b>34,857</b>	<b>49,038</b>	<b>2,119</b>	<b>34,857</b>	<b>49,038</b>
Undertakings for collective investment (Investment shares)	100%	42,086	-	37,519	42,086	-	37,519	42,086	-	37,519
	150%	-	-	-	-	-	-	-	-	-
	<b>Total</b>	<b>42,086</b>	<b>-</b>	<b>37,519</b>	<b>42,086</b>	<b>-</b>	<b>37,519</b>	<b>42,086</b>	<b>-</b>	<b>37,519</b>
Other (including equity holding)	0%	5	3	-	5	3	-	5	3	-
	20%	-	-	-	-	-	-	-	-	-
	100%	44,049	1,154	6,919	44,049	1,154	6,919	44,049	1,154	6,919
	1250%	-	-	-	-	-	-	-	-	-
	<b>Total</b>	<b>44,054</b>	<b>1,157</b>	<b>6,919</b>	<b>44,054</b>	<b>1,157</b>	<b>6,919</b>	<b>44,054</b>	<b>1,157</b>	<b>6,919</b>
<b>Total 2012</b>		<b>148,955,820</b>	<b>140,777,796</b>	<b>9,389,650</b>	<b>107,611,112</b>	<b>99,570,768</b>	<b>9,389,650</b>	<b>12,130,308</b>	<b>11,931,721</b>	<b>1,412,615</b>
<b>Total 2011</b>		157,067,431	149,561,783	9,154,290	112,489,012	104,663,893	9,154,290	10,525,132	10,593,982	964,363

Table 5-1. Total credit risk exposure values

\* CRM (Credit Risk Mitigation techniques) is described in detail in [5.3 Credit risk mitigation](#) on page 5-7.

**Note:** The data for CH and CBF is based on the German GAAP according to the German Commercial Code (HGB). The data for CBL is based on International Financial Reporting Standards (IFRS).

The allocation rules for certain exposures to defined (but, in some minor detail, differing) exposure classes and the treatment for certain counterparties differ in Germany and in Luxembourg.

In particular, central and regional German promotional banks (like KfW and NRW-Bank) are treated as "other public bodies" (KfW) or "banks with zero weight" in Germany but assigned in Luxembourg to the "institutions with central/regional government warranty" exposure class, with, as a consequence, big shifts recorded at the level of CBL compared to CH Group. Furthermore, investments in pension-linked fund shares and similar obligations in line with International Accounting Standards (IAS) 19/HGB § 246 (2) are netted in Luxembourg (as in the accounting standard) but shown as risk assets under German rules.

# Management of credit risk

Collateral for specific securities lending products (for example, see [“ASLplus”](#) on page 5–10) are kept en bloc for various single loans (collateral pool). The necessary regulatory allocation of this collateral to the individual loans is performed by the reporting software. The collateral effectiveness varies according to different algorithms incorporated in the tools used for Germany and Luxembourg respectively. In addition, differences occur due to usage of differing FX rates. This leads mainly to deviations between CBL and CH Group in the figures for the “institutions” exposure class for the same loans.

In the tables that follow in this chapter, the credit exposures shown/used are always after consideration of CRM and Credit Conversion Factors (CCFs).

## 5.2.2 Detailed information and distribution of credit risk exposures

### **Past due items and default or non-performing exposures:**

Pursuant to the below-stated definitions, Clearstream has had no past due item or default or non-performing exposure in its books at the reporting date or during the year under review.

#### **Definition of past due:**

An exposure is classified by German Solvency Regulation and CSSF circular 06/273 as “past due” where a counterparty has failed to make a payment when contractually due, when the debtor has exceeded an external limit communicated to him as well as when the debtor has utilised credit without prior consent.

#### **Definition of default or non-performing:**

According to § 125 of the German Solvency Regulation and CSSF circular 06/273, Part VII, subsection 3.4.2.2., a debtor is in default when either or both of the following conditions apply:

- The institution has material reason to consider that the obligor is unlikely to pay its (credit) obligations in full, without recourse by the institution to actions such as realising collateral (if held).
- The obligor is past due more than 90 successive calendar days on any material part of its overall credit obligation to the institution.

The Clearstream internal definition of “impairment” according to German Commercial Code (HGB) as well as International Financial Reporting Standards (IFRS) is compliant with the definition of “default” outlined in the Basel II Capital Accord.

Credit risk mainly arises in the short term and with credit institutions or governmental counterparties. Treasury counterparties as well as CCBs for the operational network are selected based on a high degree of creditworthiness and operational reliability. Due to the short-term nature of the business performed by Clearstream, strict internal guidelines and a close monitoring of business, there were no credit losses within Clearstream since 1949.

#### **Value adjustments and provisions:**

Clearstream assesses, at each balance sheet date, whether there is objective evidence that a financial asset or group of financial assets classified as held-to-maturity, available for sale or loans and receivables, are impaired. Only indications of impairment incurred at the balance sheet date resulting from past events and current economic conditions can be considered. Losses expected as a result of future events, no matter how likely, are not recognised.

According to the policies of Clearstream and in line with sound banking practices and regulations, Clearstream makes value adjustments and provisions, when necessary and due to individual decisions. Clearstream does not have any value adjustments and provisions for credit risk exposures at present, because it does not have any impaired assets.

The geographical allocation of credit risk exposures is as follows:

31 December 2012 (€'000)		Geographical areas				
Exposure class	Companies	European Union	Rest of Europe	North America	Rest of World	Total
Central governments and central banks	CH-Group (*)	6,548,241	107,528	36	6,641	6,662,446
	CBL(*)	6,553,738	155,830	4	6,639	6,716,211
	CBF (*)	2,893	-	-	-	2,893
Regional governments, local authorities and other public bodies	CH-Group (*)	750,480	-	-	-	750,480
	CBL(*)	731,873	-	-	-	731,873
	CBF (*)	15,448	-	-	-	15,448
Multilateral development banks and international organisations	CH-Group (*)	-	467,371	-	278	467,649
	CBL(*)	-	470,902	-	-	470,902
	CBF (*)	-	-	-	-	0
Institutions (banks)	CH-Group (*)	2,177,284	78,926	1,476,541	395,986	4,128,736
	CBL(*)	1,933,769	74,274	1,552,846	401,651	3,962,540
	CBF (*)	1,347,360	358	-	-	1,347,717
Corporates	CH-Group (*)	14,667	925	2,124	17,141	34,857
	CBL(*)	44,865	340	2,089	1,744	49,038
	CBF (*)	1,773	340	5	-	2,119
Undertakings for collective investment (Investment shares)	CH-Group (*)	42,086	-	-	-	42,086
	CBL(*)	-	-	-	-	-
	CBF (*)	37,519	-	-	-	37,519
Other (including equity holding)	CH-Group (*)	44,054	-	-	-	44,054
	CBL(*)	1,157	-	-	-	1,157
	CBF (*)	6,863	43	13	-	6,919
<b>Total 2012</b>	<b>CH-Group (*)</b>	<b>9,576,813</b>	<b>654,749</b>	<b>1,478,701</b>	<b>420,045</b>	<b>12,130,308</b>
	<b>CBL(*)</b>	<b>9,265,402</b>	<b>701,346</b>	<b>1,554,939</b>	<b>410,034</b>	<b>11,931,721</b>
	<b>CBF (*)</b>	<b>1,411,856</b>	<b>741</b>	<b>18</b>	<b>-</b>	<b>1,412,615</b>
Total 2011	CH-Group (*)	8,415,977	947,454	1,000,778	160,923	10,525,132
	CBL(*)	7,785,526	930,202	1,153,210	725,044	10,593,982
	CBF (*)	963,774	174	415	-	964,363

Table 5-2. Geographical allocation of credit risk exposures

**Note:** The data for CH and CBF is based on the German GAAP according to the German Commercial Code (HGB). The data for CBL is based on International Financial Reporting Standards (IFRS).

In addition, differences occur due to use of differing FX rates.

Related to shifts in the exposure class allocation and different collateral valuations between CBL and CH Group, please refer to the Note under [Table 5-1](#) on page 5-3.

Clearstream delivers settlement, custody and related services to financial markets. Clearstream does not incur exposures from its business to non-financial industrial sectors.

The following table provides information about the residual contract maturity, broken down by exposure classes. Most exposures are short-term with a significant part being intraday exposures.

## Management of credit risk

31 December 2012 (€'000)		Maturity			
Exposure class	Companies	Not more than 3 months	Up to one year	Over one year	Total
Central governments and central banks	CH-Group (*)	6,662,446	-	-	6,662,446
	CBL(*)	6,716,211	-	-	6,716,211
	CBF (*)	2,893	-	-	2,893
Regional governments, local authorities and other public bodies	CH-Group (*)	5,818	25,008	719,654	750,480
	CBL(*)	1,234	25,008	705,631	731,873
	CBF (*)	372	-	15,076	15,448
Multilateral development banks and international organisations	CH-Group (*)	664	-	466,985	467,649
	CBL(*)	-	-	470,902	470,902
	CBF (*)	-	-	-	-
Institutions (banks)	CH-Group (*)	3,832,644	553	295,539	4,128,736
	CBL(*)	3,684,316	-	278,224	3,962,540
	CBF (*)	1,327,707	-	20,010	1,347,717
Corporates	CH-Group (*)	30,634	3,666	557	34,857
	CBL(*)	44,272	3,666	1,100	49,038
	CBF (*)	2,119	-	-	2,119
Undertakings for collective investment (Investment shares)	CH-Group (*)	42,086	-	-	42,086
	CBL(*)	-	-	-	-
	CBF (*)	37,519	-	-	37,519
Other (including equity holding)	CH-Group (*)	40,165	-	3,889	44,054
	CBL(*)	55	-	1,102	1,157
	CBF (*)	3,711	-	3,208	6,919
<b>Total 2012</b>	<b>CH-Group (*)</b>	<b>10,614,457</b>	<b>29,227</b>	<b>1,486,624</b>	<b>12,130,308</b>
	<b>CBL(*)</b>	<b>10,446,088</b>	<b>28,674</b>	<b>1,456,959</b>	<b>11,931,721</b>
	<b>CBF (*)</b>	<b>1,374,321</b>	<b>-</b>	<b>38,294</b>	<b>1,412,615</b>
Total 2011	CH-Group (*)	9,050,818	204,397	1,269,917	10,525,132
	CBL(*)	9,116,956	243,806	1,233,220	10,593,982
	CBF (*)	959,023	-	5,340	964,363

Table 5-3. Residual contract maturity

**Note:** The data for CH and CBF is based on the German GAAP according to the German Commercial Code (HGB). The data for CBL is based on International Financial Reporting Standards (IFRS).

Related to shifts in the exposure class allocation and different collateral valuations between CBL and CH Group, please refer to the Note under [Table 5-1](#) on page 5-3.

### 5.2.3 Stress testing of credit risk

The term “stress test” comprises the entirety of qualitative and quantitative analysis methods of rare but plausible events. There are three stress tests performed for credit risk:

- The “Credit VaR Stress Test”, where the default of the customer with the largest uncollateralised exposure is simulated, after utilisation of all respective collateral and after taking the recovery rate into account. The calculation is done for every day.
- The “Multiple Failures Stress Test”, whose purpose is to assess the impact of the simultaneous default of two or more large customers on Clearstream’s solvency and liquidity position.
- The “Bridge Stress Test”, where the test assumes an insolvency of our Bridge<sup>1</sup> counterparty.

1. The “Bridge” is the electronic communications platform that facilitates the efficient settlement of securities transactions between counterparties in Clearstream Banking S.A. and Euroclear Bank. Transactions between a Clearstream customer and counterparties in Euroclear Bank settle across the Bridge.



Limit breaches are reported to Executive Management. Depending on the risk associated to the limit breach, reporting is done quarterly, yearly or ad hoc.

In addition to the stress tests defined above, a "Reverse Credit Stress Test" has been performed since 2011, whose aim is to identify the number of counterparties that have to default to exceed the risk bearing capacity.

## 5.3 Credit risk mitigation

Credit risk mitigation techniques, used by Clearstream for solvency purposes, are composed of hedging and collateralisation. Furthermore, a variety of account relation is maintained on a current account basis and therefore just net positions are relevant.

The companies of Deutsche Börse Group are highly integrated and perform a variety of services for each other. As a consequence, respective fees are invoiced and, as a result, payables and receivables arise. In order to optimise cash flows and to reduce payment efforts in such cases where cash flows in both directions are material, positions are held on current accounts based on netting agreements. Debits and credits are netted immediately and net positions are settled once a month.

The accounts with customers or CCBs are, in general, maintained on a current account basis. Therefore, all movements per account and currency are immediately netted to a single account balance.

For credit purposes, except as otherwise agreed between the customer and Clearstream, all accounts of the customer with Clearstream, in whatever currency they are held, are deemed to form the elements of a single, indivisible current account and Clearstream may at any time set off, in whole or in part, credit and debit balances standing to any accounts held by the customer with Clearstream.

Despite these netting possibilities, no netting takes place. For credit purposes, cash credit positions out of these arrangements are taken as cash collateral. For solvency purposes this collateral is not taken into account (see [5.3.2 Collaterals](#) on page 5-7).

CBL acts as principal in the securities lending business within the ASLplus product, which is operated on a matched principal broking basis. Lending is performed if the ultimate lender as well as the borrower are both willing and able to close the deal and the collateral is available.

CBL acts, in that product, as a central counterparty in this business according to EU directive 2006/48/EC, Annex III, Part 1, No. 2 (as confirmed by CSSF). Due to the matched principal broking basis, the business has no impact on the balance sheet. For solvency purposes, the items are nevertheless properly reflected.

### 5.3.1 Hedging

A profit participation right, as part of the total exposure of CBF and, consequently, also of Clearstream Holding AG consolidated, was hedged via a total return swap of a notional amount of EUR 175 million. The deal was closed on 18 December 2012 and no exposure was to be reported at the end of the year.

### 5.3.2 Collaterals

#### Technical Overdraft Facilities

Under the terms and conditions of a Technical Overdraft Facility (TOF), CBF/CBL has a pledge on all their customer's assets held on the customer's account to secure obligations towards CBF/CBL by the customer for the services rendered by CBF/CBL to this customer under the TOF. This is complemented by netting provisions. Unless CBF/CBL is specifically notified by the customer to the contrary, under the rules of CBF/CBL, as appropriate, all assets held by the customer in CBF/CBL are pledged in favour of CBF/CBL to the extent of any usage of the credit facilities.

Collateral eligibility is defined and approved by the Credit section. Eligibility and haircut are dependent on the security's credit, market, liquidity and legal risks.

## Management of credit risk

Securities that are eligible are subject to a margin deduction from their market value; haircuts range from 2% to 100% depending on the issue type and credit quality.

Securities issued by or correlated to the customer are not eligible as collateral.

Collateral haircuts are automatically recalculated on a daily basis; collateral policy is reviewed at least once a year.

Customers' collateral positions are evaluated daily, based on prices received from various data vendors. Any transaction on a given account that would exceed the available collateral is automatically blocked by the system.

In some instances where no collateral can be provided by the customer, Clearstream may grant an overdraft facility on the basis of third-party bank guarantees.

		<b>31 December (€ '000)</b>	
		<b>2012</b>	<b>2011</b>
<b>TOF (Technical Overdraft Facilities)</b>			
<b>CBL</b>		87,639,044	94,069,654
<b>CBF</b>		7,985,284	8,245,015
<b>Consolidated</b>		95,624,328	102,314,669
<b>Utilised lines</b>	<b>Unsecured</b>		
	<b>CBL</b>	2,317	31,450
	<b>CBF</b>	-	2
	<b>Consolidated</b>	2,317	31,452
	<b>Secured</b>		
	<b>CBL</b>	3,233,124	1,762,895
<b>CBF</b>	32,685	105,259	
<b>Consolidated</b>	3,265,809	1,868,154	
<b>Collaterals (available)</b>	<b>Cash</b>	3,043,000	2,070,265
	<b>Securities</b>	67,038,823	73,853,835
<b>Over-collateralisation (difference between utilised lines and available collaterals)</b>		66,816,014	74,055,946

Table 5-4. External credit lines and utilisation

Like the cash credit positions, received securities collateral and guarantees are also not taken into account for solvency purposes as the average outstanding debit amount, especially after weighting with the respective risk weighting, is, in general and on average, low and additional cost for CRM usage does not give a positive cost-to-benefit ratio.

Since mid-2011, new Technical Overdraft Facility lines for CBL are granted on an intraday basis only (iTOF). Remaining TOF lines for CBL and all TOF lines for CBF are in the process of being changed to intraday basis.

## Collateralised placing

CBL places a part of the group's liquidity - mainly in Euro - on the basis of reverse repo agreements and similar collateralised placings with a maximum maturity of one year, but usually with maturities of three months or less. In general, repo transactions must be governed by a Global Master Repurchase Agreement (GMRA) and are only closed with banking counterparties fulfilling minimum rating criteria.

Repo transactions are, in principle, settled via Clearstream's settlement system. In some cases, the Euroclear system is also used via the "Bridge" or the domestic settlement systems of Clearstream's depositories are used. All settlement systems used are proven for that type of transaction.

Securities for placings taken as collateral have to fulfil specific requirements:

- Only the most liquid, least volatile and easily priced debt instruments with a defined credit rating (minimum long-term credit rating of Moody's [Aa3] or Standard & Poor's [AA-] or Fitch [AA-]; in the absence of a rating for the issue, the issuer rating (lowest available is relevant) are eligible as collateral for repo transactions.
- Issuers are limited to sovereigns, local governments, government agencies that are explicitly guaranteed by national governments, U.S. Government Enterprises (conventional [non-structured] instruments only), multilateral development banks and other supranational banks and banks. The rating requirements stated above vary depending on the issuer class.
- Not acceptable as collateral are: ABS, MBS (RMBS and CMBS) and other forms of non-standard collateral (such as CDOs, derivative bonds, credit-linked bonds, callable bonds, perpetual bonds, warrants).
- All collateral must have an active market and, in general, must be liquid.
- Subordinated securities are not eligible.
- Transactions in which the securities given as collateral are issued by or correlated to the counterparty ("own assets") are not allowed. For this reason, specific wrong way risk does not play a role in Clearstream.
- The maximum remaining life to maturity of the accepted securities is 10 years.

Cross-currency collateralisation is in general possible. It was not used for bilateral transactions but in the context of triparty repos. Bilateral transactions must be "plain vanilla" on a single fixed-income security. In triparty transactions, multiple fixed-income securities may be taken as collateral. Structured transactions are not allowed.

Haircuts on the securities are applied within triparty repo transactions only. All collaterals are valued daily. To secure the cash lent through reversed repurchase agreements, CBL agrees margin calls with the repo counterparty on a daily basis to keep cash and collateral in balance.

For solvency purposes, according to §§ 185, 191 Solvency Regulation (SolvV) and CSSF circular 06/273, Part IX, Subparagraph 3.1.2.2.2.4, application of the zero weighting is possible in most cases. Where the issuer of the collateral does not fulfil the requirements of the regulation stated above or collateral is given in a different currency, supervisory haircuts as laid down in § 192 SolvV and CSSF circular 06/273, Part IX, Subparagraph 3.1.2.2.2.1 apply. In cases of FX mismatch, further cross-currency haircuts are to be applied.

Counterparty Institutions (banks)	31 December (€' 000) 2012		31 December (€' 000) 2011	
	CH-Group	CBL	CH-Group	CBL
<b>Exposure - book value</b>	<b>2,842,577</b>	<b>2,840,748</b>	<b>5,560,856</b>	<b>5,567,770</b>
<b>Collateral - market value</b>	<b>2,844,388</b>	<b>2,821,529</b>	<b>5,540,226</b>	<b>5,586,543</b>
<b>RWA</b>	<b>935</b>	<b>15,245</b>	<b>4,357</b>	<b>74,863</b>

Table 5-5. Placements from CBL

# Management of credit risk

## ASLplus

The ASLplus Programme enables customers to enhance the revenues that can be realised as a lender by offering access to the wholesale trading market. CBL acts as principal to the lenders in ASLplus and lends on securities to market participants through various counterparties.

The Credit section defines collateralised securities borrowing limits for each borrower and credit limits are agreed on the basis of standard framework agreements between CBL and each borrower. Only securities rated A+ and above are eligible for collateral with haircuts ranging from 2% to 12% depending on the issuer type. Furthermore, both the exposure and the collateral are subject to daily valuation and remarking; the exposure and the collateral may be denominated in a different currency.

Mortgage-backed and other structured securities are not eligible as collateral.

In order to mitigate cross-currency risk in ASLplus, additional coverage is requested where there is a currency mismatch between a customer's loan and collateral portfolios. The add-on haircut is currently fixed at 1% (if the currency mismatch represents more than 33% of the exposure amount) and 2% (if it exceeds 66%) for one week.

The additional haircut requirement may be increased to the following marks if the foreign exchange mismatch amount exceeds the indicated thresholds:

- 3% for FX mismatch amount between EUR 2 billion and EUR 2.75 billion;
- 4% for FX mismatch amount between EUR 2.75 billion and EUR 3.5 billion;
- 6% for FX mismatch amount above EUR 3.5 billion.

Collateral for ASLplus business is delivered in a collateral pool serving several loans. Out of the pool, collateral valued at least to the requested collateral value based on internal credit rules is blocked for the total of the associated loans. No allocation on a loan by loan basis is done for credit purposes.

As for the collateralised placing, a zero weighting by the application of §§ 185, 191 SolvV and CSSF circular 06/273, Part IX, Subparagraph 3.1.2.2.4 is, in general, possible. As the lending business is covering a wider scope of securities that do not fulfil the criteria as laid down in § 185 (3) SolvV and in CSSF circular 06/273, Part IX, Subparagraph 3.1.2.2.4, while the collateral given by the ultimate lender only partially fulfils these criteria, only a portion is zero weighted. For the remainder, the supervisory haircuts are applied. As there is a notable portion of cross-currency collateralisation, additional FX haircuts apply.

Counterparty Institutions (banks)	31 December (€' 000) 2012		31 December (€' 000) 2011	
	CH-Group	CBL	CH-Group	CBL
Exposure - book value	38,044,817	38,043,885	38,506,373	38,496,972
Collateral - market value	39,122,342	38,071,342	39,810,366	40,228,151
RWA	55,948	59,346	70,008	76,971

Table 5-6. Exposures on the ASLplus Programme

**Note:** The necessary regulatory allocation of this collateral to the loans is performed by the reporting software. The collateral effectiveness varies according to different algorithms incorporated in the tools used for Germany and Luxembourg respectively. In addition, differences occur due to usage of differing FX rates. This leads to deviations between CBL and CH Group in the figures for the "institutions" exposure class for the same loans.

## 5.4 Guarantees of the ASL business

### 5.4.1 Business description

The Automated Securities Lending (ASL) Programme is a fails lending programme that is integrated into CBL's settlement engine and enables settlement efficiency to be maximised.

CBL acts as:

- Lending Agent, offering:
  - Automatic detection of loan requirements to cover a failed trade;
  - Automatic identification of loan supply from ASL lenders;
  - Anonymous transfer of securities to the ASL borrower (undisclosed relationship between lender and borrower);
  - Administration of the loan.
- Collateral Agent, monitoring the quality and sufficiency of collateral with regard to:
  - Eligibility;
  - Collateral value;
  - Concentration limits;
  - Fluctuations in the market values of positions pledged as collateral (mark-to-market of the loan and the collateral);
  - Securities prices, reviewed several times a day depending on the closing time of the market;
  - Automatic collateral substitution.
- Guarantor for the collateralised loans:
  - Underwriting the risk involved if the borrower defaults on its obligations;
  - Managing collateral securities pledged by the borrower to CBL;
  - Assigning loan limits to borrowers to avoid any new loan opening if the limit is reached.

### 5.4.2 Risk guarantee

In the ASL Programme, every loan of securities is guaranteed by CBL. The guarantee is backed by securities pledged by the borrower, as follows:

- Collateral securities are pledged by the borrower to CBL under a Luxembourg law pledge. Collateral quality and sufficiency are monitored by CBL on a daily basis.
- Second ranking pledge on collateral - in the unlikely event of a simultaneous default by CBL and the borrower, the right to the collateral passes to the lender.

### 5.4.3 Coverage value

The coverage value of the guarantee related to an ASL loan is equal to the market value of the securities plus an additional margin. Standard margins, varying from 0% to 15%, are applied depending on the securities lent.

### 5.4.4 Collateral eligibility

The collateral eligibility criteria of the ASL Programme are the same as those for Clearstream's settlement engine.

Collateral eligibility is defined and approved by the Credit section. Eligibility and haircut are dependent on the credit, market, liquidity and legal risks of the security.

## Management of credit risk

Securities that are eligible are subject to a margin deduction from their market value; haircuts range from 2% to 100% depending on the issue type and credit quality.

Securities issued by or correlated to the customer are not eligible as collateral.

Collateral haircuts are automatically recalculated on a daily basis; collateral policy is reviewed at least once a year.

Customers' collateral positions are evaluated daily, based on prices received from various data vendors. Any transaction on a given account that would exceed the available collateral is automatically blocked by the system.

### 5.5 Monitoring and reporting

The Credit section is responsible for controlling the credit risk in Clearstream. It reports new credit lines and changes of credit lines (increases as well as reductions), changes of the internal rating for customers and credit exposures to the Group Risk Management section. Besides that, limit breaches - if any - are reported to the Executive Management and to Group Risk Management.

The reporting approach as described under [3.1.5 Risk reporting](#) on page 3-3 and [3.5 Group-wide risk reporting and monitoring](#) on page 3-10 also applies to the management of credit risk. On this basis, Group Risk Management assesses the credit risk and reports VaR results as well as risk issues to the Executive Management. Besides the assessment of the VaR, Group Risk Management also measures credit risk concentration and performs stress test calculations on credit risk (see [5.2.3 Stress testing of credit risk](#) on page 5-6).

### 5.6 Disclosures on derivative credit risk

Clearstream is, in general, not involved in the derivatives business. In particular, no credit derivatives are in the books of any Clearstream entity. The only exception was the total return swap covering the profit participation right in the books of CBF, which was closed on 18 December 2012. (See also [5.3.1 Hedging](#) on page 5-7.)

However, derivatives are, to a small extent, used to hedge interest rate or foreign exchange risk. Such instruments can only be used in established and regularly tested operational procedures. In compliance with IAS 39, hedging documentation must be established. The dealings with interest rate or foreign exchange risks (measurement, assignment of internal capital and limits etc.) are described in detail in [6. Management of market risk, including interest rate risk in the banking book](#) on page 6-1.

In cases where a certain level of foreign exchange exposure, and therefore risk, is exceeded, the risk of each individual currency exposure should be hedged. For Clearstream, the level of materiality is expressed as 10% of consolidated EBIT of the budget year. For the protection of Clearstream's budgeted interest income, the Treasury section may hedge the budgeted interest income for up to 50% of the customer credit balances for the upcoming budget period(s) through approved hedging instruments.

Forward foreign exchange contracts hedging the foreign exchange risk are settled via Continuous Linked Settlement (CLS)<sup>1</sup>, to minimise settlement risk, and executed with counterparties only where a Credit Support Annex (CSA) is signed to mitigate credit risk resulting from unfavourable market movement.

Correlations of market and credit risk are taken into account within the models for calculation of the credit risk. Group Risk Management has developed specific policies and rules about how to handle these correlation risks within their uniform risk modelling landscape.

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1. CLS (Continuous Linked Settlement): CLS is a global multi-currency settlement system that aims to eliminate foreign exchange (FX) settlement risk due to time-zone differences by settling both legs of an FX transaction simultaneously (payment vs. payment).

The original exposure method pursuant to Part VII, Section 4.2.1 of CSSF circular 06/273 is used by Clearstream to calculate the exposure value for OTC derivative instruments and long settlement transactions. The original exposure thus obtained is the exposure value.

FX swaps are considered as funding or an investment vehicle for currencies where no or limited deposit market exists (overnight swaps) or to convert USD liquidity (overnight and/or term FX swaps) into EUR used to purchase/repo against highly liquid paper delivered to BCL serving as liquidity buffer.

Exposure Value	Currency	31 December 2012 (mn)	31 December 2011 (mn)
Interest Rate Swaps - Fixed Rate Payer	EUR	0.0	0.4
Cross-currency swaps	EUR	44.4	53.7
Forward Foreign Exchange Contracts	EUR	0.5	0.0

Gross positive Fair Value	Currency	31 December 2012 (mn)	31 December 2011 (mn)
Interest Rate Swaps - Fixed Rate Payer	EUR	-	-
Cross-currency swaps	EUR	1.4	46.3
Forward Foreign Exchange Contracts	EUR	0.4	-

Notional/Trade Value	Currency	31 December 2012 (mn)	31 December 2011 (mn)
Interest Rate Swaps - Fixed Rate Payer	EUR	0.0	81.4
Cross-currency swaps	EUR	2,222.7	2,683.2
Forward Foreign Exchange Contracts	EUR	24.6	-

Table 5-7. Exposures in derivatives

## 5.7 Disclosures on equities in the banking book

Equities held in the banking book concern strategic participations in companies with business related to the business of Clearstream and a forced participation in the Society for Worldwide Interbank Financial Telecommunication (SWIFT), as CBL is one of the largest users of SWIFT. Due to the strategic alignment, no participation is held in order to make short-term profits (no trading intent).

### 5.7.1 Equities in the banking book

Since the launch of Link Up Markets in 2008, CBF has participated in that joint venture of CSDs to improve efficiency and reduce costs of post-trade processing of cross-border securities transactions. Currently, 11 CSDs are partners, each participating with an equity stake in the legal entity based in Madrid.

Link Up Markets was accounted for under the equity method. In the year under review, CBF's participation in Link Up Markets is about 23.5%.

According to § 10a (4) of the German Banking Act, Link Up Markets has, in principle, to be consolidated under regulatory terms. Due to the small size of operations, CH has requested exemption from consolidation according to § 31 (3) and (4) German Banking Act, which has been granted by BaFin.

## Management of credit risk

Similar to Link Up Markets, Clearstream Fund Services Ireland Ltd (CFSI) is not included in the consolidated reporting of Clearstream Holding because its total assets were below the minimum level outlined in § 31 (3) sentence 1 of the German Banking Act (see [5.2.1 Application of the standardised approach](#) on page 5-2).

Owing to the SWIFT constitution, CBL - and, since 2012, also CBF - must hold a participation in SWIFT.

### 5.7.2 Valuation and accounting of equities in the banking book

The valuation and accounting specifications of the German Commercial Code (HGB) are relevant for CH Group on a consolidated level and for CBF's equities in the banking book, defined as a long-term financial asset according to HGB.

In 2012, CBF acquired a participation in SWIFT that is classified as long-term financial asset.

According to § 340e HGB in connection with §§ 252 and 253 HGB, such assets may not be recognised at an amount higher than their purchase price, reduced by depreciation, amortisation and write-downs in accordance with particular requirements for fixed assets. Items of fixed assets may be written down in order to carry them at the lower of cost or market value at the balance-sheet date. Impairment losses shall be recognised if impairment is expected to be permanent. In the year under review, an impairment loss was recognised for CBF's participation in Link Up Markets with an amount of EUR 1.859 million.

On a consolidated basis, Link Up Markets is classified as an associate and accounted for using the equity method in accordance with § 311 HGB (also in line with IAS 28). From the regulatory point of view according to § 10a (4) of the German Banking Act, Link Up Markets has, in principle, to be included in the consolidated reporting; given the small size of operations, BaFin granted the exemption from consolidation according to § 31 (3) sentence 4 of the German Banking Act.

The valuation and accounting specifications of International Financial Reporting Standards (IFRS) are relevant for CBL's participation in SWIFT, which was reduced in 2012. In accordance with IAS 39.9, the participation of CBL in SWIFT is treated as an available-for-sale financial asset.

The initial measurement is based on its fair value. For the purposes of subsequent measurement, the fair value without deduction for transaction costs that the financial asset may incur on sale or other disposal has to be taken into account. Fair value is defined as the amount for which an asset could be exchanged between knowledgeable willing parties in an arm's length transaction.

	31 December 2012 (€' 000)			31 December 2011 (€' 000)		
	CH-Group	CBL	CBF	CH-Group	CBL	CBF
<b>Fair value of investments</b>	<b>7,133</b>	<b>5,386</b>	<b>3,202</b>	<b>7,897</b>	<b>6,535</b>	<b>1,467</b>
<b>Balance sheet value</b>	<b>5,689</b>	<b>3,936</b>	<b>3,208</b>	<b>7,701</b>	<b>4,598</b>	<b>3,208</b>
<b>Total unrealised gains (losses)</b>	<b>1,444</b>	<b>1,450</b>	<b>-6</b>	<b>196</b>	<b>1,937</b>	<b>-1,741</b>
<b>thereof total revaluation gains (losses)</b>	<b>1,444</b>	<b>1,450</b>	<b>-6</b>	<b>196</b>	<b>1,937</b>	<b>-1,741</b>
<b>Amounts included in the original or additional own funds</b>	<b>-</b>	<b>1,034</b>	<b>-</b>	<b>-</b>	<b>1,379</b>	<b>-</b>

Table 5-8. Equities in the banking book

**Note:** The data for CH and CBF is based on the German GAAP according to the German Commercial Code (HGB). The data for CBL is based on International Financial Reporting Standards (IFRS).

None of the participations is listed on any exchange.



## 6. Management of market risk, including interest rate risk in the banking book

The information in this chapter is presented in the following sections:

[6.1 Strategy, process, structure and organisation](#) below;

[6.2 Measurement](#) on page 6-1;

[6.3 Market risk mitigation](#) on page 6-2;

[6.4 Monitoring and reporting](#) on page 6-2;

[6.5 Specific disclosures for market risk](#) on page 6-2;

[6.6 Specific disclosures on interest rate risk in the banking book](#) on page 6-3.

### 6.1 Strategy, process, structure and organisation

Clearstream is not involved in proprietary trading activities and does not maintain a trading book. Market risks arise, therefore, only in the area of net positions in foreign currencies. Investments in securities as part of the investment or short-term portfolio are, in principle, in bonds only and these are purchased with the “buy and hold” strategy, which leads to interest rate risk in the banking book.

Clearstream’s general structure, organisation and process of risk management as well as the risk strategy is described in [3. Risk management overview](#) on page 3-1.

Treasury Policy sets the frame for hedging future currency risk and interest income. It includes the approved hedging instruments and the delegation of power for hedging of interest income and foreign exchange risk. On a group level, the materiality for hedging currency exposure is set to a percentage of the consolidated EBIT per individual foreign currency.

With regard to market risk, the risk strategy is translated into a limit system, which is monitored on a regular basis. The Treasury Policy defines limits and responsibilities.

Market risk control is performed by the Treasury mid-office, a function independent of the Treasury section. Treasury mid-office is responsible for issuing monthly reportings to the Executive Management and to Group Risk Management. Limit excesses are monitored daily and are reported immediately to Executive Management, Group Risk Management and Treasury.

### 6.2 Measurement

Besides the VaR calculations (see [3.2 Risk management methodology](#) on page 3-3), interest rate risk is calculated on all positions under Treasury management, applying a predefined parallel shift on the yield curve (see [6.6.2 Interest rate risk measurement](#) on page 6-3). For the banking book, the risk is calculated on a daily basis for CH Group and all Clearstream legal entities with own positions, applying a 2% parallel shift to the respective yield curve and assessing the resulting effect on the net present value (NPV) of this portfolio.

## Management of market risk, including interest rate risk in the banking book

For Clearstream's investment portfolio, interest rate risk is also measured with the help of a duration approach.

Foreign exchange risk is controlled using a limit system. As Clearstream has payables and receivables in foreign currencies, only the net exposure is relevant for the exposure calculation. Clearstream's income and cost are partially in foreign currencies as well. Hedging is done where the expected foreign currency net exposure out of profit and loss items exceeds 10% of the EBIT. The effectiveness of potential foreign exchange risk hedges is measured on a regular basis.

### 6.3 Market risk mitigation

Market price risk can arise in connection with cash investments or borrowing as a result of fluctuations in interest rates and foreign exchange rates as well as through corporate transactions. In the year under review, the foreign exchange market price risk was partly hedged through forward foreign exchange transactions, through which future foreign exchange exposures arising from cash flows in foreign currencies were hedged against adverse movements in market prices.

Testing of the effectiveness of hedging transactions is performed on a regular basis in compliance with IAS 39.

### 6.4 Monitoring and reporting

Treasury performance, exposure and breach of limits are controlled and reported by the Treasury mid-office. Reports are performed daily, weekly and monthly to Executive Management, Group Risk Management as well as to Treasury and Credit. Limit excesses occurring within treasury activity are reported by Treasury mid-office to Group Risk Management.

### 6.5 Specific disclosures for market risk

#### **Foreign exchange risk:**

CBL and CBF transact settlement and custody services business in more than 50 different currencies.

Customers maintain cash and securities accounts with CBL or CBF in those currencies in which they transact their business. Amounts in currency transmitted to CBL or CBF by customers are registered on the respective customers' account(s) in that currency. The same is true for any withdrawal of funds by customers (for example, for settlement purposes or for custody payments).

Debits and credits of all customers in the same currency are held by the respective Clearstream legal entity (CBL or CBF) at its cash correspondent banks (CCBs). For most of the business, CBL is the CCB for CBF and CBF's net customer position is therefore already included in CBL's position. The information used by Treasury as a basis for placings is analysed by currency. Where there is a requirement to fund net currency credit facilities, such takings are always made in the relevant currency. Therefore, with respect to multicurrency settlement, currency risk is not borne by CBL or CBF.

A limited amount of local currency is held in each location, at CBL representative offices, to cover expenses. In addition, interest earned on currency placings above interest payable to customers on currency balances will cause small (generally long) currency positions.

Customer foreign exchange orders are covered in the foreign exchange markets on a daily basis. Any residual open foreign exchange position is not considered significant and, in any case, is monitored daily by Treasury within established modest limits.

CBL has entered into forward foreign exchange transactions to partly hedge the foreign exchange risk associated with the expected commission income for 2013.

# Management of market risk, including interest rate risk in the banking book

## 6.6 Specific disclosures on interest rate risk in the banking book

### 6.6.1 Interest rate risk nature

Customer liquidity of CBL and CBF is placed and refinanced primarily through overnight secured reverse repos, placings with BCL in EUR currency and overnight foreign exchange swaps. In addition, CBL and CBF primarily purchase highly liquid and low risk-weighted investments for Capital Adequacy Ratio purposes. The investment portfolio of CBL and CBF is aimed at providing core capital investment. Consequently, these portfolios are constructed to minimise both market and credit risk and consist mainly of zero risk-weighted debt securities.

Derivative instruments are not offered to customers or employed in day-to-day liquidity management. The use of proprietary derivative instruments is restricted to interest rate swaps and forward exchange contracts that hedge or eliminate structural foreign exchange and interest rate exposure.

Clearstream monitors currency and interest rate exposures daily by means of reporting generated by the general ledger accounting system and its customer cash ledgers or the Treasury ledger.

### 6.6.2 Interest rate risk measurement

Clearstream's assets and liabilities are managed to minimise interest rate risk (IRR) within the limits established by the Treasury Policy. Liabilities usually determine the structure of its assets. The close matching of investments and customer deposits ensures that Clearstream is able to control its IRR based in the context of duration and gap.

The Treasury Policy defines the maturity mismatch limits, the IRR sensitivity limits and the maximum tenor for each currency or group of currencies. Limits are based on IRR, the concept of duration and gap. Duration means the remaining maturity of every deal on the asset and liability side. Gap means the IRR on the asset side minus the IRR on the liability side. The IRR is calculated daily on the basis of the net present value (NPV) of a 1% interest rate change for the money-market book, 0.5% for the floating rate note (FRN) portfolio and 2% for the investment portfolios.

	31 December 2012 (€' 000)				31 December 2011 (€' 000)			
	Interest Rate Risk (IRR)		Mismatch / Portfolio Limit		Interest Rate Risk (IRR)		Mismatch / Portfolio Limit	
	Exposure	Limit	Exposure	Limit	Exposure	Limit	Exposure	Limit
CBL Short-term book	2,056	8,700	1,883,486	4,700,000	5,216	8,300	4,231,626	4,400,000
CBL FRN Portfolio	59,393	85,000	1,474,299	1,900,000	28,453	34,000	1,450,699	1,500,000
CBF FRN Portfolio	1,291	5,000	30,000	100,000	0	0	0	0
CBL Investment Portfolio	0	0	0	0	-	34,000	-	400,000
CBF Investment Portfolio	422	7,000	5,000	75,000	488	15,000	5,000	175,000

Table 6-1. Limits for Clearstream Group according to the Treasury Policy

Based on BaFin and CSSF requirements, Clearstream calculates also the IRR of the banking book as a percentage of own funds. The IRR is measured as a 2% parallel shift of the yield curve. The banking book includes the investment portfolio and related fair value hedges, cash flow hedges and the short-term portfolio.

## Management of market risk, including interest rate risk in the banking book

		31 December 2012	31 December 2011
<b>Clearstream Banking S.A., Luxembourg</b>			
<u>Interest Rate Risk - Banking Book (IRRBB) as per circular CSSF 08/338</u>			
Net Asset position (in EUR equivalent)	(€' 000)	1,853,382	4,231,042
IRRBB based on parallel shift of the yieldcurve of 200 bps	(€' 000)	4,010	10,438
Base Capital*	(€' 000)	434,686	521,390
IRRBB as percentage of own funds		1%	2%
Threshold for reporting to CSSF		20%	20%
<b>Clearstream Banking AG, Frankfurt</b>			
<u>Interest Rate Risk - Banking Book (IRRBB) as per BaFin circular 11/2011 (BA)</u>			
Net Asset position (in EUR equivalent)	(€' 000)	34,880	179,777
IRRBB based on parallel shift of the yield curve of 200 bps	(€' 000)	504	641
Own funds**	(€' 000)	188,118	183,131
IRRBB as percentage of own funds		0%	0%
Threshold for reporting to BaFin and Deutsche Bundesbank		20%	20%

Table 6-2. Investment portfolio limits and interest rate risks

\* The Base Capital for CBL is based on International Financial Reporting Standards (IFRS) and consists of eligible own funds plus the profit of the year minus interim dividends (not taking into account deductions).

\*\* The own funds for CBF are based on German Commercial Code (HGB) modified by the own funds rules for solvency purposes by the German Banking Act (KWG).

The regulatory prescribed threshold has never been reached within the year under review.

### 6.6.3 Foreign exchange risk measurement

In October 2012, CBL entered into forward foreign exchange contracts hedging the foreign exchange risk associated with the USD-based part of the expected commission income for 2013 amounting to EUR 24.9 mn. The fair value on 31 December 2012 amounted to EUR 449,000.

## 7. Management of liquidity risk

The information in this chapter is presented in the following sections:

- [7.1 Strategy, process, structure and organisation](#) below;
- [7.2 Measurement](#) on page 7-2;
- [7.3 Liquidity risk mitigation](#) on page 7-3;
- [7.4 Scenarios](#) on page 7-3;
- [7.5 Governance, Approval and Validation](#) on page 7-5;
- [7.6 Monitoring and reporting](#) on page 7-6.

### 7.1 Strategy, process, structure and organisation

Liquidity is managed on a centralised basis by CBL for all Clearstream entities. The objective of liquidity management is as follows:

- To meet all payment obligations within changing net long/short customer cash balances, intraday and overnight by currency

Customers maintain cash balances with CBL and may draw on credit facilities as a result of their securities settlement activities. For EUR, USD and GBP, mismatch and portfolio limits are allocated to Treasury on the basis that a minimum customer cash balance and own funds are available at all times for Treasury investments with a tenor exceeding overnight. Therefore, payment requests to pay out customer long balances and payments related to trades initiated by Treasury are addressed in the described scenarios.

- To support the efficiency of customers' intraday securities settlement

In support of its international customers, CBL needs to provide intraday liquidity to enable timely German domestic settlement against central bank money and bridge settlement. Delay in providing liquidity will result in a low settlement efficiency postponing settlement and slowing down the settlement process. Settlement liquidity is provided through collateral held at the central bank (BCL), letter of credit (L/C) related to the Bridge<sup>1</sup> and available cash balances held with depositories, BCL and CCBs. Through an active management of those liquidity sources CBL targets to provide such liquidity on a timely basis (mainly intraday) in order to achieve maximum settlement efficiency.

Clearstream's general structure, organisation and process of risk management as well as the risk strategy is described in detail in [3. Risk management overview](#) on page 3-1.

With regard to liquidity risk, the risk strategy is translated into a limit system, which is monitored on a regular basis. The Treasury Policy defines limits and responsibilities. As a result of customers settlement activity and related customers' cash dispositions Clearstream is generally long.

1. The "Bridge" is an electronic communications link that facilitates the efficient settlement of securities transactions between counterparties in Clearstream Banking S.A. and Euroclear Bank SA/NV (EB).

## Management of liquidity risk

To safeguard against unforeseen cash dispositions in this regard Clearstream has a focus on liquid assets. The majority of its liabilities have an overnight maturity. Commercial papers can be issued to a maximum amount of EUR 1 billion to secure liquidity.

A profit participation right of EUR 150 million has been issued and signed by the ultimate parent Deutsche Börse AG. Beside that, no bonds or other debt securities are issued. The receivables are made up mainly by overnight amounts on customer or nostro accounts, collateralised and unsecured placements as well as highly liquid exchange traded bonds. The main position determining liquidity needs is therefore the (overnight) net customer cash balance.

Besides the regulatory requirements for CBL and CBF, Clearstream has defined more prudent internal liquidity limits on group level through a more restrictive definition of liquid assets. Liquid assets should amount to a minimum 40% of the last 30-day average net customer cash balances.

In addition, Clearstream monitors, on a monthly basis, the ratio of Clearstream Banking liquidity sources versus customer credit usage.

Liquidity risk is controlled by Treasury in cooperation with Credit and is closely monitored overnight and intraday. Treasury middle-office is responsible for issuing monthly reports to Executive Management and to Group Risk Management. Limit excesses are monitored daily by Treasury middle-office and are reported immediately to Executive Management and Group Risk Management as well as to Treasury and Credit.

### 7.2 Measurement

For CBF and CBL, regulatory ratios have been defined by national law. The definition is different in each country. Reporting duties are on a monthly basis. The target ratio for CBL is 30% and for CBF 100% (both minimum ratios). The regulatory ratios were more than met throughout the whole of the year under review.

In addition to the regulatory ratios, the Treasury Policy has defined internal liquidity ratios. These internal ratios are calculated on a daily basis and show the liquidity evolution more than one year into the future considering maturities of assets and liabilities.

The minimum target percentage limits for the internal liquidity ratios are calculated on the basis of the most recent two years' data and consider the maximum daily drop in customer cash with a 95% confidence level. A specific limit is set for all currencies aggregated and for each currency for which a mismatch limit is defined in the Treasury Policy.

During 2012, no oversteppings were reported. The actual internal liquidity ratios on 31 December 2012 are presented in the following table:

Ratio	Actual	Limits
All currencies	100%	40%
EUR	145%	50%
USD	49%	40%
GBP	87%	70%

In Q4 2012, the ratio of "liquidity sources versus TOF" was replaced by "Banking liquidity sources versus customer credit usage". The objective is that liquidity sources provide sufficient liquidity to cover peak customer end-of-day overdraft balances observed over the last two years.

The Treasury Policy has defined that liquidity sources in EUR and USD currencies individually represent at least 100% of peak customer overdraft balances while liquidity sources in EUR and USD currencies combined represent at least 200% of peak customer overdraft balances.

On the 31 December 2012, the "liquidity sources versus highest customer credit usage" was 555% in EUR, 612% in USD and 709% in EUR and USD (combined). The liquidity sources are comfortably above Treasury Policy liquidity limits.

## 7.3 Liquidity risk mitigation

Liquidity management guidelines are defined in the Treasury Policy. The objective of liquidity management is the ability to respond to daily changing customer net long/short cash balances. Customers maintain cash balances with Clearstream and draw on credit facilities (TOFs) as a result of their securities settlement activities.

To meet its objective, CBL maintains a EUR 1 billion multicurrency euro commercial paper programme. The BCL liquidity buffer (target EUR 4 billion) is the sum of cash held with BCL and the collateral portfolio (enabling CBL to participate in the open market operations of the BCL and to access the marginal lending facility). CBL maintains a network of Cash Correspondent Banks to support the funding requirements in relation to CBL's settlement operations in more than 40 currencies.

CBF maintains a cash account with CBL where it can withdraw funds same day.

## 7.4 Scenarios

Clearstream uses scenario analysis as part of its regular stress testing in reference to the BaFin minimum requirements for risk management as defined in the MaRisk amendments of 15 December 2010 and CSSF circular 09/403 requiring that institutions conduct liquidity stress tests that enable them to assess the potential impact of extreme but plausible stress scenarios on their liquidity positions and their current contemplated risk mitigants.

### 7.4.1 Overnight liquidity drivers

Main drivers for change in net cash position to be invested/funded by Treasury overnight are as follows:

Liquidity usage	Liquidity source
Customer debit balances	Customer credit balances
Euroclear Bank short balance	Customer takings
Treasury mismatch	Euroclear Bank long balance

Table 7-1. Liquidity usage and sources

### 7.4.2 Scenarios for the overnight liquidity

Clearstream has defined three scenarios to stress liquidity risk:

#### Scenario 1 - Base scenario

The Base scenario takes into account the average overnight cash balances by currency to be invested by Treasury. The scenario outlines the liquidity situation considering maximum expected drop from one day to the next day, noted within a most recent two-year time horizon.

#### Scenario 1 result:

In this scenario, based on the average net customer cash position and considering a maximum daily drop (95% confidence level) combined with a maximum utilisation of Treasury mismatch limits, Clearstream is able to cope with expected outflows in cash balances for all currencies. The additional BCL liquidity buffer of 4 billion EUR is maintained but remains unused.

# Management of liquidity risk

## Scenario 2 - Market Disruption scenario

The Market Disruption scenario addresses unfavourable changes in the macroeconomic environment with a deterioration of funding market conditions and a decline in the liquidity value of assets.

The scenario combines the highest customer credit usage with the lowest customer cash balances available, noted within a most recent two-year time horizon, and assumes a lower collateral value of own securities (short-term, FRN and investment portfolio) held at the central bank. It also assumes a reduction of the reliability of the money-market funding lines (availability 50%) and CCBs/depositories overdraft lines (availability 80%).

### Scenario 2 result:

This scenario is based on the lowest available customer cash and the highest customer credit usage (100% confidence level) combined with a maximum utilisation of Treasury mismatch limits. Despite the reduced availability of funding sources (50% of money-market funding lines and 80% of CCBs/depositories overdraft lines), Clearstream is able to fund the short positions in most currencies. Remaining short balances can be covered through FX swaps. The additional BCL liquidity buffer of EUR 3.8 billion is maintained but remains unused.

## Scenario 3 - Market Disruption / Idiosyncratic scenario

The Market Disruption / Idiosyncratic scenario worsens the market disruption scenario by dealing with a substantial downgrading of Clearstream. The scenario assumes a loss of all uncommitted money-market funding lines and a reduced availability (40%) of overdraft lines from CCBs and depositories.

### Scenario 3 result:

This scenario is based on the lowest available customer cash and the highest customer credit usage (100% confidence level) combined with a maximum utilisation of Treasury mismatch limits.

In this scenario, EUR and USD currencies short balances can be covered through uncommitted CCBs/depositories overdraft lines. The excess funding capacity can be used to reduce short balances in other currencies through FX swaps. The credit facilities in Clearstream are allocated on an unconditionally revocable basis and primarily for intraday usage in support of customer settlement activities. In this scenario, exceptional overnight credit usage can be restricted to be in line with available liquidity and CCBs/depositories overdraft lines. In addition, the BCL liquidity buffer of EUR 3.8 billion is maintained to generate liquidity when the highest expected liquidity shortage occurs across all currencies simultaneously.

### 7.4.3 Medium-term liquidity sources

Despite the very short-term nature of the Clearstream's liquidity risk as a consequence of its core settlement activities, situations might arise where funding requirements exceed the usual maximum of 48 hours.

The following instruments are available for funding:

- EUR 1 billion multicurrency Euro Commercial Programme;
- BCL tender participation in EUR and USD;
- Repurchase Agreements;
- Foreign exchange swaps.



## 7.4.4 Permanent Available liquidity

Permanent available liquidity consists of the own funds of all Clearstream entities managed by CBL Treasury and the stable part of the net customer cash in EUR and USD currencies based on historical data, as follows:

- Based on historical data over the most recent two-year horizon (with a 95% confidence level), the permanent available liquidity must be sufficient to cover all term investments (fixed and variable coupon bonds, CBL reversed repos and structured products) in EUR and USD.
- Based on historical data over the most recent five-year horizon (with a 98% confidence level), the permanent available liquidity must be sufficient to cover all long-term investments.

From January 2011 to December 2012, the investable own funds amount ranged from EUR 1.266 billion to EUR 1.773 billion. At year-end, the own funds amounted to EUR 1.386 billion.

Figures for the stable part of the net customer cash in EUR and USD currency, based on historical data, were as follows:

- Based on historical data over the most recent two-year horizon (with a 95% confidence level), the stable part of the net customer cash amounted to EUR equivalent 6.408 billion. Together with the own funds, the sum of permanent available liquidity is EUR 7.794 billion, which is sufficient to cover the size of all term investments of EUR equivalent 3.392 billion.
- Based on historical data over the most recent five-year horizon (with a 98% confidence level), the stable part of the net customer cash amounted to EUR equivalent 3.571 billion. Together with the own funds, the sum of permanent available liquidity is EUR 4.957 billion, which is sufficient to cover the size of long-term investments of EUR equivalent 1.509 billion.

## 7.4.5 Contingency funding plan

Additional liquidity generation capabilities are available to face a contingency situation. They are not included in the three stress scenarios, which only include liquidity instruments used in the day-to-day liquidity management by Treasury. These additional contingency funding capabilities and actions are listed below.

- Contingency liquidity generation capabilities:
  - EUR 750 million revolving credit facility;
  - Sale of customer collateral (in the event of customer's default).
- Other actions:
  - Cancellation of customer UCF/TOF lines

## 7.5 Governance, Approval and Validation

In accordance with the update to the "Minimum Requirements for Risk Management" (Mindestanforderungen an das Risikomanagement, MaRisk) on 15 December 2010, with BaFin circular 11/2010, and CSSF circular 09/403, Clearstream has formulated its liquidity management strategy by issuing the "Clearstream Liquidity Management" paper, reviewed on a quarterly basis.

This paper contains specific requirements to implement a liquidity risk strategy that includes regular stress testing and contingency planning, governance and the definition of senior management responsibilities. Required changes are proposed to the Executive Management within the annual update of the Group Treasury Policy for approval.

Day-to-day implementation of the liquidity management strategy is under the responsibility of the Head of Clearstream Treasury reporting to Deutsche Börse Group's Head of Investor Relations and Treasury under the CFO of Deutsche Börse Group.

# Management of liquidity risk

## **7.6 Monitoring and reporting**

Clearstream's liquidity risk exposure and breaches of limits are controlled and reported by the Treasury middle office. Reports are performed daily, weekly and monthly to Executive Management, Group Risk Management and Treasury. Limit excesses occurring within the Treasury activity are reported by Treasury middle office to Executive Management.

## 8. Capital structure and solvency ratio

The information in this chapter is presented in the following sections:

[8.1 Capital components](#) below;

[8.2 Internal management of capital \(Risk-Bearing Capacity\)](#) on page 8-2;

[8.3 Capital levels](#) on page 8-2.

### 8.1 Capital components

The following table summarises the total amount of Clearstream's regulatory capital. In addition, information on the regulatory capital of significant subsidiaries is disclosed, corresponding to the requirements of the German Solvency Regulation, Part V, and the CSSF circular 06/273, Part XIX, respectively.

		31 December 2012 (€' 000)			31 December 2011 (€' 000)			
		CH-Group	CBL	CBF	CH-Group	CBL	CBF	
Tier 1:	<b>Eligible Capital</b>	<b>Paid up capital</b>	101,000	57,808	25,000	101,000	57,808	25,000
		<b>Share premium</b>	2,014,314	2,117	1,108	2,014,314	2,117	1,108
	<b>Eligible Reserves</b>	<b>Reserves</b>	-1,314,815	398,029	162,832	-1,318,090	363,196	157,771
		<b>Interim profits</b>	-	72,185	-	38,527	83,850	-
	<b>Deductions:</b>		-17,141	-71,260	-822	-14,641	-82,397	-748
Tier 2:	<b>Core additional own funds</b>	<b>Revaluation reserves</b>	-	1,034	-	-	1,379	-
		<b>Fixed-term cumulative</b>	-	-	-	-	-	-
	<b>Deductions:</b>		-	-	-	-	-	-
<b>Eligible own funds:</b>			<b>783,358</b>	<b>459,913</b>	<b>188,118</b>	<b>821,110</b>	<b>425,953</b>	<b>183,131</b>

Table 8-1. Regulatory capital components

**Note:** The data for CH and CBF is based on the German GAAP according to the German Commercial Code (HGB). The data for CBL is based on International Financial Reporting Standards (IFRS).

Tier-1 capital consists mainly of subscribed capital, share premium, reserves and retained earnings.

Deductions of core capital arise from intangible assets. Different from the IFRS treatment, own work capitalised is not included at CH level as the relevant choice under German GAAP is not taken.

# Capital structure and solvency ratio

## 8.2 Internal management of capital (Risk-Bearing Capacity)

Risk-Bearing Capacity serves as a buffer to absorb potential (unexpected) losses resulting from the risks Clearstream faces in its various activities. It is the internal view on the amount of capital and, therefore, the maximum loss that the Executive Management is willing to assume in one year, the tolerance in the light of the risk as well as the desired performance levels (risk appetite is determined in the risk strategy - see also [3.1 Strategy and organisation](#) on page 3-1).

The concept regarding Risk-Bearing Capacity is to ensure that emerging risks can be absorbed and thus to safeguard the continued existence (as going concerns) of Clearstream's affiliated companies.

The risk appetite corresponds to the amount of risk that Clearstream is prepared to run to carry out its business. The risk appetite is set by the Executive Management per risk confidence level and risk type:

- For the 99% risk confidence level, the Risk-Bearing Capacity is the planned EBIT for the current business year and is updated on a monthly basis.  
For the 99.9% and 99.98% risk confidence levels, the Risk-Bearing Capacity is defined as the regulatory own funds, which are updated annually.
- The Risk-Bearing Capacity for individual risk types (operational, financial, business) is defined as a fraction of the overall Risk-Bearing Capacity. Through this allocation, the members of the Executive Management ensure that risk is limited regarding each risk type.

The risk limits as defined above are monitored all in parallel and on a monthly basis. For CH as well as for all individual affiliated companies that must comply with the regulations regarding the adequacy of regulatory own funds, the solvency ratio is monitored in parallel.

## 8.3 Capital levels

### 8.3.1 Regulatory capital levels

	31 December 2012 (€' 000)			31 December 2011 (€' 000)		
	CH-Group	CBL	CBF	CH-Group	CBL	CBF
<b>Capital requirements for counterparty risk for portfolios calculated using the Credit Risk Standardised Approach (CRSA)</b>						
Central governments and central banks	86	380	-	94	670	-
Regional governments, local authorities and other public bodies	-	-	-	-	-	-
Institutions (banks)	61,331	62,553	21,243	64,499	68,539	14,684
Corporates	2,799	2,791	170	5,159	1,968	151
Undertakings for collective investment (Investment shares)	3,367	-	3,002	2,907	-	2,599
Other (including equity holding)	3,524	92	554	2,810	606	401
<b>Total</b>	<b>71,107</b>	<b>65,816</b>	<b>24,969</b>	<b>75,469</b>	<b>71,783</b>	<b>17,835</b>

Table 8-2. Capital requirements for credit risk

**Note:** The data for CH and CBF is based on the German GAAP according to the German Commercial Code (HGB). The data for CBL is based on International Financial Reporting Standards (IFRS).

Differences in the capital usage for institutions derive mainly from different allocation algorithms related to collateral, as described in the Note under [Table 5-1](#) on page 5-3.

### Capital requirements for market price risk positions

The following table shows the capital requirements for market risk exposures. Clearstream uses the standardised approach to calculate the capital requirements:

## Capital structure and solvency ratio

	Capital requirements for market price risk					
	31 December 2012 (€' 000)			31 December 2011 (€' 000)		
	CH-Group	CBL	CBF	CH-Group	CBL	CBF
<b>Foreign Exchange risk (total)</b>	<b>2,259</b>	<b>2,078</b>	<b>774</b>	<b>3,917</b>	<b>693</b>	<b>670</b>

Table 8-3. Market price risk

**Note:** The data for CH and CBF is based on the German GAAP according to the German Commercial Code (HGB). The data for CBL is based on International Financial Reporting Standards (IFRS).

### Capital requirements for operational risk

The capital requirements for backing operational risk according to the Advanced Measurement Approach (AMA) amounted to a capital charge as follows:

	Due to group internal allocation mechanism assigned capital requirements for operational risk					
	31 December 2012 (€' 000)			31 December 2011 (€' 000)		
	CH-Group	CBL	CBF	CH-Group	CBL	CBF
<b>Operational risk (AMA)</b>	<b>195,094</b>	<b>116,724</b>	<b>74,458</b>	<b>181,301</b>	<b>110,978</b>	<b>68,933</b>

Table 8-4. Operational risk

\* For processing reasons, the CBF report is issued prior to final December calculation and is therefore based on November figures. The final AMA amount for CBF would have been EUR 78.369.575 (2011: EUR 70,332,965).

The capital figure calculated as described above and in [4. Management of operational risk](#) on page 4-1 applies for Clearstream Group. It covers the risk of all legal entities of the group and is allocated to CBL and CBF afterwards. The allocation key is defined as the ratio between the net operating income of the entity and the sum of the net operating income of CBF and CBL.

As described in [4.2 Measurement](#) on page 4-2, the defined scenarios are reviewed on an ongoing basis and are, if necessary, adjusted. Also, in 2012, a review of operational risk scenarios took place taking into account actual business environment and control factors, and internal and external loss data.

### 8.3.2 Solvency ratio

Basis of calculation	Solvency ratio					
	31 December 2012			31 December 2011		
	CH-Group	CBL	CBF	CH-Group	CBL	CBF
<b>Solvency regulation</b>	<b>23.29%</b>	<b>-</b>	<b>15.02%</b>	<b>25.20%</b>	<b>-</b>	<b>16.76%</b>
<b>CSSF circular 06/273</b>	<b>-</b>	<b>19.93%</b>	<b>-</b>	<b>-</b>	<b>18.57%</b>	<b>-</b>

Table 8-5. Solvency ratios

## Capital structure and solvency ratio

**Note:** The data for CH and CBF is based on the German GAAP according to the German Commercial Code (HGB). The data for CBL is based on International Financial Reporting Standards (IFRS).

## Appendix A. Abbreviations used in this document

<b>ABS</b>	Asset Backed Securities
<b>AMA</b>	Advanced Measurement Approach
<b>ASL</b>	Automated Securities Lending Programme
<b>BaFin</b>	Bundesanstalt für Finanzdienstleistungsaufsicht (Federal Financial Supervisory Authority)
<b>BCBS</b>	Basel Committee on Banking Supervision
<b>BCL</b>	Banque centrale du Luxembourg
<b>BCM</b>	Business Continuity Management
<b>BIA</b>	Basis Indicator Approach
<b>CBF</b>	Clearstream Banking AG
<b>CBJ</b>	Clearstream Banking Japan Ltd
<b>CBL</b>	Clearstream Banking S.A.
<b>CCB</b>	Cash Correspondent Bank
<b>CCF</b>	Credit Conversion Factor
<b>CCP</b>	Central Counterparty
<b>CDO</b>	Collateralised Debt Obligation
<b>CFO</b>	Chief Financial Officer
<b>CFSI</b>	Clearstream Fund Services Ireland Ltd
<b>CH</b>	Clearstream Holding AG
<b>CHG</b>	Clearstream Holding Group
<b>CI</b>	Clearstream International, S.A.
<b>CLS</b>	Continuous Linked Settlement
<b>CMBS</b>	Commercial Mortgage-Backed Security
<b>CNB</b>	Czech National Bank
<b>COP</b>	Clearstream Operations Prague s.r.o.
<b>CRD</b>	Capital Requirements Directive
<b>CRM</b>	Credit Risk Mitigation
<b>CRR</b>	Capital Requirements Regulation
<b>CS</b>	Clearstream Services S.A.
<b>CSA</b>	Credit Support Annex
<b>CSC</b>	Collective Safe Custody
<b>CSD</b>	Central Securities Depository
<b>CSD-R</b>	Central Securities Depository Regulation
<b>CSSF</b>	Commission de Surveillance du Secteur Financier
<b>CVA</b>	Credit Valuation Adjustment
<b>DBAG</b>	Deutsche Börse AG
<b>DVP</b>	Delivery Versus Payment
<b>EB</b>	Euroclear Bank SA/NV
<b>EBA</b>	European Banking Authority
<b>EBIT</b>	Earnings Before Interest and Tax
<b>EC</b>	European Commission
<b>ECAI</b>	External Credit Assessment Institution
<b>ECB</b>	European Central Bank
<b>EEA</b>	European Economic Area
<b>EMIR</b>	European Market Infrastructure Regulation

# Abbreviations

<b>ESMA</b>	European Securities and Markets Authority
<b>EU</b>	European Union
<b>FIRB</b>	Foundation Internal Rating Based Approach
<b>FRN</b>	Floating Rate Note
<b>FX</b>	Foreign Exchange
<b>GAAP</b>	Generally Accepted Accounting Principles
<b>GMRA</b>	Global Master Repurchase Agreement
<b>GroMiKV</b>	Groß- und Millionenkreditverordnung (Large Exposures Regulation - regulation governing large exposures and loans of EUR 1.5 million or more)
<b>GSF</b>	Global Securities Financing
<b>HF-LI</b>	High-Frequency, Low-Impact
<b>HGB</b>	Handelsgesetzbuch (German GAAP Code)
<b>IAS</b>	International Accounting Standards
<b>InstitutsVergV</b>	Institutsvergütungsverordnung (Regulation governing remuneration at institutes)
<b>ICAAP</b>	Internal Capital Adequacy Assessment Process
<b>ICSD</b>	International Central Securities Depository
<b>IFRS</b>	International Financial Reporting Standards
<b>IRB</b>	Internal Rating Based Approaches
<b>IRBA</b>	Advanced Internal Rating Based Approach
<b>IRR</b>	Interest Rate Risk
<b>IRRBB</b>	Interest Rate Risk - Banking Book
<b>iTOF</b>	Intraday Technical Overdraft Facility
<b>KfW</b>	Kreditanstalt für Wiederaufbau
<b>KWG</b>	Gesetz über das Kreditwesen (German Banking Act)
<b>LDA</b>	Loss Distribution Approach Models
<b>LF-HI</b>	Low-Frequency, High-Impact
<b>LGD</b>	Loss Given Default
<b>Link Up Markets</b>	Link-Up Capital Markets S.L., Madrid
<b>MaRisk</b>	Mindestanforderungen an das Risikomanagement (Minimum Requirements for Risk Management)
<b>MBS</b>	Mortgage-Backed Securities
<b>MEIP</b>	Minimum Export Insurance Premium
<b>NCSC</b>	Non-Collective Safe Custody
<b>NPV</b>	Net Present Value
<b>OECD</b>	Organisation for Economic Cooperation and Development
<b>OFAC</b>	Office of Foreign Assets Control
<b>OpRisk</b>	Operational Risk
<b>OTC</b>	Over-The-Counter
<b>PD</b>	Probability of Default
<b>PSF</b>	Professional of the Financial Sector
<b>RBC</b>	Risk Bearing Capacity
<b>RMBS</b>	Residential Mortgage-Backed Security
<b>RWA</b>	Risk-weighted asset
<b>SA</b>	Standardised Approach (in connection with operational risk)
<b>SIB</b>	Systematically Important Bank
<b>SolvV</b>	Solvabilitätsverordnung (German Solvency Regulation)
<b>SREP</b>	Supervisory Review and Evaluation Process
<b>SRP</b>	Supervisory Review Process
<b>SSS</b>	Securities Settlement System
<b>StA</b>	Standardised Approach (in connection with counterparty credit risk)
<b>STP</b>	Straight-Through Processing
<b>SWIFT</b>	Society for Worldwide Interbank Financial Telecommunication
<b>T2S</b>	TARGET2-securities
<b>TOF</b>	Technical Overdraft Facility
<b>VaR</b>	Value at Risk





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