

# Pillar III Disclosure Report of Clearstream Group 2015

Disclosures as of 31 December 2015

## **Pillar III Disclosure Report of Clearstream Group 2015 - According to Part 8 of the Regulation (EU) No. 575/2013 (Capital Requirements Regulation [CRR]) in conjunction with § 26a German Banking Act (Kreditwesengesetz, KWG).**

October 2016

Document number: 6475

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## Foreword

The purpose of the document is to fulfil regulatory disclosure requirements based on the revised Basel banking framework commonly known as “Basel III”. For the European Union (EU), the current disclosure framework covers the “Basel III” requirements and includes some additional components as laid down by Directive 2013/36/EU (Capital Requirements Directive, CRD IV) and Regulation (EU) No 575/2013 (Capital Requirements Regulation, CRR), commonly known as the CRD IV package.

Clearstream Holding AG (CH) has been classified as a financial holding company as defined in Article 4 paragraph 1 number 20 CRR and, together with its 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).

CH is, according to the German Banking Act (Kreditwesengesetz, KWG), the superordinated company of the regulatory Clearstream Group and therefore responsible for publishing this disclosure report in line with the provisions of Article 13 CRR in combination with further level 2 technical standard and additional EBA guidelines.

The figures for Clearstream Holding group follow the consolidation provisions set out in Article 18 to 24 of CRR in combination with the rules of § 10a (4) KWG and the German Generally Accepted Accounting Principles (German GAAP), 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), CH 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.

Clearstream Group fulfils the disclosure requirements detailed in Part 8 CRR and § 26a KWG as well as Art. 38 of the Luxembourg law of 5 April 1993, as amended (in the following Luxembourg Banking Act) which have transposed the disclosure requirements of Articles 89 to 96 CRD IV into German law and Luxembourg law as follows:

- A remuneration report that fulfils the requirements according to Article 450 CRR. That report is disclosed by year on the Clearstream Group website. [www.clearstream.com/clearstream-en/about-clearstream/regulation--1-/compensation-information](http://www.clearstream.com/clearstream-en/about-clearstream/regulation--1-/compensation-information)
- All other disclosure requirements as defined in Part 8 CRR and the related technical standards are published within this Pillar III Disclosure Report which can also be found by year on the Clearstream Group website. [www.clearstream.com/clearstream-en/about-clearstream/regulation--1-/pillar-iii-disclosure-report](http://www.clearstream.com/clearstream-en/about-clearstream/regulation--1-/pillar-iii-disclosure-report)
- Information about the Governance Arrangements stipulated in § 26a (1) sentence 1 KWG (implementation of Article 88 CRD IV into German law) are included within this Pillar III Disclosure Report.
- Country-by-Country reporting to fulfil the requirements according to § 26a (1) sentence 2 KWG (implementation of Article 88 CRD IV into German law) is included as an annex to the financial

# Foreword

statement of CH which is published on the German Federal Gazette website.  
[www.bundesanzeiger.de](http://www.bundesanzeiger.de)

- Information about the Return on Assets (RoA) according to § 26a (1) sentence 4 KWG and Art 38-4 of the Luxembourg Banking Act (implementation of Article 88 CRD IV into German law and Luxembourg law) is included in the management report to the financial statement of CBF and CBL respectively. The financial statement of CBF is published on the German Federal Gazette website: [www.bundesanzeiger.de](http://www.bundesanzeiger.de). The financial statement of CBL is made publicly available via the Luxembourg Trade and Companies Register (Registre de Commerce et des Sociétés).

In the following, we always refer to the respective laws in place during the reporting period (that is, 2015 and in principle as valid on 31 December 2015 if not stated otherwise).

## How this document is organised

The report is presented over nine chapters, as follows:

1. Introduction;
2. Implementation of Basel III 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 of exposures not included in the trading book;
7. Management of liquidity risk;
8. Capital structure, capital ratio and Leverage Ratio;
9. Governance arrangements.

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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## **9. Governance arrangements**

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# 1. Introduction

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

- 1.1 Background below;
- 1.2 The “Three Pillars” framework on page 1-5;
- 1.3 Information about Clearstream Group on page 1-17.

## 1.1 Background

### 1.1.1 Basel III framework

In December 2010, the Basel Committee on Banking Supervision (BCBS) published its revised banking regulatory framework commonly known as “Basel III”<sup>1</sup>.

The “Basel III” framework contains capital requirements for credit risk (including credit risk mitigation techniques), operational risk and market risk. In addition, “Basel III” includes a definition of regulatory capital, the requirement of capital buffers, credit valuation adjustments (CVA) for certain Over-The-Counter (OTC) derivatives exposures in the capital framework, the requirement of a Leverage Ratio (put simply, a minimum ratio of capital to unweighted total assets plus off-balance-sheet risk positions), strict liquidity management requirements and close monitoring of liquidity by supervisory authorities (in particular the introduction of quantitative minimum ratios for short-term (Liquidity Coverage Ratio, LCR) and medium-term liquidity (Net Stable Funding Ratio, NSFR)).

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

The “Basel III” package also contains a general revision of the capital requirements for exposures to central counterparties (CCPs). This topic has been revised twice. An updated set of interim rules were issued in July 2012<sup>2</sup> and a revised final standard was published in April 2014<sup>3</sup>. On 1 January 2017 the final standard will supersede the interim rules.

Certain details with regard to the Leverage Ratio are foreseen to be adjusted and fine-tuned in various steps until 2019.

The “Basel III” rules have been implemented in the EU by means of a regulatory package commonly known as “CRD IV”, consisting of a directive<sup>4</sup> and a regulation<sup>5</sup>. Both legal documents were published in July 2013 and have been in force since 1 January 2014. The CRD IV directive itself had to be transposed into national law by that date.

1. 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>
2. Capital requirements for bank exposures to central counterparties, interim rules: <http://www.bis.org/publ/bcbs227.htm>
3. Capital requirements for bank exposures to central counterparties: <http://www.bis.org/publ/bcbs282.htm>.
4. Directive 2013/36/EU of the European Parliament and of the Council: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:176:0338:0436:EN:PDF>.
5. Regulation (EU) No 575/2013 of the European Parliament and of the Council: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:176:0001:0337:EN:PDF>.

# Introduction

In addition to CRD IV and CRR, substantial parts of the implementation are steered via technical standards drafted by the European Banking Authority (EBA). The EBA has prepared a large number of such standards and the majority have been put in place by the EU Commission. These Level 2 implementing measures are important for the regulatory standards for the Pillar III disclosure report and other disclosures for the year 2015 and beyond. There are still some standards outstanding and others are to come in the next years.

EU legislation has incorporated a number of the Basel amendments and additions that the BCBS had published by the middle of the second quarter of 2013 including the interim rules for exposures towards CCPs.

The CRD IV package did not only transform the Basel III rules as such but also implemented additional components. These components include dedicated rules for capital requirements related to systematic risk and systematically important institutions. On top of that, 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 “single rule book” has been introduced in the EU.

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

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

CRD IV and the options to be exercised at national discretion by competent authorities under the CRR were implemented in Germany by way of the “CRD IV-Umsetzungsgesetz” (CRD IV Implementing Act) of 3 September 2013, as well as by a number of regulations published in the second half of December 2013. In addition, small corrections and adoptions have been introduced in Germany with the “Financial Markets Laws Amendment Act” (Gesetz zur Anpassung von Gesetzen auf dem Gebiet des Finanzmarktes) of 15 July 2014.

For Luxembourg, the Commission du Secteur Financier (CSSF) issued Circular 12/552 covering individual aspects in 2012 with some updates later on. In addition, the CSSF issued CSSF Regulation 14-01 to implement the rules for items under their discretion under CRR in 2014. CRD IV was finally implemented in Luxembourg with the law of 23 July 2015.

## 1.1.2 Beyond Basel III

Having finalised the Basel III framework, the BCBS is continuing the development of the regulatory framework. Meanwhile, the BCBS published its final rule set on the liquidity coverage ratio (LCR)<sup>1</sup> and the net stable funding ratio (NSFR)<sup>2</sup> in January 2013 and October 2014 respectively as part of the Basel III liquidity framework. The BCBS foresaw a start of the phasing-in rules for LCR starting as of 1 January 2015 with a 60% minimum ratio, reaching a fully implementation (100% binding ratio) as of 2019. The NSFR will be fully binding as minimum standard as of 1 January 2018.

In addition, rules for systematically important banks (SIBs)<sup>3</sup>, on intraday monitoring of liquidity<sup>4</sup> and a final standard for measuring and controlling large exposures<sup>5</sup> have been issued. In April 2014, the BCBS finalised its work on the capital treatment of bank exposures to central counterparties and published the final standard that will take effect on 1 January 2017<sup>6</sup>.

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1. Basel III: The Liquidity Coverage Ratio and liquidity risk monitoring tools: <http://www.bis.org/publ/bcbs238.pdf>

2. Basel III: the net stable funding ratio: <http://www.bis.org/bcbs/publ/d295.pdf>

3. Global systemically important banks: Assessment methodology and the additional loss absorbency requirement - final document: <http://www.bis.org/publ/bcbs207.htm>.

4. Monitoring tools for intraday liquidity management - final document: <http://www.bis.org/publ/bcbs248.htm>

5. Final standard for measuring and controlling large exposures published by the Basel Committee:

<http://www.bis.org/press/p140415.htm>.

6. Capital requirements for bank exposures to central counterparties - final standard: <http://www.bis.org/publ/bcbs282.htm>

The BCBS issued its revised standards on minimum capital requirements for market risk in January 2016<sup>1</sup> containing a revised boundary between the trading book and non-trading, a revised internal models approach and a revised standardised approach for market risk, a shift from value-at-risk to an expected shortfall measure of risk under stress and the incorporation of the risk of market illiquidity. The revised market risk framework will take effect on 1 January 2019.

In April 2016, the BCBS has issued the final standards on interest rate risk in the banking book in order to ensure that banks have appropriate capital to cover potential losses and limit incentives for capital arbitrage between the trading book and non-trading book<sup>2</sup>. The final rule set is applicable as of 1 January 2018.

On top of that, a second proposal to revise the Standardised Approach for Credit Risk and Credit Risk Mitigation Techniques has been issued for consultation<sup>3</sup> (December 2015, first proposal issued in December 2014). In addition, a revision of the so called Basel I floor has been initiated with the aim to replace this with a floor for the model based approaches for all categories of risks in relation to the capital charges calculated by the Standardised Methods (December 2014)<sup>4</sup>.

In November 2015, the BCBS has issued a consultative document in regard of the prudential treatment of banks' investments in TLAC<sup>5</sup>. It is applicable to all banks subject to the Basel Committee's standards, including both G-SIBs and non-G-SIBs. The objective of the proposed treatment is to reduce the risk of contagion if a G-SIB should enter into resolution.

A revision of the Basis Indicator Approach and the Standardised Approach, including its variant the Alternative Standardised Approach, was initiated in October 2014<sup>6</sup> to calibrate the capital charges for operational risk. In March 2016 the BCBS proposed in its relating consultative document to replace all current approaches by a so-called Standardised Measurement Approach (SMA)<sup>7</sup>.

In March 2016, the BCBS also issued a consultative document on disclosure requirements<sup>8</sup>. The paper combines already existing and newly introduced disclosure requirements in a consolidated and enhanced Pillar III framework.

In April 2016 the BCBS issued a consultative document regarding revisions to the Leverage Ratio framework<sup>9</sup>, e.g. higher requirements for G-SIBs, replacement of the Current Exposure Method for the calculation of derivative exposures by the Standardised Approach for Counterparty Credit Risk (SA-CCR), etc.

Moreover, in order to reduce the complexity of the internal model based approaches for credit risk (Internal Rating Based Approaches, IRBA), to improve comparability and to address excessive variability in the capital requirements for credit risk the BCBS issued a consultative document in March 2016<sup>10</sup>.

None of these initiatives have so far led to a final rule set.

Finally, the Financial Stability Board (FSB) has issued a proposal for the "Total Loss Absorbing Capacity" (TLAC)<sup>11</sup> in order to overcome capital shortages in crisis / resolution situations which in the past led to the intervention with tax payers money. This additional requirement is applicable to systemically important banks (G-SIBs and O-SIBs) and will take effect as of 1 January 2019 (transitional rules). TLAC will be fully implemented as of 1 January 2022.

The BCBS has also indicated a broader review of the treatment of exposures towards sovereigns and central banks in the future.

1. Standards Minimum capital requirements for market risk: <http://www.bis.org/bcbs/publ/d352.pdf>
2. Interest rate risk in the banking book: <http://www.bis.org/bcbs/publ/d368.pdf>
3. Revisions to the standardised approach for credit risk: <http://www.bis.org/bcbs/publ/d307.pdf>
4. Capital floors: the design of a framework based on standardised approaches: <http://www.bis.org/bcbs/publ/d306.htm>
5. TLAC Holdings: <http://www.bis.org/bcbs/publ/d342.pdf>
6. Operational risk - Revisions to the simpler approaches: <http://www.bis.org/publ/bcbs291.pdf>
7. Standardised Measurement Approach for operational risk: <http://www.bis.org/bcbs/publ/d355.pdf>
8. Pillar 3 disclosure requirements - consolidated and enhanced framework: <http://www.bis.org/bcbs/publ/d356.pdf>
9. Revisions to the Basel III leverage ratio framework: <http://www.bis.org/bcbs/publ/d365.pdf>
10. Reducing variation in credit risk-weighted assets - constraints on the use of internal model approaches: <http://www.bis.org/bcbs/publ/d362.pdf>
11. Adequacy of Loss-Absorbing Capacity of Global Systemically Important Banks in resolution: <http://www.financialstabilityboard.org/2014/11/adequacy-of-loss-absorbing-capacity-of-global-systemically-important-banks-in-resolution/>

## Introduction

It is supposed at some point in time, that all the BCBS measures beyond the 2010 Basel III rule set will be summarised in a comprehensive framework. Furthermore, it is expected that the appropriate adoption at EU level most likely will lead to a CRD V package including a revised regulation (CRR II). Due to several review clauses a first proposal of the revised package is expected in the last quarter of 2016. Several important regulatory measures within the EU play an additional role in defining future requirements for banks and have impact on the disclosure requirements. This relates inter alia to the Banking Recovery and Resolution Directive (BRRD)<sup>1</sup> including the Minimum Requirement for Own Funds Eligible Liabilities (MREL)<sup>2</sup> as well as the introduction of the Single Supervisory Mechanism (SSM)<sup>3</sup>.

- 
1. BRRD: Directive 2014/59/EU of the European Parliament and of the Council of 15 May 2014: Recovery and resolution of credit institutions and investment firms: [http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014\\_L0059&from=EN](http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014_L0059&from=EN)
  2. MREL: EBA Final Draft RTS on criteria for determining the minimum requirement for own funds and eligible liabilities under Directive 2014/59/EU: <http://www.eba.europa.eu/documents/10180/1132900/EBA-RTS-2015-05+RTS+on+MREL+Criteria.pdf>;
  3. SSM: Regulation (EU) No 1022/2013 of the European Parliament and of the Council of 22 October 2013 establishing a European Supervisory Authority: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:287:0005:0014:En:PDF>



## 1.2 The “Three Pillars” framework

### 1.2.1 Overview

The Basel banking framework contains three main pillars:

- Minimum quantitative (capital) requirements (Pillar I);
- Supervisory Review Process (Pillar II);
- Disclosure requirements in order to reach market discipline by transparency to the public (Pillar III).

The “Three Pillars” framework, originally introduced with Basel II in 2004, evolved over time and further details have been defined.

The “Three Pillars” complement each other. [Figure 1-1](#) illustrates the “Three Pillars” model of Basel III.

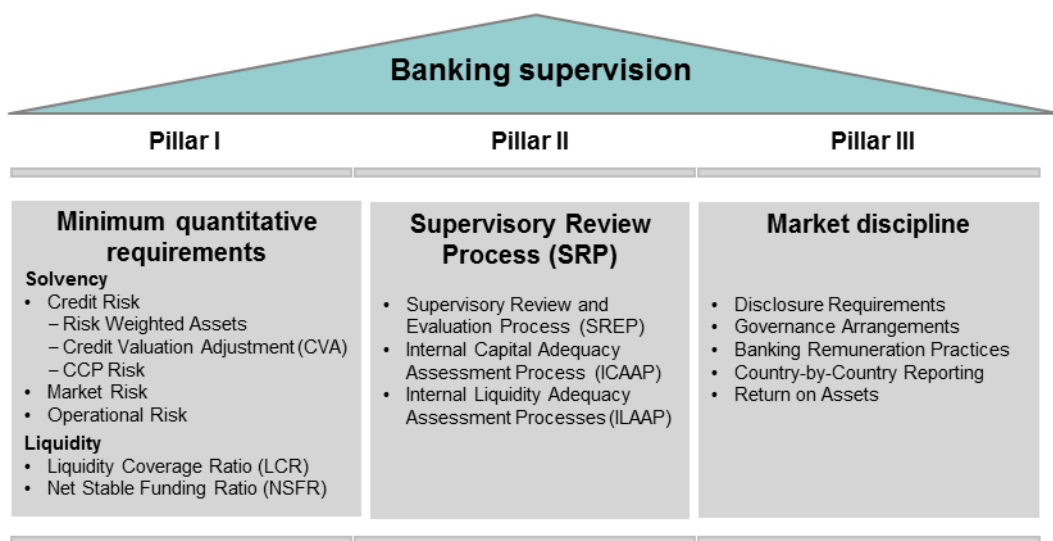


Figure 1-1. “Three Pillars” model of Basel III / CRD IV

Within the “Three Pillars” model, Pillar I offers the possibility to use different risk measurement approaches per risk category for capital requirements in the range of simple (standardised) to sophisticated model based methods according to their business model. Here, credit risk contains under Basel III a CVA charge and CCP counterparty risk. In addition to solvency requirements Pillar I also covers the requirement of liquidity (LCR and elements of the NSFR which is applicable as of 2018). Furthermore, a mandatory Leverage Ratio (Pillar I ratio) is in discussion to be potentially added in 2018.

Besides this, an Internal Capital Adequacy Assessment Process (ICAAP) and an Internal Liquidity Adequacy Assessment Process (ILAAP) were made mandatory and supervisors are obliged to develop a structured approach to review, evaluate and assess the robustness of banks and their risk models including capital and liquidity adequacy as of 2016.

In order to get a common view on the risk situation and to allow the market participants to benchmark the capital adequacy of any given bank, disclosure requirements are laid down in Pillar III. On EU level, additional elements like the Country-by-Country reporting and the Return on Assets have to be disclosed in order to increase transparency. Governance Arrangements including the structure within an institution and information regarding remuneration are further disclosures which have to be made.

The next chapters describe each of the “Three Pillars” and the Basel III framework as applicable in the EU in more detail.

# Introduction

## 1.2.2 Pillar I

### 1.2.2.1 Solvency

The first Pillar deals, amongst other things, with the minimum capital requirements. Capital requirements are to be calculated for credit risk, including CVA charge and CCP counterparty risk, market risk and operational risk. The capital charge for each risk category 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 (for detailed information see below).

The own funds requirements for operational, market, CVA and CCP counterparty risk have to be multiplied by 12.5 and are summed up with the risk weighted assets for credit risk to build the total risk exposure. The total risk exposure has to be multiplied by the required capital ratio of the related entity representing the total minimum own funds which is currently at least 8% (see [Figure 1-2](#)).

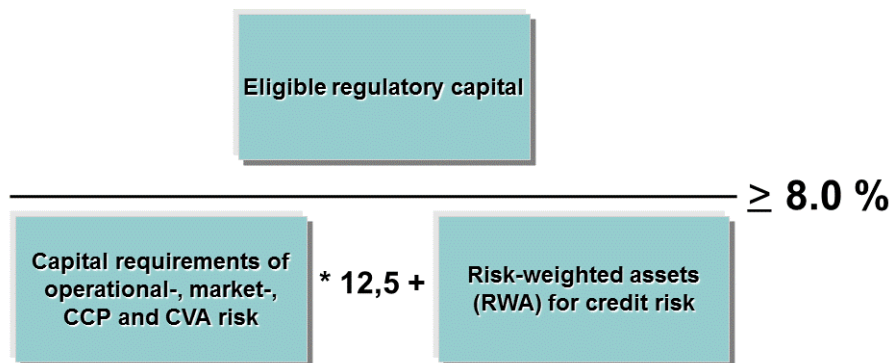


Figure 1-2. Calculation of the minimum capital requirements (capital ratio)

### 1.2.2.2 Capital

Basel III sets out provisions regarding the quantity of minimum capital requirements:

As described in [Figure 1-3](#), the required portion of the highest possible quality of own funds (Common Equity Tier 1, CET1) has to be at least 4.5% of the total risk exposure amount since 2015.

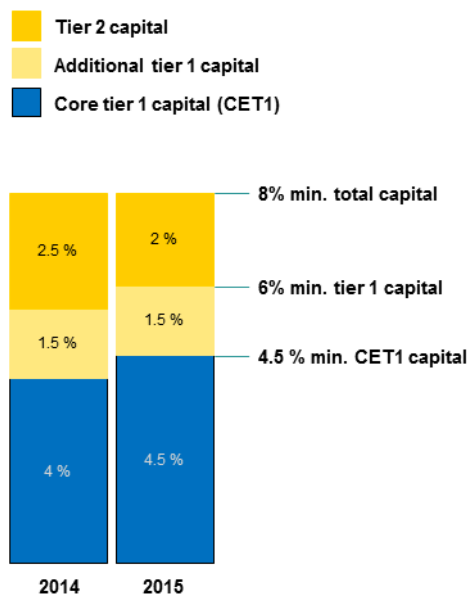


Figure 1-3. Quantitative adjustments in minimum capital requirements

On top of the minimum capital requirements of 8%, Basel III requires additional capital/risk buffers: A countercyclical buffer and a capital conservation buffer. Subsequently, the BCBS introduced further buffers for systemically important banks: G-SIB and O-SIB buffer. In the EU, CRD IV also requires the systemic risk buffer which is non cumulative (the highest applies) to the G-SII and O-SII buffers and might be imposed on all total risk exposures or on risk exposures relating to particular countries or on exposure types.

The capital conservation buffer has to be maintained as of 2016 in order to strengthen the capital basis of a bank during profitable times, but allowing for a temporarily underrun in case of an economic downturn of the bank or unexpected/sudden losses.

Similarly, the countercyclical capital buffer has to be held available to ensure that banks accumulate a buffer, during periods of economic growth in a dedicated region while it may be set to lower levels in case of an economic downturn in that region.

The capital conservation buffer will be phased in from 2016 until 2019 to finally reach 2.5% of the total risk exposure of the institution. In the same manner also the maximum value of the countercyclical buffer will be phased in. Nonetheless, the value will fluctuate over time depending on the economic situation. The respective percentage in principle is set by the competent authority of the individual country in which the (credit) exposures are domiciled. The individual rate of any given bank will therefore be a blended rate taking the size of credit operations in the various countries into account. It is to be noted though, that the authority supervising any given bank may set higher levels of buffer requirements or phase in the requirements faster than the standard phase-in schedule. In Luxembourg the capital conservation buffer has been set to 2.5% of the total risk exposure amount applicable as of 1 January 2014 (no phase-in).

The standard phase-in schedule with the maximum standard requirements is shown in [Figure 1-4](#).

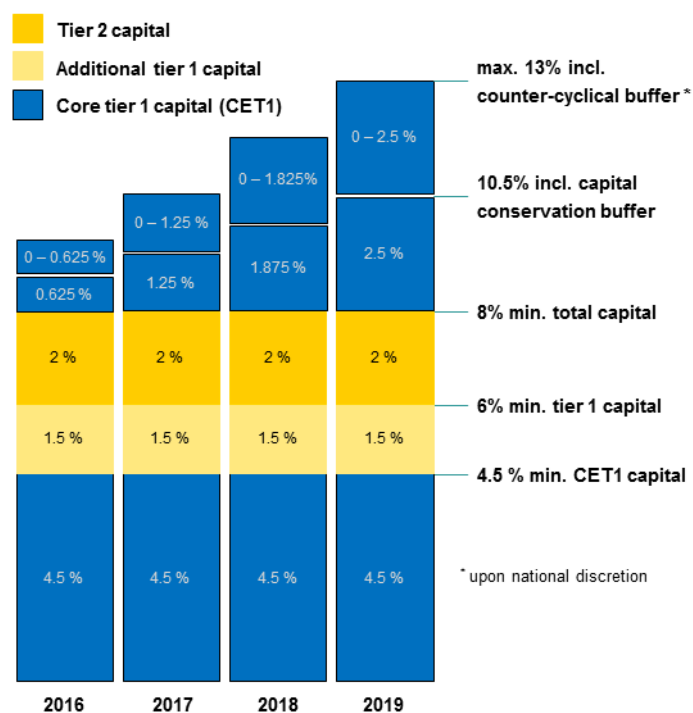


Figure 1-4. Overview of capital requirements and related transitional periods.

Additionally to the buffers illustrated in [Figure 1-4](#), a buffer for systemically important institutions (applicable as of 1 January 2016) and a systemic risk buffer (applicable as of 1 January 2014) have to be maintained in the case that they are required by the competent authority. For G-SIBs, the maximum surcharge is 3.5% of the total risk exposure amount while for O-SIBs the maximum surcharge is limited

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to 2.0% of the total risk exposure amount. The systemic risk buffer is limited to 5.0% of the total risk exposure amount and might also be imposed on isolated exposures upon national discretion, e.g. for exposures in a particular country or region. As already described, only the higher of "Systemic risk" or "Systemically Important Bank" buffer is applicable.

The G-/O-SIB buffer has been developed by the BCBS in order to reduce the implicit reliance on state aid ("too big to fail"). The objective of the buffer for systemic risk in the EU is to allow further strengthening of the capital basis in case exposures with systemic risk exist.

Figure 1-5 demonstrates how the capital requirements and the additional capital buffers will add up once they are completely phased-in as of 2019.

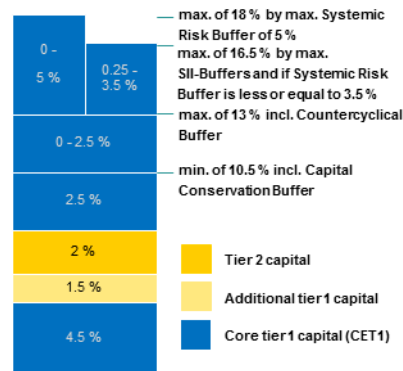


Figure 1-5. Overview of the total own funds requirements feasible as of 1 January 2016.

The minimum capital requirements of 8.0% of the total risk exposure amount and the mandatory minimum portion of a certain quality may not be breached by the credit institutions. In contrast the capital buffers may be underrun for a certain period of time as they are no binding minimum ratios and are explicitly foreseen to balance out unexpected events. The buffers are foreseen to maintain a sufficient capital base to absorb losses in stressed periods. All four mentioned capital buffers must consist of CET1 capital instruments only.

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 set additional capital requirements via Pillar II measures.

## Credit risk (risk weighted assets - RWA)

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 1-6.



Figure 1-6. 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 1-10). The basis for assessment must be multiplied by a regulatory risk weight that depends on predefined regulatory asset classes and the

counterparties' credit risk assessment by a nominated external credit assessment institution (ECAI) or is based on internal data depending on the approach chosen.

Figure 1-7 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 also increase with complexity.

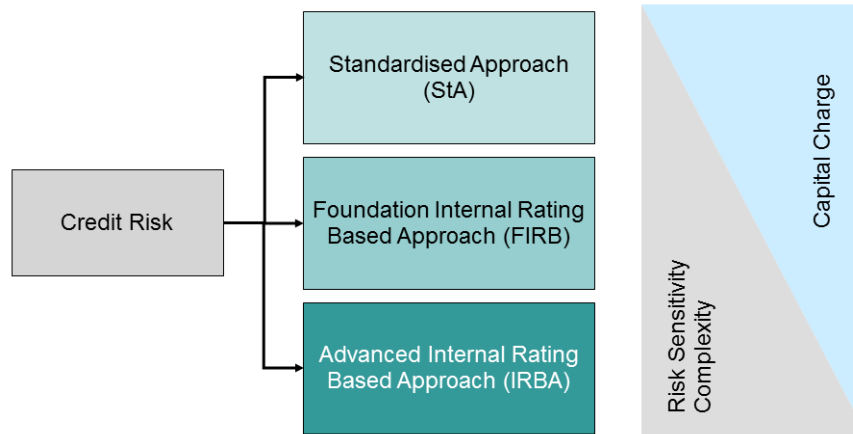


Figure 1-7. Possible calculation methods for the credit risk

The Standardised Approach defines 17 regulatory asset classes 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.).

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 for the purposes of exposures for central governments and central banks.

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 (for high income states, e.g. Germany, the OECD does not provide country risk classifications anymore).

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, are necessary to be allowed to use one of the Internal Rating Based Approaches for the calculation of the risk-weighted asset amounts.

Further developments of the advanced risk measurement systems must also 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

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

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- For probability of default estimates, own estimates of loss given default (LGD<sup>1</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.

Two methods to calculate the credit risk mitigation of financial collaterals are available: 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 to the financial collateral received under the provisions of the standardised credit risk approach shall be assigned to those portions of exposures 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 and mark ups, 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.

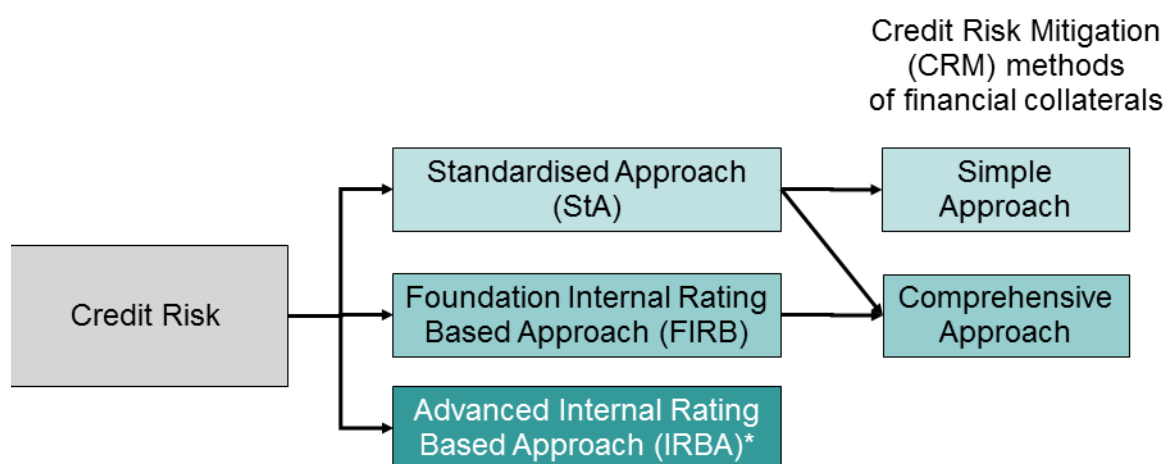
Supervisors allow banks to use own-estimate haircuts only when they fulfil certain qualitative and quantitative criteria.

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 1-8](#) gives a simplified overview of the calculation methods of financial collaterals under Basel II.

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1. 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 1-8. Overview of possible calculation methods of financial collaterals

### Credit Valuation Adjustment (CVA)

Credit Valuation Adjustment means an adjustment to the mid-market valuation of the portfolio of transactions with a counterparty in OTC derivative transactions. That adjustment reflects the current market value of the institution's counterparty credit risk, but does not reflect the current market value of the credit risk of the institution towards the counterparty. An institution shall calculate the own funds requirements for CVA risk for all OTC derivative instruments in respect of all of its business activities, other than credit derivatives, recognised to reduce risk-weighted exposure amounts for credit risk.

In addition, CVA risk may also be applicable on SFT exposures in case the competent authority determines that the institution's CVA risk exposures arising from those transactions are material.

Currently, neither Germany nor Luxembourg have applied CVA risk on SFTs.

### Central Counterparty Risk (CCP Risk)

When a bank acts as a clearing member of a CCP, a risk weight of 2% must be applied to the bank's trade exposure to the CCP in respect of derivatives securities financing transactions and long-settlement transactions. This preferential treatment may only be applied in case the CCP in question is classified as a qualified CCP. Under CRR, a CCP is considered to be a qualified CCP if it is granted an authorisation under Regulation (EU) No 648/2012 (European Markets Infrastructure Regulation, EMIR) or an equivalent regulation in its country of residence.

In addition to the 2% risk weight for the trade exposure, a capital charge is to be applied on the contribution of the clearing members to the default funds of the qualified CCP.

There are further rules with regards to client positions of a clearing member related to CCP business. As this is not relevant for our group companies, it is not detailed in this report. The comprehensive basis for the CCP risk is defined in Articles 300 - 311 CRR.

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

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Certain positions cannot be allocated by the nature of the position but need dedication to the appropriate book. 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.

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 exposures on positions not included in the trading book are taken into account under Pillar II (in the context of other or further risks).

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

## 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.

Legal and compliance risk have recently become increasingly important drivers for operational risk.

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, at some level, still inevitable. Recent events have shown that operational risk can be significant, and resulting losses can even threaten a bank's existence.

Basel III defined three methods to calculate the capital requirements for operational risk as shown in [Figure 1-9](#).

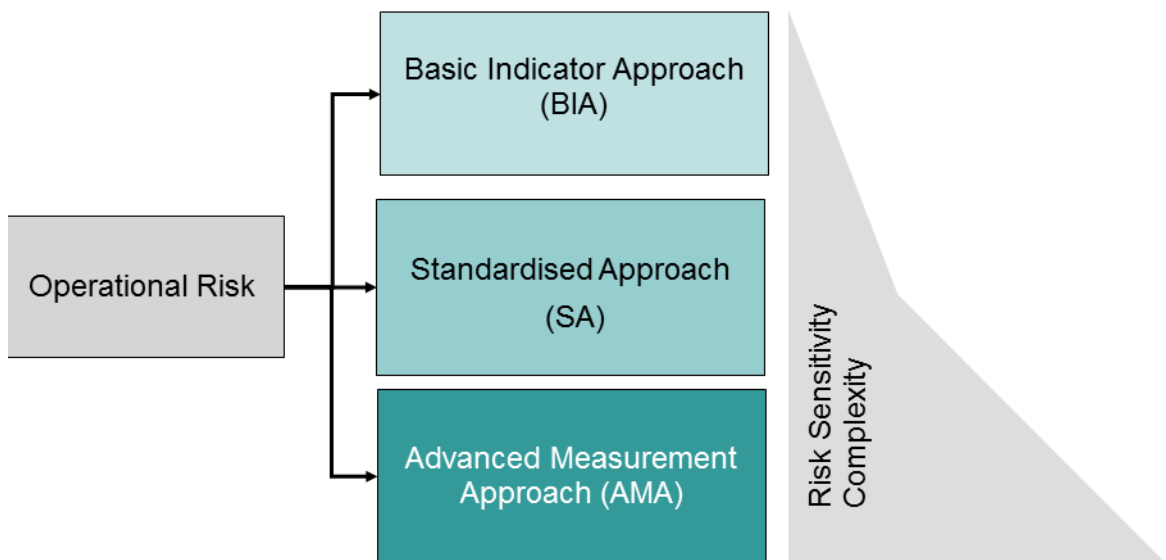


Figure 1-9. Possible calculation methods for the operational risk

Complexity and risk sensitivity in the two more simple approaches are similar, whereas they are 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 (calculated as the average of the previous three financial years). 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. 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 are 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.

### 1.2.2.3 Liquidity

In addition to the capital requirements, Basel III contains a quantitative (minimum) ratio for the management of liquidity risk.

Two liquidity standards, the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR), were introduced to achieve this objective. Both ratios reflect the minimum level of liquidity banks must provide to meet the liquidity risks they face from a regulatory perspective either short-term (LCR) or mid-term (NSFR).

#### Liquidity Coverage Ratio (LCR)

The LCR requires institutions to hold sufficient liquid assets (that is, assets that can be liquidated at negligible loss of value) to withstand the excess of liquidity outflows over inflows that could be expected to accumulate over a 30 day stressed period.

Consequently, institutions shall at all times hold liquid assets, the sum of which equals or is greater than the liquidity outflows less inflows over the next 30 days under stressed conditions (inflows are limited to 75% of liquidity outflows). Under the Basel III rules, the LCR phasing-in rules foresee a start with 60% minimum ratio as of 1 January 2015 (after an observation period that started in 2013) and a full application (100% binding ratio) as of 2019. The EU has decided that because of delays in the legislative process to start with a 60% minimum ratio as of 1 October 2015 but to reduce the phase-in period and reach the 100% minimum ratio from 1 January 2018.

Mathematically the LCR is expressed as follows:

$$\frac{\text{Stock of high quality liquid assets}}{\text{Total net cash outflows next 30 days}} \geq 100\%$$

Figure 1-10. Calculation of LCR

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## Net Stable Funding Ratio (NSFR)

The NSFR was established as a measure that should be used to optimise the structural liquidity of credit institutions over a time horizon of one year.

The NSFR is defined by BCBS as the ratio between the available stable funding and the amount for which a stable funding is required. Available stable funding is defined as the portion of capital and liabilities expected to be reliable over the time horizon of one year. The amount of stable funding required of an institution is a function of the liquidity characteristics and residual maturities of the various assets held by that institution as well as those of its off-balance sheet exposures. The amount of available stable funding must match the amount of required stable funding. The NSFR will become a minimum standard from 1 January 2018 at BCBS level

Mathematically the NSFR is expressed as follows:

$$\frac{\text{Available Stable Funding (ASF)}}{\text{Required Stable Funding (RSF)}} \geq 100\%$$

Figure 1-11. Calculation of NSFR

NSFR reporting processes have been put in place in order to monitor the ratios during the transition period in order to review the implications of these standards for financial markets, credit extension and economic growth, addressing unintended consequences as necessary.

In general, the CRR requires a minimum of stable funding for non-current obligations. However the respective ratios have not yet been defined. Since 31 March 2014, stable funding positions must be reported on a quarterly basis. The introduction of a ratio is under observation by the regulatory authorities. It is expected, that the final ratio will be proposed by 31 December 2016 as a legislative proposal by the EU Commission to be put in place during 2017 and becoming valid as of 1 January 2018.

1.2.3 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 an overview of which risks are to be considered under an integrated risk approach:

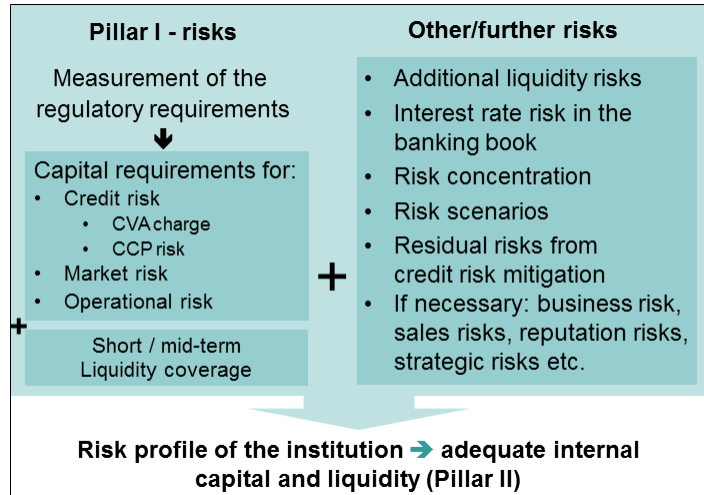


Figure 1-12. Integrated risk consideration (Pillar II) under Basel III

The bank’s internal assessment comprises:

- internal procedures and strategies to identify all risks and to assess the necessary internal amount of capital and maintain this at all times (Internal Capital Adequacy Assessment Process - ICAAP) and the Internal Liquidity Adequacy Assessment Process (ILAAP) to assess the liquidity profile of an institution in relation to its business and complexity.
- a review and evaluation process by the supervisors (Supervisory Review and Evaluation Process - SREP). This includes a review and evaluation of the bank’s capital and liquidity adequacy as well as the possibility to require capital in excess of the minimum Pillar I amount and to intervene at an early stage in case risks are not captured adequately.

All together Pillar II is also called the Supervisory Review Process (SRP).

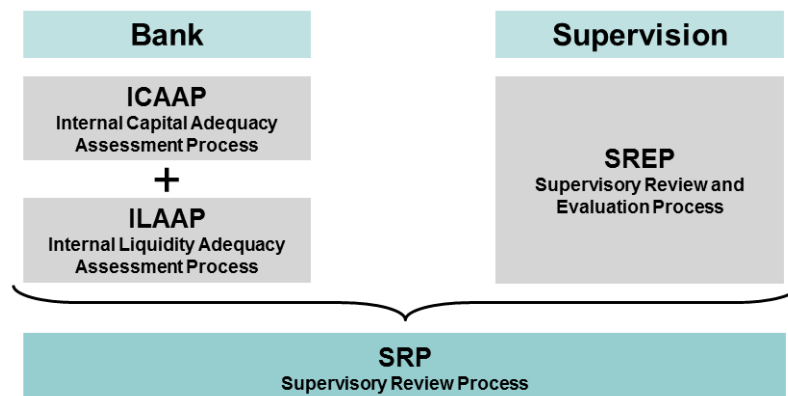


Figure 1-13. Prudential supervision under Basel III

The EU has set the necessary standards on internal organisation, risk management, capital and liquidity management, corporate governance, remuneration as well as the related Pillar II review processes within CRD IV (Chapter II, Articles 73 - 110). These rules have been transposed into German

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and Luxembourg law respectively. In addition, the EBA has issued the "Guidelines on common procedures and methodologies for the supervisory review and evaluation process (SREP)"<sup>1</sup>, which was to be implemented and used by national competent authorities as of 1 January 2016.

## 1.2.4 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 applies to all banks, and more detailed requirements have to be fulfilled from banks using internal methods.

Following the changed quantitative rules for capital and capital requirements as well as the introduction of quantitative liquidity measures, Basel III and the CRD IV package have enhanced the disclosure requirements substantially. With CRR and subsequent technical standards the disclosure requirements are much more granular. Precise requirements have been set in various areas. In addition, information on the Leverage Ratio, that has been introduced as a concept under Basel III but so far is only in discussion to become potentially a binding minimum ratio under Pillar I, needs to be disclosed for the first time in this disclosure report for the financial year 2015 ([8.4 Leverage ratio](#)).

With regards to the disclosure of information according to the Liquidity Coverage Ratio, the Basel Committee on Banking Supervision issued LCR disclosure standards applicable as of 1 January 2015 in consonance with the original implementation date of the LCR requirement. So far, the European Commission has not transposed the BCBS disclosure requirements with all its detailed information into a binding disclosure requirement in the EU. Therefore, this disclosure report only contains the LCR figure as of 31 December 2015 in Chapter [7.2](#).

The CRD IV package also contains further information to be disclosed which included details on corporate governance and governance arrangements and information about the Return on Assets (RoA).

RoA indicates the efficiency of invested capital during a specific period of time. Mathematically the RoA is expressed as follows:

$$\text{RoA} = \frac{\text{Net Income}}{\text{Total Assets}}$$

Figure 1-14. Calculation of Return on assets

The present report serves the purpose of meeting the requirements of Pillar III as outlined in the foreword and providing interested parties with further essential information about the business and risk situation of Clearstream Group.

1. EBA Guidelines on common procedures and methodologies for the supervisory review and evaluation process (SREP): <https://www.eba.europa.eu/documents/10180/935249/EBA-GL-2014-13+%28Guidelines+on+SREP+methodologies+and+processes%29.pdf>

## 1.3 Information about Clearstream Group

### 1.3.1 Group structure

Clearstream Holding and its subsidiaries are fully owned by Deutsche Börse AG (DBAG) and are highly integrated into Deutsche Börse Group. The ownership and structure of the group at 31 December 2014 is shown in [Figure 1-15](#) below.

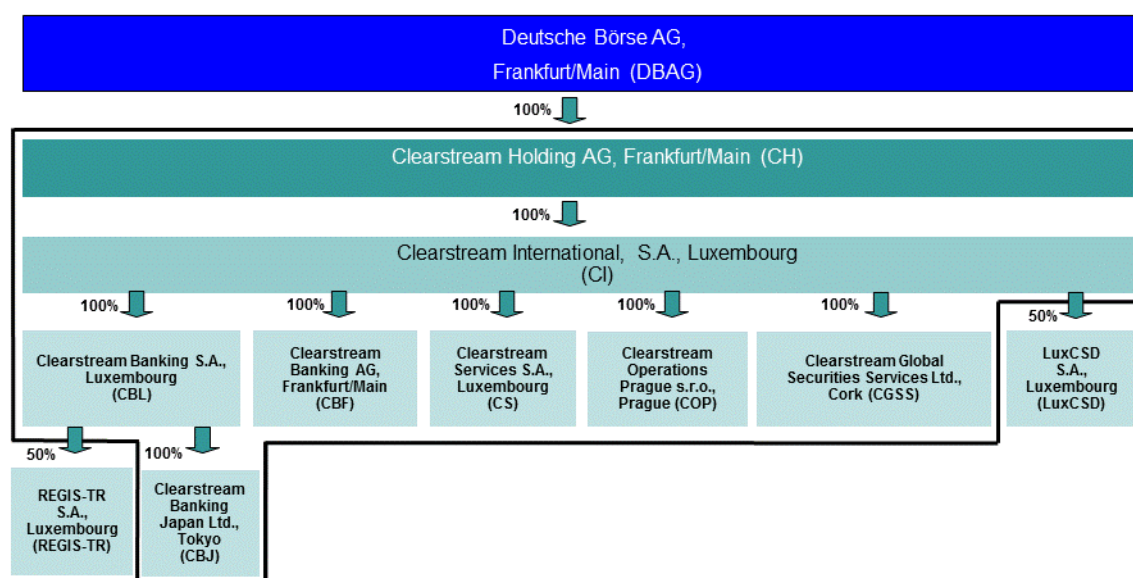


Figure 1-15. Structure and ownership of Clearstream Group

CH acts as a pure holding company for the shareholding in Clearstream International, S.A., Luxembourg (CI) and as a financial holding company under German banking law being recognised by BaFin as the superordinated company according to § 10a (1) sentence 2 KWG.

Among the subsidiaries of CI there are companies which are not included in the regulatory consolidation.

CI and its main subsidiaries act in the securities settlement and custody area. Clearstream Banking S.A., Luxembourg (CBL), 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), Clearstream Global Securities Services Ltd., Cork (CGSS) and CI, which perform supporting tasks like IT, development and operations, settlement and custody operations, central functions and other services. Clearstream Banking Japan Ltd, Tokyo (CBJ), provides customer liaison in Japan and supports accessory business activities.

Clearstream Fund Services Ireland Ltd (CFSI), a former wholly owned subsidiary of CI, was founded in 2012 in order to start hedge funds processing at Clearstream group. Due to corporate restructuring the company ceased its activity by the end of 2013 and only performed some administrative tasks until the end of 2015. On 1 December 2015 CFSI merged into CGSS.

Clearstream International, S.A., Luxembourg, and Banque centrale du Luxembourg (BCL), the Grand Duchy's central bank, jointly own LuxCSD S.A., which operates as 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). It is supervised by the Commission de Surveillance du Secteur Financier (CSSF). Due to changes in the corporate governance

# Introduction

of LuxCSD S.A., the company is no longer classified as subsidiary of Clearstream International S.A. for accounting and regulatory purposes. At present, LuxCSD S.A. is classified as a joint venture and due to its low size regarding the balance sheet volume, it is no longer consolidated in the regulatory group.

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 registered as a trade repository by the European Securities and Markets Authority (ESMA) in November 2013 in accordance with Regulation EU 648/2012 on OTC derivatives, central counterparties and trade repositories (European Markets Infrastructure Regulation, EMIR).

Clearstream International, S.A. operates a branch in London which is in process of being closed during 2016 and Clearstream Banking S.A. operates a branch in Singapore as well as a network of representative offices in Dubai, Hong Kong, New York, London, Tokyo, and Zurich. On 4 January 2016, CBL's representative office in London was transformed into a branch.

The composition of the regulatory Clearstream group is shown in [Figure 1-15](#) 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 Article 18 CRR, CFSI and CGSS had to, in principle, be consolidated under regulatory terms. Due to the small size of operations of CFSI, Clearstream Holding has decided to use the exemption from consolidation according to Article 19 CRR. As CGSS did not surpass the thresholds set in Article 19 CRR, Clearstream Holding AG has also decided to use the exemption of Article 19 CRR for CGSS in 2014. In light of the expected business development and the merger with CFSI, Clearstream Holding has made use of Article 19 CRR with regards to CGSS for 2014 only and includes CGSS within the group of regulatory consolidated entities from January 2015.

## 1.3.2 Business operations and supervision

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

CH is classified as a financial holding company according to Article 4 paragraph 1 point 20 CRR.

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 (1) 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 Banking Act on the financial sector.

In addition, CI is defined as a financial holding company in accordance with Article 4 paragraph 1 point 20 CRR.

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, internal audit 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);
  - money-market instruments, including short-term and medium-term notes, commercial paper and certificates of deposit;
- 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).

The CSSF is the competent authority for the supervision of CBL as credit institution according to Articles 42 and 43 of the Luxembourg Banking Act 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 is designated as a securities settlement system (SSS) according to Title V of the Luxembourg Law of 10 November 2009 relating to payment services. The BCL is responsible for the oversight of SSSs (in accordance with Article 110 of the law of 10 November 2009). The focus of the oversight is the operational and financial stability of each system and participants in such a system 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).

CBL maintains relationships with around 2,500 customers in over 110 countries. Its global network extends across 54 domestic markets.

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.

CBL London Branch opened in January 2016 after having a representative office in London since 1985. It took over the activities of the representative office.

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, securities issued elsewhere and even physical gold 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 for the international business. 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 Banking Act.

The business operations CS provides to CBL, CBF and LuxCSD includes activities in international custody processing, settlement and new issuance business as well as credit operating services.



## **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 CNB performs local oversight on behalf of the BCL.

COP operates services for the Clearstream Banking units and for LuxCSD. 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.

Furthermore, COP functions as a shared services centre for certain administrative and support functions for major parts of the entire Deutsche Börse Group.

## **Clearstream Global Securities Services Ltd, Cork (CGSS):**

CGSS is not a regulated entity. Clearstream Global Securities Services Ltd (CGSS) is a wholly owned subsidiary of Clearstream International S.A. and is Clearstream's hedge fund processing centre which complements the company's servicing centres for mutual funds in Luxembourg, Prague and Singapore.

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

LuxCSD was created within the context of the implementation of the Eurosystem's TARGET2- Securities (T2S) initiative. T2S is bringing a single integrated process across Europe for delivery versus payment (DVP) settlement in Euro 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.

LuxCSD is licensed by the CSSF as professional depository of financial instruments according to Article 26 of the Luxembourg Banking Act and as Securities Settlement System (SSS) by the BCL. In addition, BCL oversees the business activities of LuxCSD.

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

REGIS-TR currently operates central register of derivatives where all contracts agreed over a wide variety of derivative financial instruments traded, OTC or on-exchange, can be centrally collected and recorded, giving market participants and regulators a consolidated view of positions. REGIS-TR was granted authorisation as a trade repository by the European Securities and Markets Authority (ESMA) in November 2013, enabling REGIS-TR to support customers in registering exchange-traded and OTC derivatives. Since 12 February 2014, the reporting by the market participants of the details of any derivatives contracts has been mandatory under EMIR.

Since 2010, REGIS-TR is fully consolidated in the DB Group financial statements. With regard to the consolidation provisions set out in the CRR/KWG, REGIS-TR has been classified as an "other undertaking" and is therefore not included in regulatory consolidation (see [Figure 1-15](#) on page 1-17).

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

CBJ is not a regulated entity. The purpose of CBJ is to engage in marketing, information provision 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

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## 2. Implementation of Basel III 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 \(SRP\)](#) on page 2-2;
- [2.3 Pillar III: Market discipline](#) on page 2-2;
- [2.4 Regulatory environment](#) on page 2-5.

### 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 of minimum capital requirements.

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 master data, movements and balances is crucial to the business.

In the year under review, about 139 million settlement transactions were processed. 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.

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.

# Implementation of Basel III at Clearstream

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

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)

Clearstream Group has implemented all necessary organisational and methodological requirements for the Internal Capital Adequacy Assessment Process (ICAAP), the Internal Liquidity Adequacy Assessment Process (ILAAP) and all other elements that constitute the basis for the Supervisory Evaluation and Review Process (SREP).

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 required 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. EC 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%. The required Economic Capital takes into account a correlation of "1" between individual risks types. This is the most conservative approach for this purpose.

With the introduction of Basel III the Pillar II and its SRP were amended by the assessment of an institution's liquidity adequacy.

Basel III requires Clearstream to have in place robust strategies, policies and systems for the identification, measurement, management and monitoring of liquidity risk over appropriate time horizons so as to ensure that Clearstream maintains adequate levels of liquidity buffers. The design of its ILAAP framework is in the sole responsibility of Clearstream.

Within the SREP, competent authorities collect quantitative and qualitative information on Clearstream's ILAAP to determine Clearstream's ability to cover its liquidity and funding risks, even under stressed conditions.

As part of the SREP, the management of Clearstream Group is in a constant dialogue with all its supervisors.

## 2.3 Pillar III: Market discipline

CH is the superordinated company of the financial holding group according to §10a (1) KWG. CH in its role as a 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 Part 8 of the CRR and § 26a KWG. The information required by Article 450 CRR (information regarding remuneration), § 26a (1) sentence 2

# Implementation of Basel III at Clearstream

KWG (Country-by-Country reporting) and § 26a (1) sentence 4 KWG (Return on Assets) is disclosed separately. For a comprehensive overview of all disclosures please see the Foreword.

Article 6 paragraph 3 CRR exempts CBF and CBL 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 disclosure report. In conjunction with this Article 13 paragraph 2 CRR and EBA Q&A 2014\_759 clarify that the consolidated CH report shall contain information on individual level of its significant institutions CBL and CBF.

In addition, certain requirements do not apply for CH. As Clearstream does not perform any kind of trading, related disclosure requirements are not applicable (Article 439 CRR). Due to the businesses of Clearstream the following articles are not relevant as the underlying topics do not exist at Clearstream although they apply in principle: Article 441 CRR (Indicators of global systemic importance), Article 449 CRR (Exposure to securitisation positions), Article 452 CRR (Use of the IRB Approaches to credit risk) and Article 455 CRR (Use of Internal Market Risk Models).

According to Article 433 the applicable disclosures have to be published at least on an annual basis in conjunction with the date of publication of the financial statement. In addition, Clearstream companies assess annually the need to publish certain information more frequently in order to ensure stakeholders' access to a core set of up-to-date information. The related assessment is performed according to EBA Q&A 2014\_1379 on group level (CH) as well as on level of significant subsidiaries as CBL and CBF are.

The assessment process performed in February 2016, according to EBA Guideline 2014/14<sup>1</sup>, was heading to the result that the four-year average of total assets of CBL (FY 2012 - 2015) exceeds 20% of the four-year average of Luxembourg's GDP of the same period of time. Thus, CBL is in principle required to disclose certain information on semi-annual basis. If appropriate and reasonable institutions have the opportunity to waive more frequently disclosures according to paragraph 29 of the EBA Guideline. CBL's balance sheet volume is highly volatile and is driven by participants' cash deposits used to foster settlement. Thus, this year for the first time the four-year average of total assets of CBL is slightly above the threshold. In addition, the risk to which CBL is being exposed to is not fluctuating in an excessive manner and is in general quite small mainly driven by operational risk. In this line, the additional semi-annual disclosures would add only limited information value. Thus, the Executive Committee of Clearstream Holding AG and Clearstream Banking S.A. decided to waive the disclosure with reference date of 30 June 2016 due to CBL's limited possibility to manage its balance sheet and its related limited additional information value of more frequently disclosures.

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 1-15](#) 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.

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1. EBA Guideline transposed in Germany via BaFin Rundschreiben 05/2015 (BA): [https://www.bafin.de/SharedDocs/Veroeffentlichungen/DE/Rundschreiben/2015/rs\\_1505\\_ba\\_offenlegung.html](https://www.bafin.de/SharedDocs/Veroeffentlichungen/DE/Rundschreiben/2015/rs_1505_ba_offenlegung.html)

## Implementation of Basel III at Clearstream

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 Art. 18 CRR Full Consolidation | Deduction/ Higher Risk Weighting acc. Art. 48 CRR | Full consolidation       | At equity |
| 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>a</sup> | x  |   | x                        |           |
| Financial institution                    | LuxCSD S.A. Luxembourg (LuxCSD) <sup>a</sup>                  |  | x   |                          | x         |
| Regulated Ancillary Services Undertaking | Clearstream Services S.A., Luxembourg (CS) <sup>b</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 Global Securities Services Ltd, Cork (CGSS)       | x  |   | x                        |           |
| "Other" Undertaking                      | REGIS-TR S.A., Luxembourg (REGIS-TR) <sup>c</sup>             |  | x   | x                        |           |

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

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

c. REGIS-TR is classified as a trade repository according to Article 2 paragraph 2 EMIR.

Table 2-2. Accounting and prudential consolidation

# Implementation of Basel III at Clearstream

The assignment of the companies to the types of enterprise is mainly based on the definitions contained in § 4 CRR. Clearstream has no company that was consolidated proportionately at the reporting date.

## 2.4 Regulatory environment

The Clearstream Group fulfils the “Basel III” regulatory equity requirements based on the EU implemented Directive and Regulation CRD IV and CRR 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).

On 15 October 2013, the EU adopted the Single Supervisory Mechanism (SSM) Regulation, under which the ECB assumes responsibility in principle for banking supervision in the Eurozone; countries outside the Eurozone have the option to join the supervisory mechanism. The SSM has been set up in order to further harmonise supervisory practices in the EU and to structure a “banking union”. In the first step, supervision over the largest banks (Significant Institutions, (SIs)) with international operations was transferred directly to the European Central Bank (ECB) in November 2014.

However, for the less significant institutions (LSIs), the ECB only lays down supervisory principles, harmonises interpretation decisions and coordinates the national supervisory authorities.

In June 2014, after a comprehensive assessment the ECB decided to classify CBL which was the only Clearstream entity under inspection as LSI. The decision reflects the dedicated role of Clearstream outside the core banking business that is the focus of the SSM. Although CBL and the whole Clearstream Group continue to be seen as systemically important as a Financial Market Infrastructure (FMI), CBL (and CBF and CH) is not classified as an SI for the purposes of the SSM. As such, CBL remains under the supervision of the CSSF on a stand-alone basis and Clearstream Group continues to be supervised at a consolidated level by BaFin. In this regard BaFin and Bundesbank classified CH (and any subsidiary) neither as other systemically important institution nor as domestic systemically important institution.

In 2016 the ECB confirmed the classification of the Clearstream entities based on its review in 2015 and in line with more prioritising ECB specified the classification as LSI with high priority.

Once the CSD Regulation comes into effect, the organisational setup and responsibilities for the supervision of the Clearstream entities will have to be reviewed.

# Implementation of Basel III at Clearstream

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## 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](#) 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 Executive Management 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](#) 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 various operational units are responsible for identifying risks and for reporting them promptly to Clearstream Risk Management, a central function unit with group-wide responsibilities.

Clearstream 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. Controlling risks 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 Clearstream 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.

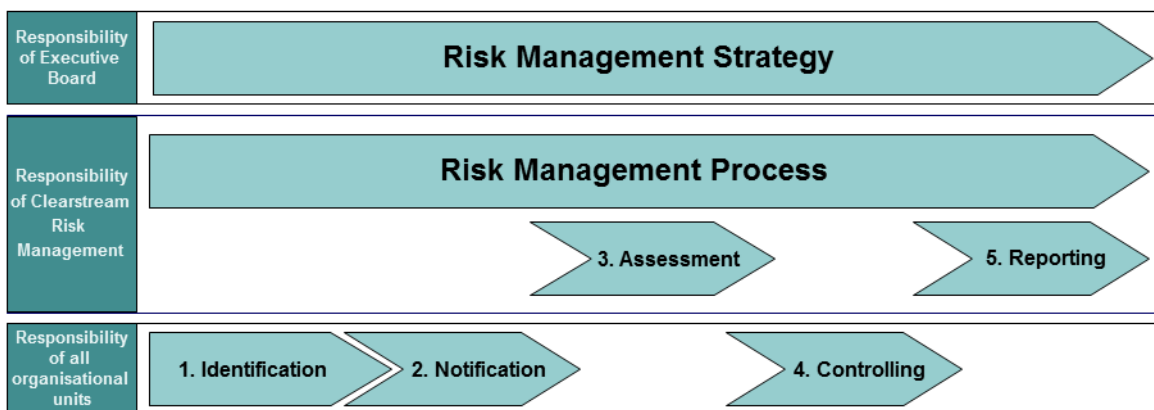


Figure 3-1. Five-level risk management system with central and decentralised responsibilities

## 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 (first line of defence) including individual employees must notify Clearstream Risk Management (second line of defence), in a timely manner, of the risks that they have identified and quantified.

### 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](#) 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 Clearstream 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 Clearstream 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. Clearstream 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, Clearstream 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.

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 III framework, on a one-

## Risk management overview

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 99.0% 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.

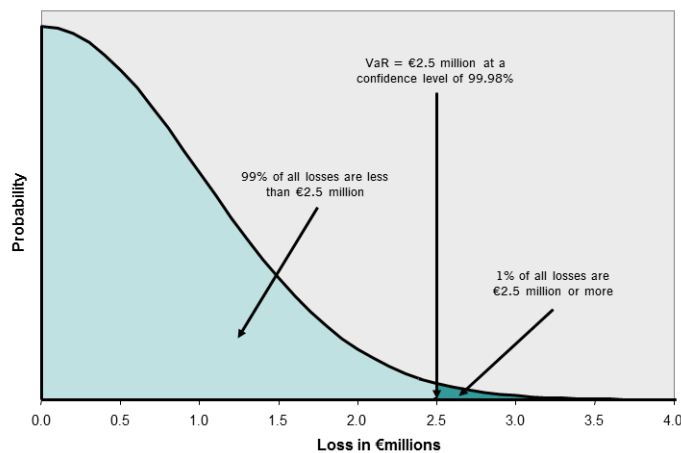


Figure 3-2. Example of VaR allocation

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

Clearstream defines risk as a potential negative impact on its financial, revenue and liquidity situation. CH differentiates between four major risk types that are managed and controlled with distinct methods. These risk types are operational risk, financial risk, business risk and project risk which are illustrated in the following figure:

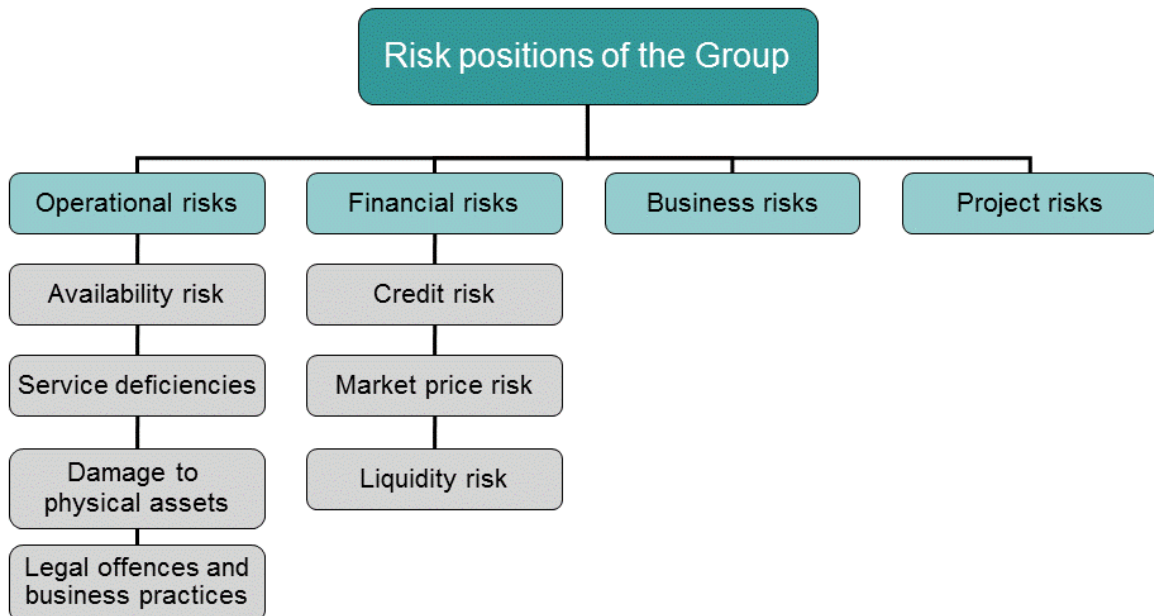


Figure 3-3. Risk structure of Clearstream

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

### 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.

#### 3.3.1.1 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 root causes 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, workspace, staff, suppliers), including the redundant design of all critical IT systems and technical infrastructure, as well

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

as workspaces and staff unavailability plans for mission-critical functions in each of the main operational centres (see also [4.3.2 Business Continuity Management](#) on page 4-8).

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

### 3.3.1.2 Service deficiencies

In contrast to availability risk, the occurrence of service deficiencies 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.

There was one significant loss of EUR 390,000 which occurred in 2015 in relation to an Internal Human Error and Omission. The mistake was due to a lack of appropriate and documented procedures for client contracts in the area of Global Securities Financing.

### 3.3.1.3 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.

### 3.3.1.4 Legal offences and 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.

Losses can also result from ongoing legal proceedings. Deutsche Börse judges the probability that this operational risk will occur to be medium, although damage can be substantial. As a result, GRM continually monitors ongoing legal proceedings. These can occur if Deutsche Börse Group breaches laws or requirements, enters into inadequate contractual agreements, or fails to observe case law to a sufficient degree. Legal risks also include losses due to fraud and labour law issues.

No significant losses occurred as a result of legal offences and 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 pension funds and liquidity risk. Exposure to the above-mentioned risks is mitigated through the existence of effective control measures.

#### 3.3.2.1 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 are uncommitted and can be revoked at any time. The main credit product offered is the "Technical Overdraft Facility" (TOF). This overdraft facility is an intraday credit arrangement 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.

As at 31 December 2014, a few TOF contracts allowing overnight borrowing were still in place. In the course of 2015, the majority of these contracts were migrated into intraday facilities. Only a few will be migrated in 2016.

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 and 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 credit limits for each counterparty and by largely making short-term, collateralised placements. Clearstream establishes credit limits on the basis of annual credit assessments and ad-hoc analyses as required. The creditworthiness of Clearstream's CCBs is also assessed on an annual or, if necessary, ad-hoc basis.

#### 3.3.2.2 Market 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.

CI and CBF have entered into a Contractual Trust Agreement (CTA), shared within Deutsche Börse Group, that serves to cover 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 price risk.



# Risk management overview

## 3.3.2.3 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 departments and managed with the help of a limit system. Sufficient credit lines are available to provide cover in extreme situations (see also [7. Management of liquidity risk](#) on page 7-1).

In addition, Clearstream performs three classic liquidity stress tests and two reverse liquidity stress tests. The aim of the classic liquidity stress tests is to check for possible liquidity shortfalls under different stress scenarios (base scenario, market disruption scenario, and market disruption and idiosyncratic scenario).

The reverse liquidity stress tests are based on the market disruption and idiosyncratic scenario. Their aim is to determine what would need to happen to customer cash balances, for Clearstream to suffer a liquidity shortfall.

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

In 2015, Clearstream performed a "Fire Drill" that focussed on liquidity risk management, governance, information flows and decision making in a time of crisis. The results of the "Fire Drill" helped to enhance existing processes and procedures.

## 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.

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 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 2-5).

## 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 Clearstream 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.

Based on relevant monitoring and control, project risks are continuously analysed and assessed. Project risks can be operational, financial or business-related and are quantified in the respective risk category.

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



### 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.

# 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 Clearstream 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

Clearstream 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 Audit 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, CBL and CBF apply the AMA to calculate their capital requirements for operational risk. In October 2010, CH received BaFin's approval to use the approach at group level in the course of the introduction of the supervision on CH 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. To achieve this target Executive Management appoints "Operational Risk Representatives" for their respective area with a direct reporting line to the respective member of the Executive Management.

The Operational Risk Representative is the key contact for both the employees in the respective organisational unit as well as for Clearstream 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 Clearstream 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 Clearstream 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 as indirect factors. 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.

## 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 class is treated separately. The data is modelled in the following structure:

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

For a sound estimation of a Poisson frequency, a minimum number of relevant data points should exist. In line with regulatory requirements, a history of relevant data of at least 12 quarters is required.

# Management of operational risk

- Body severity distribution: Modelled for each risk class 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 class 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 class. Therefore, each risk class is individually modelled with a combined severity distribution.

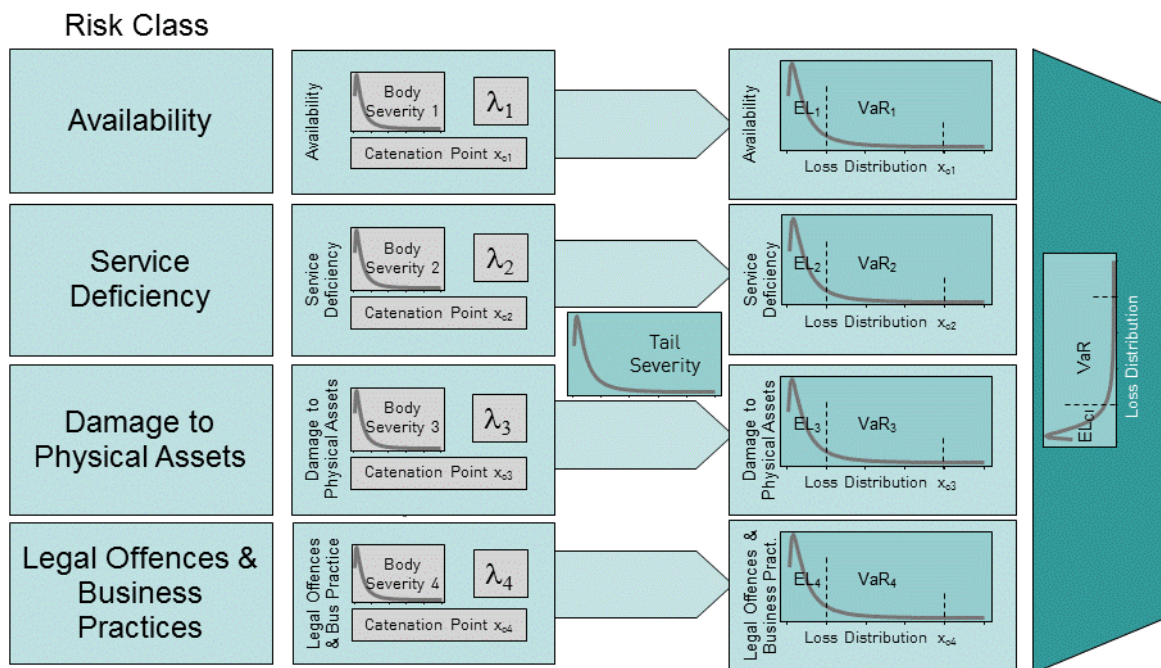


Figure 4-1. Overview of model structure

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 class 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 class level. This approach considers potentially severe events properly for every risk class and enables diversification effects between different risk classes 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 classes with a probability of one or less in 20 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 class. 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.

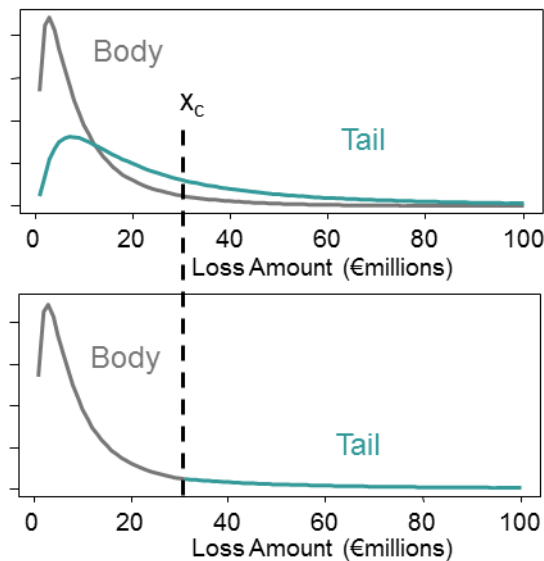


Figure 4-2. Example for substitution of the body distribution by the tail severity distribution

# Management of operational risk

## 4.2.3 Insurance modelling

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 classes 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 class 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 class 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 class 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 class with the required accuracy.

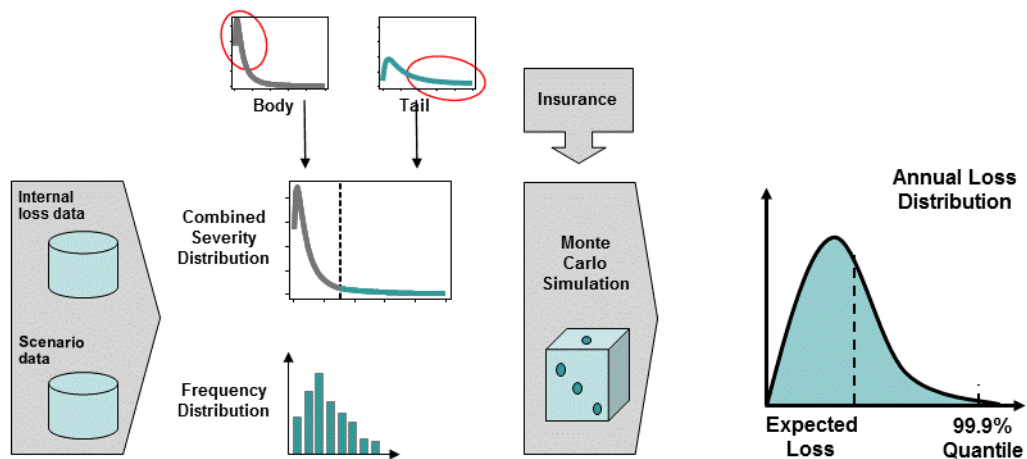


Figure 4-3. Steps of single Monte Carlo simulation



## 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 addition to the stress tests defined above, Clearstream Risk Management performs, since 2011, so-called reverse stress test for operational risk that 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.

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## 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. Related tests must be performed once a year. The corresponding tests were last carried out in April 2016.

### 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, Clearstream Risk Management is responsible for the overall coordination, monitoring and assessment 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 and address the unavailability of systems, workspace, staff and suppliers in order to ensure the continuity of the most critical operations even in cases of catastrophic events. 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 are geographically 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 functions 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 catastrophic scenarios and such as terrorist attacks and 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 in place so 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 reviews of suppliers' BCM arrangements, provision of services by alternative suppliers if possible and service level agreements, describing minimum service levels and contingency procedures.

### Incident and crisis management process

Clearstream has implemented a group-wide incident and crisis management process that facilitates a 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 enabling a swift return to regular business activity.

Incident Managers have been appointed in the respective business areas as points of contact in case of incidents and crises to ensure the appropriate response including escalation up to the Executive Management and notification to customers and other relevant external parties.

## “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.

BCM test results are validated against the following objectives:

- Functional effectiveness: validating all technical functionalities.
- Execution ability: staff must be familiar with and knowledgeable in the execution of BCM procedures.
- Recovery time: the functions in the scope of the BCM plans must be operational within the defined recovery time objective.

Test results are reported to Executive Management. Customers are regularly invited to participate in Clearstream's BCM tests to provide them with direct assurance of Clearstream's BCM preparedness.

### 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 Clearstream 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.

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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 non-trading book](#) on page 5-14;
- [5.8 Asset encumbrance](#) on page 5-15

### 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,

# Management of credit risk

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.

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.

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

## 5.2 Credit risk exposures

### 5.2.1 Application of the standardised approach

Clearstream uses the credit assessments by OECD<sup>1</sup> for the central governments and central banks exposure class. In addition, Clearstream nominated the external credit assessment institution (ECAI) Standard & Poor's for the same exposure class as OECD ceased to assess so called "high income countries" in 2013. For regional governments or local authorities, public sector entities and institutions (credit institutions, investment firms and other dedicated financial counterparties) exposure classes, the dedicated risk weight is derived from that of the respective country of residence. The use of these credit assessments by OECD and Standard & Poor's ratings has been notified to the German and Luxembourg supervisors.

The exposures of Clearstream belong mainly to the exposure classes of central governments and central banks and to institutions. The current exposures to central governments and central banks are mainly risk-weighted by 0%. The exposures to institutions have generally a short original maturity of less than or equal to three months, therefore, pursuant to Article 120 paragraph 2 CRR the risk weight is 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 no ECAI for that purpose has been nominated irrespective a rating exists.

Clearstream complies with the risk weighting as defined in Section 2, Chapter 2 of Part Three, Title II of the CRR.

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 Chapter 2 of Part Three, Title II of the CRR.

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1. Country Risk Classification: <http://www.oecd.org/tad/xcred/crc.htm>.

| 31 December 2015 (€' 000)                 |                   | Exposure value    |                   |                  | Exposure value after CRM* |                  |                  | Exposure value after considering Conversion Factor (CF) |                  |                  |
|---|-------------------|-------------------|-------------------|------------------|---------------------------|------------------|------------------|---|------------------|------------------|
| Exposure class                            | Risk weight class | CH-Group (*)      | CBL(*)            | CBF (*)          | CH-Group (*)              | CBL (*)          | CBF (*)          | CH-Group (*)  | CBL (*)          | CBF (*)          |
| Central governments or central banks      | 0%                | 3,676,752         | 3,500,215         | 202,324          | 3,676,752                 | 3,500,215        | 202,324          | 3,676,752   | 3,500,215        | 202,324          |
|   | 20%               | 2,880             | -                 | -                | 2,880                     | -                | -                | 2,880   | -                | -                |
|   | 50%               | 553               | -                 | -                | 553                       | -                | -                | 553   | -                | -                |
|   | 100%              | 213               | 3,934             | 79               | 213                       | 3,934            | 79               | 213   | 3,934            | 79               |
|   | 150%              | 66                | -                 | -                | 66                        | -                | -                | 66  | -                | -                |
|   | Total             | 3,680,464         | 3,504,149         | 202,403          | 3,680,464                 | 3,504,149        | 202,403          | 3,680,464   | 3,504,149        | 202,403          |
| Regional governments or local authorities | 0%                | 497,292           | 570,649           | 59,308           | 497,292                   | 570,649          | 59,308           | 497,292   | 570,649          | 59,308           |
|   | Total             | 497,292           | 570,649           | 59,308           | 497,292                   | 570,649          | 59,308           | 497,292   | 570,649          | 59,308           |
| Public sector entities                    | 0%                | 1,007,393         | 811,066           | 65,458           | 1,007,393                 | 811,066          | 65,458           | 1,007,393   | 811,066          | 65,458           |
|   | Total             | -                 | -                 | -                | -                         | -                | -                | -   | -                | -                |
|   | Total             | 1,007,393         | 811,066           | 65,458           | 1,007,393                 | 811,066          | 65,458           | 1,007,393   | 811,066          | 65,458           |
| Multilateral development banks            | 0%                | 486,471           | 472,882           | 14,993           | 486,471                   | 472,882          | 14,993           | 486,471   | 472,882          | 14,993           |
|   | Total             | 486,471           | 472,882           | 14,993           | 486,471                   | 472,882          | 14,993           | 486,471   | 472,882          | 14,993           |
| International organisations               | 0%                | 88,538            | 52,018            | 36,571           | 88,538                    | 52,018           | 36,571           | 88,538  | 52,018           | 36,571           |
|   | Total             | 88,538            | 52,018            | 36,571           | 88,538                    | 52,018           | 36,571           | 88,538  | 52,018           | 36,571           |
| Institutions                              | 20%               | 58,554,472        | 57,271,262        | 1,871,759        | 4,333,969                 | 2,963,294        | 1,598,759        | 2,657,658   | 1,686,231        | 1,203,792        |
|   | 50%               | -                 | -                 | -                | -                         | -                | -                | -   | -                | -                |
|   | 100%              | -                 | 788,552           | -                | -                         | 218,983          | -                | -   | 218,983          | -                |
|   | 150%              | -                 | -                 | -                | -                         | -                | -                | -   | -                | -                |
|   | Total             | 58,554,472        | 58,059,814        | 1,871,759        | 4,333,969                 | 3,182,277        | 1,598,759        | 2,657,658   | 1,905,214        | 1,203,792        |
| Corporates                                | 20%               | -                 | -                 | -                | -                         | -                | -                | -   | -                | -                |
|   | 50%               | -                 | -                 | -                | -                         | -                | -                | -   | -                | -                |
|   | 100%              | 362,630           | 58,066            | 3,817            | 216,745                   | 58,066           | 3,817            | 216,745   | 58,066           | 3,817            |
|   | 150%              | 46                | 74                | 1                | 46                        | 74               | 1                | 46  | 74               | 1                |
|   | Total             | 362,676           | 58,140            | 3,818            | 216,791                   | 58,140           | 3,818            | 216,791   | 58,140           | 3,818            |
| Equity                                    | 100%              | 10,474            | 7,962             | 1,201            | 10,474                    | 7,962            | 1,201            | 10,474  | 7,962            | 1,201            |
|   | Total             | -                 | -                 | -                | -                         | -                | -                | -   | -                | -                |
| Other items                               | 0%                | 6                 | 3                 | -                | 6                         | 3                | -                | 6   | 3                | -                |
|   | Total             | 42,812            | 4,474             | 303              | 42,812                    | 4,474            | 303              | 42,812  | 4,474            | 303              |
|   | Total             | 42,818            | 4,477             | 303              | 42,819                    | 4,477            | 303              | 42,818  | 4,477            | 303              |
| <b>Total 2015</b>                         |                   | <b>64,730,599</b> | <b>63,541,157</b> | <b>2,255,815</b> | <b>10,364,211</b>         | <b>8,663,620</b> | <b>1,982,815</b> | <b>8,687,899</b>  | <b>7,386,557</b> | <b>1,587,848</b> |
| Total 2014                                |                   | 66,834,414        | 63,352,754        | 4,923,182        | 14,009,988                | 11,078,568       | 3,521,172        | 5,549,336   | 5,731,195        | 414,280          |

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

Table 5-1. Total credit risk exposure values

**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).

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) and since 2014 also in Germany. The treatment is in line with point 109 of Article 4 CRR that states that "defined benefit pension fund assets" shall be calculated as the assets after the reduction of obligations under the same fund or plan. This is in line with the treatment under § 246 (2) HGB.

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 Conversion Factors (CFs).

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## 5.2.2 Detailed information and distribution of credit risk exposures

### Distribution of credit risk exposures:

In the following the distribution of the credit risk exposures is broken down by exposure classes, by geographical areas and by the residual maturity according to Article 442 CRR.

At 31 December 2015, the geographical allocation of credit risk exposures was as shown in the following table. Most of the exposures of the Clearstream entities are placed in the European Union.

| 31 December 2015 (€'000)                  |                 | Geographical areas |                |                |                | Total            |
|---|-----------------|--------------------|----------------|----------------|----------------|------------------|
| Exposure class                            | Companies       | European Union     | Rest of Europe | North America  | Rest of World  |                  |
| Central governments or central banks      | CH-Group        | 3,583,127          | 89,636         | 33             | 7,669          | 3,680,464        |
|   | CBL             | 3,401,447          | 99,112         | 16             | 3,574          | 3,504,149        |
|   | CBF             | 202,403            | -              | -              | -              | 202,403          |
| Regional governments or local authorities | CH-Group        | 497,292            | -              | -              | -              | 497,292          |
|   | CBL             | 570,649            | -              | -              | -              | 570,649          |
|   | CBF             | 59,308             | -              | -              | -              | 59,308           |
| Public sector entities                    | CH-Group        | 1,007,393          | -              | -              | -              | 1,007,393        |
|   | CBL             | 811,066            | -              | -              | -              | 811,066          |
|   | CBF             | 65,458             | -              | -              | -              | 65,458           |
| Multilateral development banks            | CH-Group        | 486,455            | -              | -              | 15             | 486,471          |
|   | CBL             | 472,862            | -              | 4              | 15             | 472,881          |
|   | CBF             | 14,993             | -              | -              | -              | 14,993           |
| International organisations               | CH-Group        | 88,369             | 169            | -              | -              | 88,538           |
|   | CBL             | 52,018             | -              | -              | -              | 52,018           |
|   | CBF             | 36,571             | -              | -              | -              | 36,571           |
| Institutions                              | CH-Group        | 2,123,104          | 99,425         | 210,482        | 224,647        | 2,657,658        |
|   | CBL             | 1,193,221          | 185,209        | 204,928        | 321,856        | 1,905,214        |
|   | CBF             | 1,202,500          | 1,268          | 24             | -              | 1,203,792        |
| Corporates                                | CH-Group        | 157,265            | 5,483          | 15,044         | 38,999         | 216,791          |
|   | CBL             | 43,144             | 361            | 13,429         | 1,206          | 58,140           |
|   | CBF             | 3,708              | 92             | 12             | 5              | 3,818            |
| Equity                                    | CH-Group        | 10,473             | 1              | -              | -              | 10,474           |
|   | CBL             | 7,226              | -              | -              | 737            | 7,963            |
|   | CBF             | 1,201              | -              | -              | -              | 1,201            |
| Other items                               | CH-Group        | 42,818             | -              | -              | -              | 42,818           |
|   | CBL             | 4,477              | -              | -              | -              | 4,477            |
|   | CBF             | 270                | -              | 33             | -              | 303              |
| <b>Total 2015</b>                         | <b>CH-Group</b> | <b>7,996,297</b>   | <b>194,714</b> | <b>225,559</b> | <b>271,329</b> | <b>8,687,899</b> |
|   | <b>CBL</b>      | <b>6,556,110</b>   | <b>284,682</b> | <b>218,377</b> | <b>327,388</b> | <b>7,386,557</b> |
|   | <b>CBF</b>      | <b>1,586,413</b>   | <b>1,361</b>   | <b>69</b>      | <b>5</b>       | <b>1,587,848</b> |
| Total 2014                                | CH-Group        | 4,975,061          | 207,763        | 79,313         | 287,198        | 5,549,336        |
|   | CBL             | 5,005,791          | 282,850        | 107,704        | 334,850        | 5,731,195        |
|   | CBF             | 413,420            | 841            | 12             | 7              | 414,280          |

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.



## Management of credit risk

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.

| 31 December 2015 (€'000)                  |                     | Maturity               |                |                  |                  |
|---|---------------------|------------------------|----------------|------------------|------------------|
| Exposure class                            | Companies           | Not more than 3 months | Up to one year | Over one year    | Total            |
| Central governments or central banks      | CH-Group (*)        | 3,680,464              | -              | -                | 3,680,464        |
|   | CBL(*)              | 3,504,149              | -              | -                | 3,504,149        |
|   | CBF (*)             | 202,403                | -              | -                | 202,403          |
| Regional governments or local authorities | CH-Group (*)        | -                      | -              | 497,292          | 497,292          |
|   | CBL(*)              | 144                    | -              | 570,505          | 570,649          |
|   | CBF (*)             | -                      | -              | 59,308           | 59,308           |
| Public sector entities                    | CH-Group (*)        | 733                    | -              | 1,006,660        | 1,007,393        |
|   | CBL(*)              | -                      | 31,931         | 779,135          | 811,066          |
|   | CBF (*)             | 447                    | 20,005         | 45,006           | 65,458           |
| Multilateral development banks            | CH-Group (*)        | 584                    | -              | 485,887          | 486,471          |
|   | CBL(*)              | 506                    | -              | 472,375          | 472,881          |
|   | CBF (*)             | -                      | -              | 14,993           | 14,993           |
| International organisations               | CH-Group (*)        | 230                    | -              | 88,308           | 88,538           |
|   | CBL(*)              | 59                     | 10,317         | 41,642           | 52,018           |
|   | CBF (*)             | -                      | -              | 36,571           | 36,571           |
| Institutions                              | CH-Group (*)        | 2,605,115              | 46,310         | 6,233            | 2,657,658        |
|   | CBL(*)              | 1,896,316              | 8,898          | -                | 1,905,214        |
|   | CBF (*)             | 1,203,792              | -              | -                | 1,203,792        |
| Corporates                                | CH-Group (*)        | 216,791                | -              | -                | 216,791          |
|   | CBL(*)              | 58,140                 | -              | -                | 58,140           |
|   | CBF (*)             | 3,818                  | -              | -                | 3,818            |
| Equity                                    | CH-Group (*)        | -                      | -              | 10,474           | 10,474           |
|   | CBL(*)              | -                      | -              | 7,963            | 7,963            |
|   | CBF (*)             | -                      | -              | 1,201            | 1,201            |
| Covered Bonds                             | CH-Group (*)        | -                      | -              | -                | 0                |
|   | CBL(*)              | -                      | -              | -                | -                |
|   | CBF (*)             | -                      | -              | -                | -                |
| Other items                               | CH-Group (*)        | 42,818                 | -              | -                | 42,818           |
|   | CBL(*)              | 4,477                  | -              | -                | 4,477            |
|   | CBF (*)             | 303                    | -              | -                | 303              |
| <b>Total 2015</b>                         | <b>CH-Group (*)</b> | <b>6,546,735</b>       | <b>46,310</b>  | <b>2,094,854</b> | <b>8,687,899</b> |
|   | <b>CBL(*)</b>       | <b>5,463,791</b>       | <b>51,146</b>  | <b>1,871,620</b> | <b>7,386,557</b> |
|   | <b>CBF (*)</b>      | <b>1,410,764</b>       | <b>20,005</b>  | <b>157,079</b>   | <b>1,587,848</b> |
| Total 2014                                | CH-Group (*)        | 3,990,250              | 237,158        | 1,321,928        | 5,549,336        |
|   | CBL(*)              | 4,322,734              | 202,246        | 1,206,215        | 5,731,195        |
|   | CBF (*)             | 272,829                | 34,972         | 106,479          | 414,280          |

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.

# Management of credit risk

## **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.

## **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 the CRR 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 Article 178 of the CRR, 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 the German Commercial Code (HGB) as well as International Financial Reporting Standards (IFRS) is compliant with the definition of “default” outlined in Article 178 CRR.

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.

## **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 four stress tests performed for credit risk:

- The “Default of the Largest Counterparty Group Stress Test”, where the default of the counterparty group with the largest unsecured exposure is simulated on a monthly basis, after utilisation of all respective collateral and after taking the recovery rate into account.
- The “Economic Deterioration Stress Test”, where the impact of a deterioration of the economic environment on Clearstream is simulated on a monthly basis. To capture the worsening of the economy, certain credit risk model parameters are adjusted compared to the standard VaR simulation.
- 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.

The results of the "Default of the Largest Counterparty Group Stress Test" and the "Economic Deterioration Stress Test" are compared to limits, which are defined as a fraction of the available risk bearing capacity. The stress test results are reported to the Executive Management on a quarterly basis and to the Supervisory Board on a half-yearly basis.

In addition to the stress tests defined above, a "Reverse Credit Stress Test" is being performed, whose aim is to identify the number of unsecured credit lines that exceed the available risk bearing capacity.

In the year under review, the stress tests did not reveal any risks that endanger the going concern of Clearstream's business.

## 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 [5.3.1 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.

### 5.3.1 Collaterals

#### 5.3.1.1 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(s) defined as pledge account(s) 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 permitting the set off of credit and debit balances standing to customer accounts.

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.

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.

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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.

## Management of credit risk

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>2015</b>                 | <b>2014</b> |
| <b>TOF (Technical Overdraft Facilities)</b>   |                     |                             |             |
| <b>CBL</b>  |                     | 107,932,500                 | 88,843,322  |
| <b>CBF</b>  |                     | 10,743,000                  | 7,971,749   |
| <b>Consolidated</b>   |                     | 118,675,500                 | 96,815,071  |
| <b>Utilised lines</b>   | <b>Unsecured</b>    |                             |             |
|   | <b>CBL</b>          | 31,899                      | 23,437      |
|   | <b>CBF</b>          | 0                           | 0           |
|   | <b>Consolidated</b> | 31,899                      | 23,437      |
|   | <b>Secured</b>      |                             |             |
|   | <b>CBL</b>          | 2,147,228                   | 2,400,318   |
| <b>CBF</b>  | 59,042              | 452,881                     |             |
| <b>Consolidated</b>   | 2,206,270           | 2,853,199                   |             |
| <b>Collaterals (available)</b>  | <b>Cash</b>         | 286,028                     | 848,728     |
|   | <b>Securities</b>   | 159,025,240                 | 192,357,457 |
| <b>Over-collateralisation<br/>(difference between utilised lines and available collaterals)</b> |                     | 157,104,998                 | 190,352,985 |

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.

## 5.3.1.2 Collateralised placing

CBL places a major part of the group's liquidity on the basis of reverse repo agreements with a maximum maturity of one year, but usually with maturities of three months or less. 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 settled via Clearstream's settlement system or the Euroclear system via the "Bridge" or the domestic settlement systems of Clearstream's depositories. 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, supranational banks and all issuers with an explicit sovereign or local government guaranty.
- 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 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 (including Eurex Repo GC Pooling 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 (including Eurex Repo GC Pooling transactions). All collaterals are valued daily. To secure the cash lent through reverse 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 Article 227 CRR the application of zero volatility adjustments is possible in most cases. Where the conditions of the regulation stated above are not fulfilled, supervisory haircuts as laid down in Article 224 CRR apply. In cases of FX mismatch, further cross-currency haircuts are to be applied.

## Management of credit risk

| Counterparty/ Exposure Class<br>Institutions (banks) | 31 December (€' 000)<br>2015 |           | 31 December (€' 000)<br>2014 |           |
|--|------------------------------|-----------|------------------------------|-----------|
|  | CH-Group                     | CBL       | CH-Group                     | CBL       |
| Exposure - book value                                | 5,277,067                    | 5,604,772 | 8,085,149                    | 8,538,039 |
| Collateral - market value                            | 5,289,611                    | 5,279,239 | 8,124,015                    | 8,063,669 |
| RWA  | 10,786                       | 7,245     | 9,403                        | 8,607     |

| Counterparty/ Exposure Class<br>Corporates | 31 December (€' 000)<br>2015 |         | 31 December (€' 000)<br>2014 |         |
|--|------------------------------|---------|------------------------------|---------|
|  | CH-Group                     | CBL     | CH-Group                     | CBL     |
| Exposure - book value                      | 137,608                      | 137,148 | 122,313                      | 175,246 |
| Collateral - market value                  | 137,559                      | 136,131 | 122,309                      | 122,163 |
| RWA  | 49                           | 1,017   | 4                            | 4,180   |

Table 5-5. Placements

### 5.3.1.3 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 14% depending on the issuer type. Furthermore, both the exposure and the collateral are subject to daily valuation and remargining; 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 ranges from 0.5% (if the currency mismatch represents more than 20% of the exposure amount) to 2% (if it exceeds 80%) for three business days.

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 Article 227 CRR 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 Article 227 CRR, 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<br>Institutions (banks) | 31 December (€' 000)<br>2015 |            | 31 December (€' 000)<br>2014 |            |
|--------------------------------------|------------------------------|------------|------------------------------|------------|
|                                      | CH-Group                     | CBL        | CH-Group                     | CBL        |
| Exposure - book value                | 48,602,770                   | 48,602,770 | 44,716,154                   | 44,716,154 |
| Collateral - market value            | 51,022,795                   | 51,022,795 | 52,539,842                   | 52,539,842 |
| RWA                                  | 83,384                       | 283,583    | 104,288                      | 200,043    |

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.

# Management of credit risk

## 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 first ranking Luxembourg law pledge. Collateral quality and sufficiency are monitored by CBL on a daily basis.
- Second ranking pledge on collateral in favour of the lender - 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.

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 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 Monitoring section. Besides that, limit breaches - if any - are reported to the relevant Executive Management and to Group Risk Monitoring.

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 Monitoring 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 Monitoring 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, at the end of 2015, there were no derivatives in the books of any Clearstream entity, except from the ones described in the following paragraphs.

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 of exposures not included in the trading 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 Deutsche Börse Group, the level of materiality is expressed as 10% of consolidated EBIT of the budget year to be hedged for each individual currency exposure. 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.

Foreign exchange outright 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 market movement.

The Standardised Method pursuant to Article 276 CRR 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 2015 (mn) | 31 December 2014 (mn) |
|------------------------------------|----------|-----------------------|-----------------------|
| Cross-currency swaps               | EUR      | 50.3                  | 36.0                  |
| Forward Foreign Exchange Contracts | EUR      | 0.2                   | 0.2                   |

| Gross positive Fair Value          | Currency | 31 December 2015 (mn) | 31 December 2014 (mn) |
|------------------------------------|----------|-----------------------|-----------------------|
| Cross-currency swaps               | EUR      | 24.5                  | 34.8                  |
| Forward Foreign Exchange Contracts | EUR      | 0.0                   | 0.0                   |

| Notional/Trade Value               | Currency | 31 December 2015 (mn) | 31 December 2014 (mn) |
|------------------------------------|----------|-----------------------|-----------------------|
| Cross-currency swaps               | EUR      | 2,634.9               | 1,798.8               |
| Forward Foreign Exchange Contracts | EUR      | 8.7                   | 8.6                   |

Table 5-7. Exposures in derivatives of CBL

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).

# Management of credit risk

## 5.7 Disclosures on equities in the non-trading book

Equities held in the non-trading 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 and CBF are some 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 non-trading book

In 2014 the Clearstream subsidiaries, Clearstream Fund Services Ireland Ltd (CFSI), as well as Clearstream Global Securities Services Ltd (CGSS) were not included in the consolidated reporting of Clearstream Holding because their total assets were below the minimum level outlined in Article 19 paragraph 1 CRR. Therefore, they were shown as equities in the non-trading book.

As of 1 December 2015, CFSI merged into CGSS. In light of the expected business development and the merger with CFSI, Clearstream Holding has made use of Article 19 CRR with regards to CGSS for 2014 only and includes CGSS within the group of regulatory consolidated entities from January 2015.

As described in Chapter 1.3.1, at 31 December 2015, LuxCSD S.A. is no longer classified as subsidiary of Clearstream International S.A. for accounting and regulatory purposes. LuxCSD S.A. is now classified as joint venture and due to its low size regarding the balance sheet volume, it is not consolidated in the regulatory group any longer. Therefore the participation in LuxCSD is held as equity in the non-trading book.

Owing to the SWIFT constitution, CBL - and, since 2012, also CBF - must hold a participation in SWIFT. In addition, the 50% participation of CBL in the trade repository REGIS-TR is held as equity in the non-trading book as well.

### 5.7.2 Valuation and accounting of equities in the non-trading book

For valuation and accounting purposes the German GAAP according to the German Commercial Code (HGB) is relevant for CH Group on a consolidated level and for CBF's equities in the non-trading book. According to the specifications of HGB, equities in the non-trading book are defined as long-term financial assets.

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.

The valuation and accounting specifications of International Financial Reporting Standards (IFRS) are relevant for CBL's participations. In accordance with IAS 39.9, the participations of CBL are treated as available-for-sale financial assets.

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.

The following table considers in particular the participations in CGSS, CFSI, SWIFT and REGIS-TR that are held as equities in the non-trading book:

|   | 31 December 2015 (€' 000) |              |              | 31 December 2014 (€' 000) |              |              |
|---|---------------------------|--------------|--------------|---------------------------|--------------|--------------|
|   | CH-Group                  | CBL          | CBF          | CH-Group                  | CBL          | CBF          |
| <b>Fair value of investments</b>                                | <b>11,362</b>             | <b>7,342</b> | <b>1,321</b> | <b>20,331</b>             | <b>5,535</b> | <b>1,931</b> |
| <b>Balance sheet value</b>                                      | <b>9,432</b>              | <b>5,532</b> | <b>1,201</b> | <b>18,660</b>             | <b>5,535</b> | <b>1,858</b> |
| <b>Total unrealised gains (losses)</b>                          | <b>1,930</b>              | <b>1,810</b> | <b>120</b>   | <b>1,671</b>              | <b>1,598</b> | <b>73</b>    |
| <b>thereof total revaluation gains (losses)</b>                 | <b>1,930</b>              | <b>1,810</b> | <b>120</b>   | <b>1,671</b>              | <b>1,598</b> | <b>73</b>    |
| <b>Amounts included in the original or additional own funds</b> | <b>-</b>                  | <b>1,200</b> | <b>-</b>     | <b>-</b>                  | <b>1,131</b> | <b>-</b>     |

Table 5-8. Equities in the non-trading 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.

## 5.8 Asset encumbrance

The disclosure of information on asset encumbrance pursuant to Article 443 CRR was specified by EBA with the EBA guidelines on the disclosure of encumbered and unencumbered assets on 26 June 2014<sup>1</sup>. Based on this guideline, the below disclosures are made. The disclosed figures are median values based on the reported quarter-end figures as required. The information is disclosed at the consolidated level of CH group.

Main source of encumbrance is a security from the portfolio of CBL that was partially used as a default fund contribution to a CCP. However, the overall level of encumbrance is very low as shown in [Table 5-9](#) on page 5-16. Unencumbered assets in column 60 are mainly related to the following positions:

- Collateralised Placings: As described in [5.3.1 Collaterals](#) on page 5-7, CBL enters into repo transactions which account for around 62% of the unencumbered assets in column 60;
- Placings: Customer liquidity that is mainly placed overnight amounts to around 15% of the unencumbered assets;
- Own Securities: Approximately 15% of unencumbered assets are investments of both CBL and CBF in debt securities;

Other assets: The remaining unencumbered assets are mainly other receivables and intangible assets. The amount of other assets shown in row 120 of the following [Table 5-9](#) on page 5-16 is not a residual value, it is a subitem as the other rows 030 and 040 are.

Row 010 column 60 shows the aggregated median of 16,119,765 billion EUR which consists of loans on demand, equity instruments, debt securities and other assets which are all unencumbered.

1. Guidelines on disclosure of encumbered and unencumbered assets: <http://www.eba.europa.eu/documents/10180/741903/EBA-GL-2014-03+Guidelines+on+the+disclosure+of+asset+encumbrance.pdf/c65a7f66-9fa5-435b-b843-3476a8b58d66>.

## Management of credit risk

| 31 December 2015 (€' 000)<br>CH-Group |  |                                      |                                 |  |                                   |
|---------------------------------------|--|--------------------------------------|---------------------------------|--|-----------------------------------|
|                                       |  | Carrying amount of encumbered assets | Fair value of encumbered assets | Carrying amount of unencumbered assets | Fair value of unencumbered assets |
|                                       |  | 010                                  | 40                              | 60                                     | 90                                |
| <b>010</b>                            | <b>Assets of the reporting institution</b> | <b>3,954</b>                         |                                 | <b>16,119,765</b>                      |                                   |
| 030                                   | Equity instruments                         | 0                                    | 0                               | 14,536                                 | 14,536                            |
| 040                                   | Debt securities                            | 3,954                                | 3,953                           | 2,126,548                              | 2,125,846                         |
| 120                                   | Other assets                               | 0                                    |                                 | 219,698                                |                                   |

Table 5-9. Encumbered and unencumbered assets

In table 5-10 the fair value of the non-encumbered collaterals from collateralised placings is shown.

| 31 December 2015 (€' 000)<br>CH-Group |   |  |   |
|---------------------------------------|---|--|---|
|                                       |   | Fair value of encumbered collateral received or own debt securities issued | Fair value of collateral received or own debt securities issued available for encumbrance |
|                                       |   | 010  | 040   |
| <b>130</b>                            | <b>Collateral received by the reporting institution</b> | -  | <b>8,273,913</b>  |
| 160                                   | Debt securities   | -  | 8,273,913   |

Table 5-10. Collateral received

As there were no matching liabilities to the only source of encumbrance, no sources can be shown in the following table.

| 31 December 2015 (€' 000)<br>CH-Group |  |   |   |
|---------------------------------------|--|---|---|
|                                       |  | Matching liabilities, contingent liabilities or securities lent | Assets, collateral received and own debt securities issued other than covered bonds and ABSs encumbered |
|                                       |  | 010   | 030   |
| <b>010</b>                            | <b>Carrying amount of selected financial liabilities</b> | <b>0</b>  | <b>0</b>  |

Table 5-11. Encumbered assets/collateral received and associated liabilities

## 6. Management of market risk, including interest rate risk of exposures not included in the trading 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 on positions not included in the trading 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 as currency risk in the area of net positions in foreign currencies. Money market activities (mostly secured) and investments in securities as part of the investment or short-term portfolios that are purchased with the intention to “buy and hold” lead to interest rate risk in the non-trading book. The Treasury Policy defines the limits set for money market activities and securities purchase transactions. Furthermore, market risks arise in Clearstream’s portion of the Deutsche Börse group-wide CTA and in the Clearstream Pension Fund.

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.

The Treasury Investment 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. For Deutsche Börse Group, the level of materiality of future currency risk is expressed as 10% of consolidated EBIT of the budget year to be hedged for each individual foreign currency exposure. 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.

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.

### 6.2 Measurement

Besides the overall risk appetite calculated via VaR (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 situation](#) on page 6-3). On a daily basis, interest rate risk on all positions under Treasury management is computed by applying a 1%

## Management of market risk, including interest rate risk of exposures not included in the trading book

parallel shift for the money market portfolio and a 2% parallel shift for the investment portfolio to the respective yield curve and assessing the resulting effect on the net present value (NPV) of this portfolio.

In cases where Clearstream's budgeted interest income should be hedged, the effectiveness of potential hedges is measured and the credit rating of the trade counterparties is controlled on a regular basis.

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. In cases where a certain level of foreign exchange exposure is exceeded in a currency, the risk of this currency exposure should be hedged. For Deutsche Börse Group, the level of materiality is expressed as 10% of consolidated EBIT of the budget year to be hedged for each individual currency exposure. The effectiveness of potential foreign exchange risk hedges is measured and the credit rating of the trade counterparties is controlled 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, no foreign exchange hedge was undertaken.

If a foreign exchange hedge is undertaken, testing of the effectiveness of hedging transactions is performed on a regular basis in compliance with IAS 39.

### 6.4 Monitoring and reporting

Market risk control is performed by Treasury Middle Office. Treasury Middle Office is responsible for monitoring compliance with limits and issues monthly reports to the relevant Executive Management and to Group Risk Monitoring. Treasury Middle Office monitors exposures against limits on a daily basis and immediately reports excesses to Executive Management, Group Risk Monitoring and Treasury. This function is independent from the Treasury Front Office department that controls liquidity and executes transactions (liquidity management function).

### 6.5 Specific disclosures for market risk

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

CBL and CBF transact settlement and custody services business in more than 40 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 included in CBL's position. Treasury analyses balances per currency as a basis for placings. 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, CBL or CBF bear no currency risk.

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.

## Management of market risk, including interest rate risk of exposures not included in the trading book

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 Middle Office within established modest limits.

### 6.6 Specific disclosures on interest rate risk on positions not included in the trading 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 Banque centrale du Luxembourg in EUR currency and overnight foreign exchange swaps. In addition, CBL and CBF primarily purchase highly liquid and low risk-weighted investments for capital ratio purposes. The investment portfolio of CBL and CBF is aimed at providing core capital investment. Consequently, these portfolios are constructed to contain both market and credit risks and consist mainly of zero risk-weighted debt securities.

Derivative instruments are not offered to customers. The use of proprietary derivative instruments is restricted to:

- Interest rate swaps and forward foreign exchange contracts that hedge or eliminate structural foreign exchange and interest rate exposures.
- FX swap contracts to avoid large unsecured exposures with commercial banks and/or to convert available funds in a currency into another currency where funds are required to support the securities settlement efficiency.

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 situation

Clearstream's assets and liabilities are managed to contain 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.

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 trades/instruments with a remaining life to maturity less than one year and 2% otherwise.

|  | 31 December 2015 (€' 000) |           |                          |        | 31 December 2014 (€' 000) |           |                          |        |
|--|---------------------------|-----------|--------------------------|--------|---------------------------|-----------|--------------------------|--------|
|  | Mismatch/Portfolio limit  |           | Interest Rate Risk (IRR) |        | Mismatch/Portfolio limit  |           | Interest Rate Risk (IRR) |        |
|  | Exposure                  | Limit     | Exposure                 | Limit  | Exposure                  | Limit     | Exposure                 | Limit  |
| CBL Investment portfolio (Fixed and FRN) | 1,891,692                 | 2,000,000 | 67,743                   | 72,000 | 1,433,299                 | 2,000,000 | 53,493                   | 72,000 |
| CBF Investment portfolio (Fixed and FRN) | 174,000                   | 175,000   | 6,851                    | 8,000  | 175,000                   | 175,000   | 4,257                    | 8,000  |
| CBL MM portfolio                         | 4,253,037                 | 6,400,000 | 4,496                    | 24,000 | 5,383,235                 | 6,400,000 | 6,023                    | 24,000 |
| CBF MM portfolio                         | 134,332                   | 300,000   | 162                      | 1,000  | 100,117                   | 300,000   | 123                      | 1,000  |

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 non-trading book as a percentage of own funds. The IRR is measured as a 2% parallel shift of the yield curve. The non-trading 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 of exposures not included in the trading book

| <b>Clearstream Banking S.A., Luxembourg</b>   | <b>31 December 2015</b> | <b>31 December 2014</b> |
|---|-------------------------|-------------------------|
| <b>Interest Rate Risk - Banking Book (IRRBB) as per circular CSSF 08/338</b>        |                         |                         |
| Net Asset position (in EUR equivalent) (€' 000)                                     | <b>4,523,871</b>        | <b>5,400,366</b>        |
| IRRBB based on parallel shift of the yield curve of 200 bps (€' 000)                | <b>25,876</b>           | <b>12,048</b>           |
| Base Capital* (€' 000)  | <b>999,099</b>          | <b>909,323</b>          |
| IRRBB as percentage of own funds  | <b>3%</b>               | <b>1%</b>               |
| Threshold for reporting to CSSF   | <b>20%</b>              | <b>20%</b>              |
| <b>Clearstream Banking AG, Frankfurt</b>  |                         |                         |
| <b>Interest Rate Risk - Banking Book (IRRBB) as per BaFin circular 11/2011 (BA)</b> |                         |                         |
| Net Asset position (in EUR equivalent) (€' 000)                                     | <b>175,692</b>          | <b>174,900</b>          |
| IRRBB based on parallel shift of the yield curve of 200 bps (€' 000)                | <b>2,896</b>            | <b>768</b>              |
| Own funds** (€' 000)  | <b>278,687</b>          | <b>248,727</b>          |
| IRRBB as percentage of own funds  | <b>1%</b>               | <b>0%</b>               |
| Threshold for reporting to BaFin and Deutsche Bundesbank                            | <b>20%</b>              | <b>20%</b>              |

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

Foreign exchange currency positions stemming from corporate activities and customer foreign exchange transactions are covered via spot foreign exchange transactions. The Treasury policy defines the maximum open foreign exchange position allowed for all currencies. A report showing the foreign exchange positions in all currencies is produced daily. Treasury Back-Office unit (hierarchically independent from Treasury) controls the report and reports any overstepping against the limit to Executive Management. No overstepping was reported in 2015.

Forward foreign exchange transactions may be undertaken in anticipation of expected future exposures in foreign currencies (for instance to hedge the expected net customer income in USD). On 31 December 2015, no such foreign exchange hedging exposure was reported.



## 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 7-4;
- [7.5 Governance, Approval and Validation](#) on page 7-6;
- [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 Treasury 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 CBF and may draw on credit facilities as a result of their securities settlement activities. To be able to repay upon demand, CBL in principal only places net customer cash with a tenor of one (1) business day ("overnight"). For EUR, USD and GBP, Treasury analyses the historical net customer cash balance evolution to determine the minimum balance that is available for Treasury investments with a tenor exceeding overnight. Payment requests to pay out customer long balances and payments related to trades initiated by Treasury are addressed in the established stress scenarios.

- To support the efficiency of customers' intraday securities settlement

In support of its international customers, CBL provides intraday liquidity to enable timely German domestic and LuxCSD 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. Liquidity is provided through collateral held at the Banque centrale du Luxembourg (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 "Clearstream Treasury Liquidity Management" policy defines limits and

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

## Management of liquidity risk

responsibilities. As a result of customers' settlement activity and related customers' cash dispositions Clearstream is generally long.

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.

No bonds are issued. The receivables are made up mainly by overnight amounts on nostro accounts, collateralised and unsecured placements as well as highly liquid exchange traded bonds. The main position determining liquidity needs is therefore the intraday and overnight customer credit usage in each currency.

Besides the regulatory requirements for CBL and CBF, Clearstream has defined more prudent internal liquidity limits to ensure a more dynamic adaptation to a changing liquidity situation. These limits prohibit mismatch positions being created if there is a sudden or temporary decrease of its available cash until the liquidity risk exposure allows it again. Liquid assets should amount to a minimum percentage (depending on the currency or group of currencies) of the last 30-day average net customer cash balances.

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

The liquidity management function is governed by the "Clearstream Treasury Liquidity Management" policy and is performed by Treasury in cooperation with Credit and Clearstream Risk Management. Treasury Middle Office is responsible for issuing daily and monthly reports to Executive Management and to Clearstream Risk Management. Limit excesses are monitored daily by Treasury Middle Office and are reported immediately to Executive Management, Clearstream Risk Management 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 minimum ratio for CBL is 30% and for CBF 100%. The regulatory ratios were exceeded throughout the whole of the year under review.

With the implementation of the CRR the Liquidity Coverage Ratio (LCR) was introduced in 2014, initially as a reporting measure. The implementation as a minimum ratio started with a minimum ratio of 60% as of 1 October 2015 reaching its full implementation at 100% from 1 January 2018.

The institutions need to hold a liquidity buffer of high quality liquid assets (HQLA) to cover their net cash outflows in stressed conditions over a thirty day period. The HQLA at CBF and CBL consist of cash held with central banks, own securities and securities received in reverse repo transactions. As at 31 December 2015, CBF had a Liquidity Coverage Ratio of 165% and CBL a LCR of 112%.

In addition to the regulatory ratios, the Treasury Policy has defined two internal liquidity ratios:

## 7.2.1 Internal liquidity ratio I (Liquid assets / Net customer cash)

The objective of the internal liquidity ratio I limit is to ensure a more dynamic adaptation to a changing liquidity situation. These limits prevent the new creation of mismatch positions by traders in cases of a sudden/temporary decrease of net customer cash balances until the liquidity risk exposure allows it again.

The basis for the calculation of the Liquid Assets and Net Customer Cash is the Treasury operating system, in which all Treasury transactions are recorded. Liquidity is calculated for EUR, USD, GBP and combined EUR and USD.

The ratio is calculated daily and reported on a monthly basis by Treasury Middle Office to Executive Management. During 2015, no oversteppings were reported. The internal liquidity ratios I on 31 December 2015 were as follows:

| Currencies  | Ratio (%) | Limits (%) |
|-------------|-----------|------------|
| EUR and USD | 111       | 50         |
| EUR         | 158       | 50         |
| USD         | 70        | 60         |
| GBP         | 97        | 90         |

Table 7-1. Internal liquidity ratio I

## 7.2.2 Internal liquidity ratio II (Liquid sources / Customer credit usage)

The objective of the internal liquidity ratio II is that liquidity sources provide sufficient liquidity to cover peak customer end-of-day overdraft balances observed over the preceding two years.

During 2015, the liquidity sources / customer credit usage were comfortably above the limits set in the Treasury Investment Policy. The internal ratios II on 31 December 2015 were as follows:

| Currencies  | Ratio (%) | Limits (%) |
|-------------|-----------|------------|
| EUR and USD | 907       | 200        |
| EUR         | 619       | 100        |
| USD         | 287       | 100        |

Table 7-2. Internal liquidity ratio II

## 7.3 Liquidity risk mitigation

Liquidity management guidelines are defined in the Clearstream Treasury Liquidity Management 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 several liquidity sources, including

- Liquidity buffers in EUR and USD currencies. The estimated size of the minimum required liquidity buffers in EUR and USD currencies is determined by the stress test results. For the EUR currency on 31 December 2015, the minimum required liquidity buffer was set at EUR 1.47 billion with a target of EUR 4 billion constantly available (EUR 6.5 billion on 31 December 2015). The EUR liquidity buffer is composed of the sum of cash held with BCL and the ECB eligible collateral portfolio (enabling CBL to generate liquidity through ECB standing facilities). For the USD currency on 31 December 2015, the USD minimum required liquidity buffer is set at EUR 0 equivalent with a target of EUR 1 billion equivalent constantly available (EUR 3.4 billion

# Management of liquidity risk

equivalent on 31 December 2015). The USD liquidity buffer is composed of central bank eligible USD-denominated securities purchased or received as collateral through reverse repo transactions.

- Three committed repo funding lines with three major commercial banks (USD 250 million each).
- A EUR 1 billion multicurrency euro commercial paper programme.
- A network of cash correspondent banks and depositories to support the funding requirements in relation to CBL's settlement operations in more than 40 currencies via uncommitted unsecured credit lines.
- A broad range of money market counterparties via uncommitted unsecured credit lines granted to CBL.

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

Clearstream Holding acts as a holding company without an operating business. As such, its main earnings source is dividend income from Clearstream International. Available liquidity is to a large extent lent to Deutsche Börse AG in a cash pool with daily availability of funds. Besides that, Clearstream Holding holds limited balances in a current account with a commercial bank. As a holding company, Clearstream Holding does not conduct customer business, and is therefore not subject to the associated liquidity risks.

## 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 of 14 December 2012 (BaFin Circular 10/2012) 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 mitigation.

### 7.4.1 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 lowest net cash balances by currency in the most recent five-year time horizon.

#### Scenario 1 result:

In this scenario, based on the lowest net cash balances in past five years, Clearstream is able to cope with expected outflows in cash balances for all currencies.

#### Scenario 2 - Market Disruption scenario

The market disruption scenario considers a disruption in the macro economic environment. The assumption is that customer cash balances would drop by 10% (from their lowest historical five year level), money market funding lines would decline by 50% and overdraft lines at CCBs/Depositories by 20%.

#### Scenario 2 result:

The scenario is based on net customer cash balances dropping by 10% (from their lowest historical five year level), money market funding lines would decline by 50% and overdraft lines at CCBs/Depositories by 20%. Despite the reduced availability of funding sources, Clearstream is able to fund the short positions in most currencies. Remaining short balances can be covered through FX swaps.

## Scenario 3 - Market Disruption / Idiosyncratic scenario

The market disruption / idiosyncratic scenario considers a disruption in the macro economic environment and a downgrade of Clearstream's credit rating. The assumption is that customer cash balances would drop by 30% (from their lowest historical five year level), money market funding lines would no longer be accessible, and overdraft lines at CCBs/Depositories would decline by 60%.

### Scenario 3 result:

The scenario is based on net customer cash balances dropping by 30% (from their lowest historical 5 year level), money market funding lines would no longer be accessible, and overdraft lines at CCBs/Depositories would decline by 60%. In this scenario, USD currency short balances can be covered through uncommitted CCBs/depositories overdraft lines. The excess funding capacity can be used to cover short balances in other currencies through FX swaps. In this scenario, exceptional overnight credit usage could also be restricted to be in line with available liquidity and CCBs/depositories overdraft lines since credit facilities in Clearstream are allocated on an unconditionally revocable basis and primarily for intraday usage in support of customer settlement activities.

## 7.4.2 Medium-term liquidity sources

Despite the very short-term nature of 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 multi-currency Euro Commercial Programme;
- BCL tender participation in EUR and USD;
- Repurchase Agreements;
- Foreign exchange swaps.

## 7.4.3 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 99% 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 99% confidence level), the permanent available liquidity must be sufficient to cover all long-term investments.

From January 2014 to December 2015, the investable own funds amount ranged from EUR 1.452 billion to EUR 1.575 billion. At year-end 2015, the own funds amounted to EUR 1.479 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 99% confidence level), the stable part of the net customer cash (EUR and USD combined) amounted to EUR equivalent 8.701 billion. Together with the own funds, the sum of permanent available liquidity is EUR equivalent 10.180 billion, which is sufficient to cover the size of all term investments of EUR equivalent 4.249 billion.
- Based on historical data over the most recent five-year horizon (with a 99% confidence level), the stable part of the net customer cash (EUR and USD combined) amounted to EUR equivalent 6.875 billion. Together with the own funds, the sum of permanent available liquidity is EUR equivalent 8.354 billion, which is sufficient to cover the size of long-term investments of EUR equivalent 2.066 billion.

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## 7.4.4 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);
  - Liquidation/Buy-in of securities for Clearstream Treasury repo transactions;
  - Intra-group funding;
- Other actions:
  - Cancellation of customer UCF/TOF lines;
  - Flagging income and redemption proceeds 'Upon Receipt of Funds' (URF);
  - Sale of proprietary fixed-coupon and/or FRN portfolio.

## 7.5 Governance, Approval and Validation

In accordance with the MaRisk of 14 December 2014 and CSSF Circular 09/403, Clearstream has formulated its Clearstream Treasury Liquidity Management Policy, which is reviewed on a quarterly basis.

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

Day-to-day implementation of the liquidity management strategy is under the responsibility of the Head of Clearstream Treasury.

## 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, Clearstream Risk Management and Treasury. Limit excesses occurring within the Treasury activity are reported by Treasury Middle Office to Executive Management.

## 8. Capital structure, capital ratio and Leverage 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 8-9;
- 8.3 Capital levels on page 8-10;
- 8.4 Leverage ratio on page 8-13.

### 8.1 Capital components

#### 8.1.1 Overview

The following table summarises the total amount of Clearstream's regulatory capital. "Tier 1" capital in 2014 corresponds to Core Equity Tier 1 (CET1) capital according to Article 26 CRR.

|                     |                           | 31 December 2015 (€' 000) |           |         | 31 December 2014 (€' 000) |           |         |         |
|---------------------|---------------------------|---------------------------|-----------|---------|---------------------------|-----------|---------|---------|
|                     |                           | CH-Group                  | CBL       | CBF     | CH-Group                  | CBL       | CBF     |         |
| Tier 1:             | Eligible Capital          |                           |           |         |                           |           |         |         |
|                     |                           | Paid up capital           | 101,000   | 92,000  | 25,000                    | 101,000   | 92,000  | 25,000  |
|                     |                           | Share premium             | 2,014,314 | 136,836 | 1,108                     | 2,014,314 | 136,836 | 1,108   |
|                     | Eligible Reserves         | Reserves                  | -868,762  | 806,600 | 253,126                   | -980,546  | 685,886 | 223,096 |
|                     |                           | Interim profits           | -         | -       | -                         | -         | -       | -       |
|                     | Deductions:               |                           | -49,221   | -37,295 | -500                      | -55,073   | -38,104 | -477    |
| Tier 2:             | Core additional own funds | Revaluation reserves      | -         | -       | -                         | -         | -       | -       |
|                     |                           | Subordinated Loan Capital | -         | -       | -                         | -         | -       | -       |
|                     | Deductions:               |                           | -         | -       | -                         | -         | -       | -       |
| Eligible own funds: |                           |                           | 1,197,330 | 998,141 | 278,734                   | 1,079,695 | 876,618 | 248,727 |

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 of CH, CBL and CBF 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.

The following subsections disclose the information as required by Article 437 paragraph 1 CRR and details set out in Commission Implementing Regulation (EU) No 1423/2013.

## Capital structure, capital ratio and Leverage Ratio

### 8.1.2 Reconciliation of own funds items to audited financial statements

A full reconciliation of own funds to audited financial statements pursuant to point (a) of Article 437 paragraph 1 CRR has to be applied by institutions as laid out in the Implementing Regulation (EU) No 1423/2013. As CH is exempted from the preparation of consolidated annual accounts in line with § 291 (1) HGB a reconciliation with consolidated own funds is not possible. The balance sheet reconciliation for CBL and CBF is shown in Table 8-2.

| Balance Sheet Reconciliation   | 31 December 2015 (€' 000) |                |
|--|---------------------------|----------------|
|  | CBL                       | CBF            |
| <b>Own Funds elements in the Annual Financial Statements</b>   |                           |                |
| <b>Subscribed Capital</b>  | 92,000                    | 25,000         |
| <b>Share premium</b>   | 136,836                   | 1,108          |
| <b>Legal Reserve</b>   | 9,200                     | 1,392          |
| <b>Other reserves and retained earnings</b>  | 797,400                   | 261,116        |
| <b>Profits for the financial year and accumulated profits</b>  | 57,135                    | 82,000         |
| <b>Total Own Funds Elements in Audited Financial Statements</b>  | <b>1,092,571</b>          | <b>370,616</b> |
| <b>Profits allocated to other reserves with the approval of financial statements (i.e. after reporting of Own Funds)</b> | -                         | -9,382         |
| <b>Profits for the financial year and accumulated profits (i.e. after reporting of Own Funds)</b>                        | -57,135                   | -82,000        |
| <b>Eligible Capital (CET1) before regulatory adjustments</b>   | <b>1,035,436</b>          | <b>279,234</b> |
| <b>Regulatory adjustments</b>  |                           |                |
| <b>Deduction other intangible assets</b>   | -15,286                   | -500           |
| <b>Other CET 1 capital adjustments</b>   | -22,009                   | -              |
| <b>Common Equity Tier 1 Capital/Total Eligible Own Funds</b>   | <b>998,141</b>            | <b>278,734</b> |

Table 8-2. Balance Sheet Reconciliation

The own funds of the financial statements of the Clearstream entities consider profits allocated to retained earnings with the approval of the financial statements and year-end profits which both do not qualify for the regulatory own funds as of 31 December 2016. The profits allocated to retained earnings do not count as CET1 capital as long as the financial statements are not approved or a prior permission by the competent authority according to Article 26 paragraph 2 CRR is granted.



# Capital structure, capital ratio and Leverage Ratio

## 8.1.3 Description of the main features of capital instruments

Disclosures under point (b) of Article 437 CRR are shown in the next tables for CH, CBL and CBF in line with the disclosure templates set out in the Implementing Regulation (EU) No 1423/2013.

| Capital Instruments' main features <sup>1</sup> |   |                                     |
|---|---|-------------------------------------|
|   | Features  | Instrument                          |
| 1   | Issuer  | Clearstream Holding AG              |
| 2   | Unique identifier (e.g. ISIN, etc.)   | DE000A0TGKK3                        |
| 3   | Governing law(s) of the instrument  | German Stock Corporation Act (AktG) |
| <i>Regulatory treatment</i>                     |   |                                     |
| 4   | Transitional CRR rules  | Common Equity Tier 1                |
| 5   | Post-transitional CRR rules   | Common Equity Tier 1                |
| 6   | Eligible at solo/ (sub-)consolidated/ solo & (sub-)consolidated   | Consolidated                        |
| 7   | Instrument type (types to be specified by each jurisdiction)  | Ordinary Shares                     |
| 8   | Amount recognised in regulatory capital (currency in million, as of most recent reporting date)               | € m 101                             |
| 9   | Nominal amount of instrument (in million, in currency of issuance)  | € m 101                             |
| 9a  | Issue price   | € m 2,115                           |
| 9b  | Redemption price  | N/A                                 |
| 10  | Accounting classification   | Shareholders' equity                |
| 11  | Original date of issuance   | 04/06/2007                          |
| 12  | Perpetual or dated  | perpetual                           |
| 13  | Original maturity date  | N/A                                 |
| 14  | Issuer call subject to prior supervisory approval   | No                                  |
| 15  | Optional call date, contingent call dates and redemption amount   | N/A                                 |
| 16  | Subsequent call dates, if applicable  | N/A                                 |
| <i>Coupons/dividends</i>                        |   |                                     |
| 17  | Fixed or floating dividend/coupon   | Floating                            |
| 18  | Coupon rate and any related index   | N/A                                 |
| 19  | Existence of a dividend stopper   | N/A                                 |
| 20a   | Fully discretionary, partially discretionary or mandatory (in terms of timing)                                | Mandatory                           |
| 20b   | Fully discretionary, partially discretionary or mandatory (in terms of amount)                                | Mandatory                           |
| 21  | Existence of step up or other incentive to redeem   | No                                  |
| 22  | Noncumulative or cumulative   | Noncumulative                       |
| 23  | Convertible or non-convertible  | Nonconvertible                      |
| 24  | If convertible, conversion trigger(s)   | N/A                                 |
| 25  | If convertible, fully or partially  | N/A                                 |
| 26  | If convertible, conversion rate   | N/A                                 |
| 27  | If convertible, mandatory or optional conversion  | N/A                                 |
| 28  | If convertible, specify instrument type convertible into  | N/A                                 |
| 29  | If convertible, specify issuer of instrument it converts into   | N/A                                 |
| 30  | Write-down features   | No                                  |
| 31  | If write-down, write-down trigger(s)  | N/A                                 |
| 32  | If write-down, full or partial  | N/A                                 |
| 33  | If write-down, permanent or temporary   | N/A                                 |
| 34  | If temporary write-down, description of write-up mechanism  | N/A                                 |
| 35  | Position in subordination hierarchy in liquidation (specify instrument type immediately senior to instrument) | N/A                                 |
| 36  | Non-compliant transitioned features   | No                                  |
| 37  | If yes, specify non-compliant features  | N/A                                 |

(1) 'N/A' inserted if the question is not applicable

Table 8-3. Capital Instruments of CH

## Capital structure, capital ratio and Leverage Ratio

| Capital Instruments' main features <sup>1</sup> |   |   |
|---|---|---|
|   | Features  | Instrument  |
| 1   | Issuer  | Clearstream Banking SA  |
| 2   | Unique identifier (e.g. ISIN, etc.)   | N/A   |
| 3   | Governing law(s) of the instrument  | Luxembourg Company Law: Law of 10th August 1915 on commercial companies |
| <i>Regulatory treatment</i>                     |   |   |
| 4   | Transitional CRR rules  | Common Equity Tier 1  |
| 5   | Post-transitional CRR rules   | Common Equity Tier 1  |
| 6   | Eligible at solo/ (sub-)consolidated/ solo & (sub-)consolidated   | Solo  |
| 7   | Instrument type (types to be specified by each jurisdiction)  | Ordinary Shares   |
| 8   | Amount recognised in regulatory capital (currency in million, as of most recent reporting date)               | € m 229   |
| 9   | Nominal amount of instrument (in million, in currency of issuance)  | € m 92  |
| 9a  | Issue price   | € m 229   |
| 9b  | Redemption price  | N/A   |
| 10  | Accounting classification   | Shareholders' equity  |
| 11  | Original date of issuance   | 1970  |
| 12  | Perpetual or dated  | perpetual   |
| 13  | Original maturity date  | N/A   |
| 14  | Issuer call subject to prior supervisory approval   | No  |
| 15  | Optional call date, contingent call dates and redemption amount   | N/A   |
| 16  | Subsequent call dates, if applicable  | N/A   |
| <i>Coupons/dividends</i>                        |   |   |
| 17  | Fixed or floating dividend/coupon   | Floating  |
| 18  | Coupon rate and any related index   | N/A   |
| 19  | Existence of a dividend stopper   | N/A   |
| 20a   | Fully discretionary, partially discretionary or mandatory (in terms of timing)                                | Fully discretionary   |
| 20b   | Fully discretionary, partially discretionary or mandatory (in terms of amount)                                | Fully discretionary   |
| 21  | Existence of step up or other incentive to redeem   | No  |
| 22  | Noncumulative or cumulative   | Noncumulative   |
| 23  | Convertible or non-convertible  | Nonconvertible  |
| 24  | If convertible, conversion trigger(s)   | N/A   |
| 25  | If convertible, fully or partially  | N/A   |
| 26  | If convertible, conversion rate   | N/A   |
| 27  | If convertible, mandatory or optional conversion  | N/A   |
| 28  | If convertible, specify instrument type convertible into  | N/A   |
| 29  | If convertible, specify issuer of instrument it converts into   | N/A   |
| 30  | Write-down features   | No  |
| 31  | If write-down, write-down trigger(s)  | N/A   |
| 32  | If write-down, full or partial  | N/A   |
| 33  | If write-down, permanent or temporary   | N/A   |
| 34  | If temporary write-down, description of write-up mechanism  | N/A   |
| 35  | Position in subordination hierarchy in liquidation (specify instrument type immediately senior to instrument) | N/A   |
| 36  | Non-compliant transitioned features   | No  |
| 37  | If yes, specify non-compliant features  | N/A   |

[1] 'N/A' inserted if the question is not applicable

Table 8-4. Capital Instruments of CBL

## Capital structure, capital ratio and Leverage Ratio

| Capital Instruments' main features <sup>1</sup>  |  |  |
|--|--|--|
| Features   | Instrument                             |  |
| 1 Issuer   | Clearstream Banking Aktiengesellschaft |  |
| 2 Unique identifier (e.g. ISIN, etc.)  | DE0008053604                           |  |
| 3 Governing law(s) of the instrument   | German Stock Corporation Act (AktG)    |  |
| <i>Regulatory treatment</i>  |  |  |
| 4 Transitional CRR rules   | Common Equity Tier 1                   |  |
| 5 Post-transitional CRR rules  | Common Equity Tier 1                   |  |
| 6 Eligible at solo/ (sub-)consolidated/ solo & (sub-)consolidated  | Solo & Consolidated                    |  |
| 7 Instrument type (types to be specified by each jurisdiction)   | Ordinary Shares                        |  |
| 8 Amount recognised in regulatory capital (currency in million, as of most recent reporting date)                | € m 25                                 |  |
| 9 Nominal amount of instrument (in million, in currency of issuance)   | € m 25                                 |  |
| 9a Issue price   | € m 26                                 |  |
| 9b Redemption price  | N/A                                    |  |
| 10 Accounting classification   | Shareholders' equity                   |  |
| 11 Original date of issuance   | 12/07/1949                             |  |
| 12 Perpetual or dated  | perpetual                              |  |
| 13 Original maturity date  | N/A                                    |  |
| 14 Issuer call subject to prior supervisory approval   | No                                     |  |
| 15 Optional call date, contingent call dates and redemption amount   | N/A                                    |  |
| 16 Subsequent call dates, if applicable  | N/A                                    |  |
| <i>Coupons/dividends</i>   |  |  |
| 17 Fixed or floating dividend/coupon   | Floating                               |  |
| 18 Coupon rate and any related index   | N/A                                    |  |
| 19 Existence of a dividend stopper   | N/A                                    |  |
| 20a Fully discretionary, partially discretionary or mandatory (in terms of timing)                               | Partially discretionary                |  |
| 20b Fully discretionary, partially discretionary or mandatory (in terms of amount)                               | Partially discretionary                |  |
| 21 Existence of step up or other incentive to redeem   | No                                     |  |
| 22 Noncumulative or cumulative   | Noncumulative                          |  |
| 23 Convertible or non-convertible  | Nonconvertible                         |  |
| 24 If convertible, conversion trigger(s)   | N/A                                    |  |
| 25 If convertible, fully or partially  | N/A                                    |  |
| 26 If convertible, conversion rate   | N/A                                    |  |
| 27 If convertible, mandatory or optional conversion  | N/A                                    |  |
| 28 If convertible, specify instrument type convertible into  | N/A                                    |  |
| 29 If convertible, specify issuer of instrument it converts into   | N/A                                    |  |
| 30 Write-down features   | No                                     |  |
| 31 If write-down, write-down trigger(s)  | N/A                                    |  |
| 32 If write-down, full or partial  | N/A                                    |  |
| 33 If write-down, permanent or temporary   | N/A                                    |  |
| 34 If temporary write-down, description of write-up mechanism  | N/A                                    |  |
| 35 Position in subordination hierarchy in liquidation (specify instrument type immediately senior to instrument) | N/A                                    |  |
| 36 Non-compliant transitioned features   | No                                     |  |
| 37 If yes, specify non-compliant features  | N/A                                    |  |

(1) 'N/A' inserted if the question is not applicable

Table 8-5. Capital Instruments of CBF

# Capital structure, capital ratio and Leverage Ratio

## 8.1.4 Disclosure of additional information during the transitional period

|  |  | (A) Amounts at<br>31.12.2015<br>(€'000) | (B)<br>REGULATION (EU)<br>No. 575/2013<br>ARTICLE<br>REFERENCE            | (C)<br>AMOUNTS<br>SUBJECT TO<br>PRE-<br>REGULATION<br>(EU) No.<br>575/2013<br>TREATMENT<br>OR<br>PRESCRIBED<br>RESIDUAL<br>AMOUNT OF<br>REGULATION<br>(EU) 575/2013<br>(€'000) |
|--|--|---|---|--|
| <b>Common Equity Tier 1 capital: instruments and reserves</b>          |  |   |   |  |
| 1  | Capital Instruments and Share premium  | 2,115,314                               | 26 (f), 27, 28, 29, EBA list 26 (3)                                       |  |
|  | of which: Subscribed capital   | 101,000                                 | EBA list 26 (3)   |  |
|  | of which: Share premium  | 2,014,314                               | EBA list 26 (3)   |  |
| 2  | Retained Earnings  | -74,002                                 | 26 (f)(c)   |  |
| 3  | Accumulated other comprehensive income (and other reserves, to include unrealised gains and losses under the applicable accounting standards)  | -364,063                                | 26 (f)  |  |
| 3a   | Funds for general banking risk   | 163,303                                 | 26 (f)(f)   |  |
| 4  | Amount of qualifying items referred to in Article 484 (3) and the related share premium accounts subject to phase out from CET1  | 0                                       | 486 (2)   |  |
|  | Public sector capital injections grandfathered until 1 January 2018  | 0                                       | 483 (2)   |  |
| 5  | Minority interests (amount allowed in consolidated CET1)   | 0                                       | 84, 473, 480  |  |
| 5a   | Independently reviewed interim profits net of any foreseeable charge or dividend   | 0                                       | 26 (2)  |  |
| 6  | <b>Common Equity Tier 1 (CET1) capital before regulatory adjustments</b>   | <b>1,246,552</b>                        |   |  |
| <b>Common Equity Tier 1 (CET1) capital: regulatory adjustments</b>     |  |   |   |  |
| 8  | Intangible assets (net of related tax liability) (negative amount)   | -43,221                                 | 36 (f)(b), 37, 472 (4)  |  |
| 26   | Regulatory adjustments applied to Common Equity Tier 1 in respect of amounts subject to pre-CRR treatment  | 23,533                                  |   |  |
| 26b  | Amount to be deducted from or added to Common Equity Tier 1 capital with regard to additional filters and deductions required pre-CRR  | 23,533                                  | 481   |  |
|  | of which: Intangible assets  | 23,533                                  |   |  |
| 27   | Qualifying AT1 deductions that exceeds the AT1 capital of the institution (negative amount)  | -23,533                                 | 36 (f)(i)   |  |
| 28   | <b>Total regulatory adjustments to Common Equity Tier 1 (CET1)</b>   | <b>-43,221</b>                          |   |  |
| 29   | <b>Common Equity Tier 1 (CET1) capital</b>   | <b>1,197,330</b>                        |   |  |
| <b>Additional Tier 1 (AT1) capital: instruments</b>                    |  |   |   |  |
| 36   | <b>Additional Tier 1 (AT1) capital before regulatory adjustments</b>   |   |   |  |
| <b>Additional Tier 1 Capital (AT1) capital: regulatory adjustments</b> |  |   |   |  |
| 41   | Regulatory adjustments applied to additional tier 1 capital in respect of amounts subject to pre-CRR treatment subject to phase out as prescribed in Regulation (EU) No 575/2013 (i.e. CRR residual amounts) | -23,533                                 |   |  |
| 41a  | Residual amounts deducted from Additional Tier 1 capital with regard to deduction from Common Equity Tier 1 capital during the transitional period pursuant to article 472 of Regulation (EU) No 575/2013    | -23,533                                 | 472, 472(3)(a), 472(4), 472(6), 472(8)(a), 472(9), 472(10)(a), 472(11)(a) |  |
|  | of which: Intangible assets  | -23,533                                 |   |  |
|  | <b>Excess of deduction from AT1 items over AT1 Capital (deducted in CET1)</b>  | <b>23,533</b>                           |   |  |
| 43   | <b>Total regulatory adjustments to Additional Tier 1 (AT1) capital</b>   | <b>0</b>                                |   |  |
| 44   | <b>Additional Tier 1 (AT1) capital</b>   | <b>0</b>                                |   |  |
| 45   | <b>Tier 1 capital (T1 = CET1 + AT1)</b>  | <b>1,197,330</b>                        |   |  |

Table 8-6. Own funds details CH

## Capital structure, capital ratio and Leverage Ratio

| Common Equity Tier 1 capital: instruments and reserves                  |  | (A) Amounts at<br>31.12.2015<br>[€'000] | (B)<br>REGULATION [EU]<br>No. 575/2013<br>ARTICLE<br>REFERENCE            | (C)<br>AMOUNTS<br>SUBJECT TO<br>PRE-<br>REGULATION<br>[EU] No.<br>575/2013<br>TREATMENT<br>OR<br>PRESCRIBED<br>RESIDUAL<br>AMOUNT OF<br>REGULATION<br>[EU] 575/2013<br>[€'000] |
|---|--|---|---|--|
| 1   | Capital Instruments and Share premium  | 228,836                                 | 26 (1), 27, 28, 29, EBA list 26 (3)                                       |  |
|   | of which: Subscribed capital   | 92,000                                  | EBA list 26 (3)   |  |
|   | of which: Share premium  | 136,836                                 | EBA list 26 (3)   |  |
| 2   | Retained Earnings  | 0                                       | 26 (1)(c)   |  |
| 3   | Accumulated other comprehensive income (and other reserves, to include unrealized gains and losses under the applicable accounting standards)  | 806,600                                 | 26 (1)  |  |
| 3a  | Funds for general banking risk   | 0                                       | 26 (1)(f)   |  |
| 4   | Amount of qualifying items referred to in Article 484 (3) and the related share premium accounts subject to phase out from CET1  | 0                                       | 486 (2)   |  |
|   | Public sector capital injections grandfathered until 1 January 2018  | 0                                       | 483 (2)   |  |
| 5   | Minority interests (amount allowed in consolidated CET1)   | 0                                       | 84, 479, 480  |  |
| 5a  | Independently reviewed interim profits net of any foreseeable charge or dividend   | 0                                       | 26 (2)  |  |
| 6   | <b>Common Equity Tier 1 (CET1) capital before regulatory adjustments</b>   | <b>1,035,436</b>                        |   |  |
| <b>Common Equity Tier 1 (CET1) capital: regulatory adjustments</b>      |  |   |   |  |
| 8   | Intangible assets (net of related tax liability) (negative amount)   | -15,286                                 | 36 (1)(b), 37, 472 (4)  |  |
| 26  | Regulatory adjustments applied to Common Equity Tier 1 in respect of amounts subject to pre-CRR treatment  | -22,009                                 |   |  |
| 26b   | Amount to be deducted from or added to Common Equity Tier 1 capital with regard to additional filters and deductions required pre CRR  | 0                                       | 481   |  |
|   | of which: Intangible assets  | 0                                       |   |  |
| 27  | Qualifying AT1 deductions that exceeds the AT1 capital of the institution (negative amount)  | 0                                       | 36 (1)(i)   |  |
| 28  | <b>Total regulatory adjustments to Common Equity Tier 1 (CET1)</b>   | <b>-37,295</b>                          |   |  |
| 29  | <b>Common Equity Tier 1 (CET1) capital</b>   | <b>998,141</b>                          |   |  |
| <b>Additional Tier 1 (AT1) capital: instruments</b>                     |  |   |   |  |
| 36  | <b>Additional Tier 1 (AT1) capital before regulatory adjustments</b>   | <b>0</b>                                |   |  |
| <b>Additional Tier 1 Capital (CET1) capital: regulatory adjustments</b> |  |   |   |  |
| 41  | Regulatory adjustments applied to additional tier 1 capital in respect of amounts subject to pre-CRR treatment subject to phase out as prescribed in Regulation (EU) No 575/2013 (i.e. CRR residual amounts) | 0                                       |   |  |
| 41a   | Residual amounts deducted from Additional Tier 1 capital with regard to deduction from Common Equity Tier 1 capital during the transitional period pursuant to article 472 of Regulation (EU) No 575/2013    | 0                                       | 472, 472(3)(a), 472(4), 472(6), 472(8)(a), 472(9), 472(10)(a), 472(11)(a) |  |
|   | of which: Intangible assets  | 0                                       |   |  |
|   | <b>Excess of deduction from AT1 items over AT1 Capital (deducted in CET1)</b>  | <b>0</b>                                |   |  |
| 43  | <b>Total regulatory adjustments to Additional Tier 1 (AT1) capital</b>   | <b>0</b>                                |   |  |
| 44  | <b>Additional Tier 1 (AT1) capital</b>   | <b>0</b>                                |   |  |
| 45  | <b>Tier 1 capital (T1 = CET1 + AT1)</b>  | <b>998,141</b>                          |   |  |

Table 8-7. Own funds details CBL

## Capital structure, capital ratio and Leverage Ratio

|   |  | (A) Amounts at<br>31.12.2015 (€'000) | (B)<br>REGULATION (EU)<br>No. 575/2013<br>ARTICLE<br>REFERENCE            | (C)<br>AMOUNTS<br>SUBJECT TO<br>PRE-<br>REGULATION<br>(EU) No.<br>575/2013<br>TREATMENT<br>OR<br>PRESCRIBED<br>RESIDUAL<br>AMOUNT OF<br>REGULATION<br>(EU) 575/2013<br>(€'000) |
|---|--|--------------------------------------|---|--|
| <b>Common Equity Tier 1 capital: instruments and reserves</b>           |  |                                      |   |  |
| 1   | Capital Instruments and Share premium  | 26,108                               | 26 (f), 27, 28, 29, EBA list 26(3)  |  |
|   | of which: Subscribed capital   | 25,000                               | EBA list 26(3)  |  |
|   | of which: Share premium  | 1,108                                | EBA list 26(3)  |  |
| 2   | Retained Earnings  | 57,234                               | 26 (f)(c)   |  |
| 3   | Accumulated other comprehensive income (and other reserves, to include unrealized gains and losses under the applicable accounting standards)  | 135,832                              | 26 (f)  |  |
| 3a  | Funds for general banking risk   | 0                                    | 26 (f)(f)   |  |
| 4   | Amount of qualifying items referred to in Article 484 (3) and the related share premium accounts subject to phase out from CET1  | 0                                    | 486(2)  |  |
|   | Public sector capital injections grandfathered until 1 January 2018  | 0                                    | 483(2)  |  |
| 5   | Minority interests (amount allowed in consolidated CET1)   | 0                                    | 84, 473, 480  |  |
| 5a  | Independently reviewed interim profits net of any foreseeable charge or dividend   | 0                                    | 26(2)   |  |
| 6   | <b>Common Equity Tier 1 (CET1) capital before regulatory adjustments</b>   | <b>279,234</b>                       |   |  |
| <b>Common Equity Tier 1 (CET1) capital: regulatory adjustments</b>      |  |                                      |   |  |
| 8   | Intangible assets (net of related tax liability) (negative amount)   | -500                                 | 36 (f)(b), 37, 472(4)   |  |
| 26  | Regulatory adjustments applied to Common Equity Tier 1 in respect of amounts subject to pre-CRR treatment  | 300                                  |   |  |
| 26b   | Amount to be deducted from or added to Common Equity Tier 1 capital with regard to additional filters and deductions required pre CRR  | 300                                  | 481   |  |
|   | of which: Intangible assets  | 300                                  |   |  |
| 27  | Qualifying AT1 deductions that exceeds the AT1 capital of the institution (negative amount)  | -300                                 | 36 (f)(i)   |  |
| 28  | <b>Total regulatory adjustments to Common Equity Tier 1 (CET1)</b>   | <b>-500</b>                          |   |  |
| 29  | <b>Common Equity Tier 1 (CET1) capital</b>   | <b>278,734</b>                       |   |  |
| <b>Additional Tier 1 (AT1) capital: instruments</b>                     |  |                                      |   |  |
| 36  | <b>Additional Tier 1 (AT1) capital before regulatory adjustments</b>   | <b>0</b>                             |   |  |
| <b>Additional Tier 1 Capital (CET1) capital: regulatory adjustments</b> |  |                                      |   |  |
| 41  | Regulatory adjustments applied to additional tier 1 capital in respect of amounts subject to pre-CRR treatment subject to phase out as prescribed in Regulation (EU) No 575/2013 (i.e. CRR residual amounts) | -300                                 |   |  |
| 41a   | Residual amounts deducted from Additional Tier 1 capital with regard to deduction from Common Equity Tier 1 capital during the transitional period pursuant to article 472 of Regulation (EU) No 575/2013    | -300                                 | 472, 472(3)(a), 472(4), 472(6), 472(8)(a), 472(9), 472(10)(a), 472(11)(a) |  |
|   | of which: Intangible assets  | -300                                 |   |  |
|   | <b>Excess of deduction from AT1 items over AT1 Capital (deducted in CET1)</b>  | <b>300</b>                           |   |  |
| 43  | <b>Total regulatory adjustments to Additional Tier 1 (AT1) capital</b>   | <b>0</b>                             |   |  |
| 44  | <b>Additional Tier 1 (AT1) capital</b>   | <b>0</b>                             |   |  |
| 45  | <b>Tier 1 capital (T1 = CET1 + AT1)</b>  | <b>278,734</b>                       |   |  |

Table 8-8. Own funds details CBF

## 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.
- For the 99.9% and 99.98% risk confidence levels, the Risk-Bearing Capacity is defined as the regulatory own funds, which are updated according to the regulatory reporting frequency of the respective Clearstream entities.
- 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 capital ratio is monitored in parallel.



# Capital structure, capital ratio and Leverage Ratio

## 8.3 Capital levels

### 8.3.1 Regulatory capital levels

#### Capital requirements for credit risk positions

Clearstream uses the Standardised Approach to calculate the capital requirements. The following table shows the capital requirements for credit risk exposures:

| <b>Capital requirements for counterparty risk for portfolios calculated using the Credit Risk Standardised Approach (CRSA)</b> |                           |               |               |                           |               |              |
|--|---------------------------|---------------|---------------|---------------------------|---------------|--------------|
|  | 31 December 2015 (€' 000) |               |               | 31 December 2014 (€' 000) |               |              |
|  | CH-Group                  | CBL           | CBF           | CH-Group                  | CBL           | CBF          |
| Central governments and central banks  | 93                        | 315           | 10            | 98                        | 795           | 5            |
| Regional governments, local authorities and other public bodies  | -                         | -             | -             | -                         | 11            | -            |
| Institutions (banks)   | 42,523                    | 45,252        | 19,261        | 27,722                    | 34,635        | 3,567        |
| Corporates   | 17,345                    | 4,654         | 306           | 13,497                    | 7,453         | 243          |
| Undertakings for collective investment (Investment shares)   | -                         | -             | -             | -                         | -             | -            |
| Other (including equity holding)   | 4,263                     | 995           | 120           | 5,008                     | 885           | 171          |
| Capital requirements from contributions to the default fund of a CCP   | 9                         | 9             | -             | 5                         | 5             | -            |
| <b>Total</b>   | <b>64,233</b>             | <b>51,225</b> | <b>19,696</b> | <b>46,330</b>             | <b>43,784</b> | <b>3,986</b> |

Table 8-9. Capital requirements for credit risk

**Note:** The data for CH and CBF is based on 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 risk positions

Clearstream uses the Standardised Approach to calculate the capital requirements for market risk positions. On 31 December 2015, as described in [6.6.3 Foreign exchange risk measurement](#) on page 6-4, no foreign exchange exposure was reported resulting in any capital requirements as the following table shows:

| <b>Capital requirements for market risk</b> |                           |     |     |                           |     |     |
|---|---------------------------|-----|-----|---------------------------|-----|-----|
|   | 31 December 2015 (€' 000) |     |     | 31 December 2014 (€' 000) |     |     |
|   | CH-Group                  | CBL | CBF | CH-Group                  | CBL | CBF |
| <b>Foreign Exchange risk (total)</b>        | -                         | -   | -   | -                         | -   | -   |

Table 8-10. Market price risk

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



# Capital structure, capital ratio and Leverage Ratio

## 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 2015 (€' 000)   |                |               | 31 December 2014 (€' 000) |                |               |
|                               | CH-Group  | CBL            | CBF           | CH-Group                  | CBL            | CBF           |
| <b>Operational risk (AMA)</b> | <b>396,080</b>  | <b>302,171</b> | <b>93,909</b> | <b>312,948</b>            | <b>215,934</b> | <b>97,014</b> |

Table 8-11. Operational risk

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.

In July 2015 the Clearstream entities were ordered by BaFin to hold an additional capital surcharge of 10% for their operational risks as of 30 June 2016. Occasion for the sanction was an audit by the Bundesbank in December 2014 regarding the AMA. The capital surcharge has to be hold by CBF, CBL and on consolidated level of CH.

## Capital requirements for credit valuation adjustment

Clearstream uses the Standardised Method to calculate the capital requirements for CVA risk which arises from transactions of CBL only. The following table shows the resulting capital requirements:

|                     | Capital requirements for Credit Valuation Adjustment |     |     |                           |     |     |
|---------------------|--|-----|-----|---------------------------|-----|-----|
|                     | 31 December 2015 (€' 000)                            |     |     | 31 December 2014 (€' 000) |     |     |
|                     | CH-Group   | CBL | CBF | CH-Group                  | CBL | CBF |
| Standardised Method | 60   | 60  | -   | 44                        | 44  | -   |

Table 8-12. Credit valuation adjustment

# Capital structure, capital ratio and Leverage Ratio

## 8.3.2 Capital ratio

The capital requirements of the Clearstream entities rose in the reporting period. This was mainly driven by further increases in capital requirements for operational risk. The AMA model was adjusted in some areas, thus also fine-tuning the allocation of risks among CBL and CBF. Moreover, new operational risks arising from the first-time consolidation of the CGSS business were accounted for; weaker Euro/U.S. Dollar rate in particular led to increased compliance and legal risks. Due to the fact that certain quantitative data was not yet fully available, the supervisory authorities determined that a temporary add-on (equivalent to 10% of calculated capital requirements) be applied. Capital requirements for credit risks increased, particularly on the level of CBF (and hence, at CH group level) due to the substantial drawdown of settlement loans by clients on the balance sheet data. Even though these claims are generally collateralised, collateral pledged in this respect is not applied when calculation capital requirements, for reasons of simplicity.

The Clearstream Holding group already responded to the increased own funds requirements in the past by launching a programme to strengthen its capital base; this programme continued in 2015. Further measures are planned for the coming years in the context of medium-term capital planning. In 2015, the group's capital base was boosted by retaining profits at different companies, as well as through contributions to capital reserves at CBL and CBF.

In the following table the resulting capital ratio of CH, CBL and CBF is shown:

| Basis of calculation        | 31 December 2015 |        |        | 31 December 2014 |        |        |
|-----------------------------|------------------|--------|--------|------------------|--------|--------|
|                             | CH-Group         | CBL    | CBF    | CH-Group         | CBL    | CBF    |
| Regulation (EU) No 575/2013 | 20.81%           | 22.59% | 19.63% | 24.04%           | 27.00% | 19.70% |

Table 8-13. Capital ratios of 2014 and 2015

**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 structure, capital ratio and Leverage Ratio

## 8.4 Leverage ratio

The Leverage Ratio could become a binding minimum ratio as of 2018. Nevertheless, delegated regulation on disclosure of the leverage ratio (EU) No 1423/2013 requires disclosure of detailed information which is shown in the following tables:

| Summary comparison of accounting assets vs Leverage Ratio exposure measure   | 31 December 2015 (€' 000) |                  |
|--|---------------------------|------------------|
|  | CBL                       | CBF              |
| Total consolidated assets as per published financial statements  | 12,091,428                | 1,860,459        |
| Adjustment for investments in banking, financial, insurance or commercial entities that are consolidated for accounting purposes but outside the scope of regulatory consolidation | 0                         | 0                |
| Adjustment for fiduciary assets recognised on the balance sheet pursuant to the operative accounting framework but excluded from the leverage ratio exposure measure               | 0                         | 0                |
| Adjustments for derivative financial instruments   | 25,990                    | 0                |
| Adjustment for securities financing transactions (ie repos and similar secured lending)  | 0                         | 0                |
| Adjustment for off-balance sheet items (ie conversion to credit equivalent amounts of off-balance sheet exposures)   | 2,204,135                 | 39,497           |
| Other adjustments  | -16,808                   | 389              |
| <b>Leverage Ratio exposure</b>   | <b>14,304,745</b>         | <b>1,900,345</b> |

Table 8-14. Summary reconciliation of accounting assets and Leverage Ratio exposures (LRSum)

## Capital structure, capital ratio and Leverage Ratio

| Leverage ratio common disclosure template  | 31 December 2015 (€' 000) |                  |                  |
|--|---------------------------|------------------|------------------|
|  | CH-Group                  | CBL              | CBF              |
| On-balance sheet items (excluding derivatives and SFTs, but including collateral)  | 8,069,583                 | 6,664,880        | 1,587,848        |
| (Asset amounts deducted in determining Basel III Tier 1 capital)   | 0                         | -15,286          | 0                |
| <b>On-balance sheet exposures</b>  | <b>8,069,583</b>          | <b>6,649,594</b> | <b>1,587,848</b> |
| Replacement cost associated with all derivatives transactions (ie net of eligible cash variation margin)                                 | 52,797                    | 50,495           | 0                |
| Add-on amounts for PFE associated with all derivatives transactions  | 0                         | 0                | 0                |
| Gross-up for derivatives collateral provided where deducted from the balance sheet assets pursuant to the operative accounting framework | 0                         | 0                | 0                |
| (Deductions of receivables assets for cash variation margin provided in derivatives transactions)  | 0                         | 0                | 0                |
| (Exempted CCP leg of client-cleared trade exposures)   | 0                         | 0                | 0                |
| Adjusted effective notional amount of written credit derivatives   | 0                         | 0                | 0                |
| (Adjusted effective notional offsets and add-on deductions for written credit derivatives)   | 0                         | 0                | 0                |
| <b>Total derivative exposures</b>  | <b>52,797</b>             | <b>50,495</b>    | <b>0</b>         |
| Gross SFT assets with no recognition of netting, after adjusting for sale accounting transactions  | 5,434,900                 | 5,400,521        | 273,000          |
| (Netted amounts of cash payables and cash receivables of gross SFT assets)   | 0                         | 0                | 0                |
| CCR exposure for SFT assets  | 0                         | 0                | 0                |
| Agent transaction exposures  | 0                         | 0                | 0                |
| <b>Total securities financing transaction exposures</b>  | <b>5,434,900</b>          | <b>5,400,521</b> | <b>273,000</b>   |
| Off-balance sheet exposure at gross notional amount  | 1,082,093                 | 2,204,135        | 39,497           |
| (Adjustments for conversion to credit equivalent amounts)  | 0                         | 0                | 0                |
| <b>Off-balance sheet items</b>   | <b>1,082,093</b>          | <b>2,204,135</b> | <b>39,497</b>    |
| Tier 1 capital   | 1,197,330                 | 998,141          | 278,734          |
| Total exposures (sum of on-balance, derivative, SFT and off-balance exposures)   | 14,639,374                | 14,304,745       | 1,900,345        |
| <b>Basel III Leverage Ratio</b>  | <b>8.18%</b>              | <b>6.98%</b>     | <b>14.67%</b>    |
| Choice on transitional arrangements for the definition of the capital measure  | 0                         | 0                | 0                |
| Amount of derecognised fiduciary items in accordance with Article 429 (11) of Regulation (EU) No 575/2013                                | 0                         | 0                | 0                |

Table 8-15. Leverage Ratio common disclosure template (LRCom)

| CRR leverage ratio exposures  | 31 December 2015 (€' 000) |
|---|---------------------------|
|   | CH-Group                  |
| Total on-balance sheet exposures (excluding derivatives, SFTs, and exempted exposures), of which:     | 8,069,583                 |
| Trading book exposures  | 0                         |
| Banking book exposures, of which:   | 8,069,583                 |
| Covered bonds   | 0                         |
| Exposures treated as sovereigns   | 4,687,857                 |
| Exposures to regional governments, MDB, international organisations and PSE NOT treated as sovereigns | 1,072,301                 |
| Institutions  | 2,041,469                 |
| Secured by mortgages of immovable properties  | 0                         |
| Retail exposures  | 0                         |
| Corporate   | 214,664                   |
| Exposures in default  | 0                         |
| Other exposures (eg equity, securitisations, and other non-credit obligation assets)                  | 53,292                    |

Table 8-16. Split-up of on balance sheet exposures (excluding derivatives, SFTs and exempted exposures; LRSpl)

## Capital structure, capital ratio and Leverage Ratio

| CRR leverage ratio exposures   | CH-Group   | CBL   | CBF  |
|--|--|---|--|
| Description of processes used to manage the risk of excessive leverage   | Clearstream as CSD has a volatile balance sheet volume depending on the clients' short term cash deposits used to foster settlement. The balance sheet varies sharply within short timeframes and the cash received is reinvested with low credit and market risk. This position affects the Leverage Ratio exposure measure to a high degree. Thus, a direct management of leverage is only feasible to a limited extent. |   |  |
| Description of the factors that had an impact on the leverage ratio during the period to which the disclosed leverage ratio refers | -  | Beside the highly volatile Leverage Ratio exposure measure described above the Leverage ratio exposure measure at year-end shown in Table 8-15 was adjusted by €16,808k due to different FX rates used for accounting and reporting purposes at year-end. | Beside the highly volatile Leverage Ratio exposure measure described above the Leverage ratio exposure measure at year-end shown in Table 8-15 was adjusted by €389,000k due to different FX rates used for accounting and reporting purposes at year-end. |

Table 8-17. Description of qualitative items (LRQua)

# Capital structure, capital ratio and Leverage Ratio

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## 9. Governance arrangements

### 9.1 Clearstream Holding AG

#### 9.1.1 General arrangements

Clearstream Holding AG is a stock corporation incorporated in Germany. The German Stock Corporation Act (AktG) requires such a company to set up an Executive Board and a Supervisory Board, §§ 76 et seq.

Clearstream Holding AG maintains a comprehensive suitability policy. The objective of this policy is to ensure that the members of the Executive Board, the members of the Supervisory Board and key function holders of CH (as well as of the subsidiaries of CH that are to be qualified as credit institutions) are suitable in terms of reputation, experience and governance criteria, as stipulated in the "EBA Guidelines on the assessment of the suitability of members of the management body and key function holders" (EBA/GL/2012/06) and BaFin guidance notice BA 53-FR 1903-2012/0003 as amended. CH follows a stringent recruitment policy for the selection of members of the Supervisory Board and Executive Board as described below.

#### 9.1.2 Supervisory Board

CH has established a Supervisory Board to supervise the Executive Board, in accordance with the mandatory provision of the German Stock Corporation Act (AktG). The members of the Supervisory Board of CH are elected by the shareholders. This in principle takes place during the annual meeting of shareholders. The members are elected for a period of five years.

According to the Articles of Incorporation of CH, the Supervisory Board consists of three members. The Supervisory Board in its entirety must have the necessary skills, capabilities and experience to supervise and control the Executive Board of CH. This requires understanding of the business of a Financial Holding Company. In addition, the Supervisory Board must have:

- At least one member with expertise in the area of accounting and auditing; and
- At least one member with expertise in the area of risk management and risk controlling.

The rules of the limitation of mandates in accordance with § 25d (3) KWG must be complied with. Under this definition, and in consideration of the legal permissibility of the aggregation of mandates, on 31 December 2015, the three members of the Supervisory Board of CH held a total of seven directorships.

The Supervisory Board meets as often as business requires, but at least two meetings are scheduled each year, that generally take place around May and December each year.

During the meeting of the Supervisory Board of CH on 2 December 2015, the Supervisory Board members recorded that there was no female representation in the current composition of the board. The SB members agreed to aim to increase the female participation in the course of the regular re-election in 2018 or, as far as possible, in case of vacancies to one out of three members.

## Governance arrangements

They also agreed to support and make use of the existing Female Executive Mentoring (FEM) program which is a part of the gender diversity initiative of Deutsche Börse Group as well as the Deutsche Börse Group's Women's Network; both programs promote the underrepresented gender on different levels.

### 9.1.3 Executive Board

According to § 25a KWG and MaRisk certain functions and duties in several business areas have to be segregated up to the level of the Executive Board. In addition, all tasks have to be allocated in a clear manner to the responsible areas. Furthermore, the four-eyes principle as well as the role of a deputy should be determined. In order to fulfil the above mentioned organisational requirements and in the light of the systemic importance of CH the size of the Executive Board is assumed to consist of not less than four members.

The Executive Board is inter alia responsible for the proper business organisation (in accordance with § 25c (3) number 1 in connection with § 25a of the German Banking Act). Provided that all members of the Executive Board agree to the business distribution plan, the Executive Board is also responsible for the adoption of the business distribution plan which regulates the allocation of tasks between the board members in order to enable a more efficient management of the group. Nevertheless, the Executive Board as a whole remains responsible for the fulfilment of the duties as defined by law and set out in the Articles of Incorporation (overall responsibility).

Meetings of the Executive Board shall be held regularly; further details, including but not limited to the interval between the meetings, shall be determined by the chairperson. Meetings must take place if required for the well-being of CH. In fact, the Executive Board meets monthly.

The members of the Executive Board must be professionally suitable and reliable for the management of a Financial Holding Company and must be able to devote sufficient time to fulfil their tasks. Their professional competence requires sufficient theoretical and practical knowledge of the business of a Financial Holding Company.

Members of the Executive Board must have:

- An understanding of financial markets, especially within the regulatory framework;
- Professional experience with credit institutions;
- Sufficient practical and professional experience in managerial positions.

The rules of the limitation of mandates in accordance with § 25c (2) KWG must be complied with. Under this definition, and in consideration of the legal permissibility of the aggregation of mandates, on 31 December 2015, the seven members of the Executive Board of CH held a total of fifteen directorships.

## 9.2 Clearstream Banking S.A.

### 9.2.1 General arrangements

Clearstream Banking S.A. is a Luxembourg company incorporated in Luxembourg under the form of a public limited company (société anonyme). It is governed by the Articles of Incorporation, by the law of 10 August 1915, as amended, on commercial companies (the "Companies' Act") and by the law of 5 April 1993 on the financial sector, as amended (Luxembourg Banking Act).

CBL maintains a comprehensive suitability policy. The objective of this policy is to ensure that members of the Group Executive Management (GEM) of CBL, the members of the Board of Directors of CBL and key function holders of CBL are suitable in terms of reputation, experience and governance criteria, as stipulated in the 'EBA Guidelines on the assessment of the suitability of members of the management body and key function holders' (EBA/GL/2012/06) and Circulaire CSSF 12/552 as amended. CBL follows a stringent recruitment policy for the selection of members of the Board of Directors and of the Group Executive Management as described below.



## 9.2.2 Board of Directors

The directors of CBL are members of the Board of Directors (BoD) which operates as a body in accordance with Article 50 et seq. of the Companies' Act. They may act only at duly convened meetings or by written consent in accordance with Article 8 of the Articles of Incorporation.

The Board of Directors is vested with the broadest powers to perform all acts of administration and disposition in the interest of CBL, except where such powers have been expressly reserved by law or by the Articles of Incorporation to the general meeting of shareholders and without prejudice to the daily management delegated to the GEM in accordance with Article 10 of the Articles of Incorporation.

The directors shall be elected by the annual meeting of shareholders in accordance with Article 7.1. of the Articles of Incorporation. The members are elected for a period of four years. The Board of Directors cannot have among its members a majority of persons who take on an executive role within CBL (authorised directors or other employees of CBL, with the exception of staff representatives).

A member of the Board of Directors has to fulfil certain criteria and in order to be compliant with regulatory requirements every candidate for a position to the Board of Directors has to run through an internal suitability assessment which is conducted by Boards & Committees Clearstream unit.

Special requirements for members of BoD according to CSSF Circular 12/552 (as amended):

- Members of the BoD must be reliable, possess the required expertise to perform the control function and to assess and monitor the management and invest sufficient time to fulfil their duties. When considering whether a person has the respective expertise, the scope and complexity of the business has to be considered;
- The BoD in its entirety shall have the knowledge, skills and experience that are necessary to perform the control function as well as to assess and monitor the daily management of the credit institution;

The rules of the limitation of mandates in accordance with Article 38-2 of the Luxembourg Banking Act do not apply to CBL. On 31 December 2014 the five members of the Board of Directors of CBL held a total of fifteen directorships.

The Board of Directors meets whenever the interests of CBL so require. Meetings are convened in writing or by email. The BoD should meet at least four times per year.

During the meeting of the Board of Directors of CBL on 29 October 2015, the BoD members recorded that in the course of new appointments, the BoD would aim to increase the female participation.

The BoD appointed an Audit, Compliance and Risk Management Committee composed of three board members (among which the chairman and the vice-chairman and one member) and other external members (if and as appropriate). The Chief Internal Auditor, the Compliance Officer and the external auditor attend the meetings as permanent guests. The CEO/relevant Co-CEO attends as a permanent guest too. The Audit, Compliance and Risk Management Committee reviews CBL's financial statements and makes recommendations to the BoD, approves annually the internal audit functions, objectives, the audit plan, staffing and financial budgets, ensures true and proper accounting and reporting of financial results, oversees the proper financial management, reviews the adequacy and effectiveness of accounting systems and internal financial controls, monitors the efficiency and independence of the internal audit function and meets regularly with the external auditor. The Audit, Compliance and Risk Management Committee reviews at least on a yearly basis a compliance status report obtained from the GEM.

## 9.2.3 Group Executive Management

Main tasks and competencies of GEM are:

- To manage and monitor daily operations;
- To retain and grow the customer base, taking into account pricing strategies, credit decisions and compliance requirements;

## Governance arrangements

- To develop product strategies in the context of changing market and customer requirements, competitor's moves and regulatory developments, including the necessary budget releases;
- To make human resources related decisions, such as hiring and promotions, in accordance with the relevant group-wide policies;
- To manage interfaces with the different interest groups (internal and external);
- To prepare and consult the Board of Directors of CBL in substantive decisions concerning the banking, settlement & custody area.

In accordance with Article 60 of the Companies' Act, the Board of Directors delegates the day-to-day management of CBL as well as the representation of CBL towards third parties in relation with such management to the GEM.

The GEM determines the daily management of CBL in accordance with Article 10 of the Articles of Association and Article 38-1 of the Luxembourg Banking Act. It further proposes strategies and budgets to the Board of Directors. GEM meetings take place on a monthly basis.

The Board of Directors of CBL cannot have among its members a majority of persons who take on an executive role within CBL (authorised directors or other employees of CBL, with the exception of staff representatives). In addition, the chairman of the Board of Directors cannot be a member of the daily management of CBL.

The members of the GEM must be professionally suitable and reliable for the management of a credit institution and must be able to devote sufficient time to fulfil their tasks. Their professional competence requires sufficient theoretical and practical knowledge of the business of a credit institution.

Members of the Group Executive Management must have:

- An understanding of financial markets, especially within the regulatory framework;
- Professional experience with credit institutions;
- Sufficient practical and professional experience in managerial positions.

The quantitative rules of the limitation of mandates in accordance with Article 38-2 of the Luxembourg Banking Act do not apply for CBL. On 31 December 2015 the seven members of the Group Executive Management of CBL held a total of fifteen directorships.

### 9.3 Clearstream Banking AG

#### 9.3.1 General Arrangements

Clearstream Banking AG (CBF) is a stock corporation incorporated in Germany. The German Stock Corporation Act (Aktiengesetz - AktG) requires such a company to set up an Executive Board and a Supervisory Board, §§ 76 et seq. AktG.

Clearstream maintains a comprehensive suitability policy. The objective of this policy is to ensure that members of the Executive Board, members of the Supervisory Board and key function holders of CBF are suitable in terms of reputation, experience and governance criteria, as stipulated in the "EBA Guidelines on the assessment of the suitability of members of the management body and key function holders" (EBA/GL/2012/06) and BaFin guidance notice BA 53-FR 1903-2012/0003 as amended. CBF follows a stringent recruitment policy for the selection of members of the Supervisory Board and Executive Board as described below.

#### 9.3.2 Supervisory Board

CBF has established a Supervisory Board to supervise the Executive Board, in accordance with the mandatory provisions of the German Stock Corporation Act (AktG) in connection with the German One-Third Participation Act (Drittelbeteiligungsgesetz - DrittelbG). According to the DrittelbG, one third of the members of the Supervisory Board (two out of six) are employee representatives. The shareholders'

representatives of the Supervisory Board of CBF are elected by the shareholders in the annual meeting of shareholders or, if there is the need of a replacement, in an extraordinary shareholders' meeting. The employee representatives are elected by the employees of CBF prior to that shareholders' meeting to elect a new Supervisory Board. All members are elected for a period of five years.

According to the Articles of Incorporation, the Supervisory Board consists of six members. The Supervisory Board in its entirety must have the necessary skills, capabilities and experience to supervise and control the Executive Board of CBF. This requires understanding of the business of a credit institution. In addition, the Supervisory Board must have:

- At least one member with expertise in the area of accounting and auditing; and
- At least one member with expertise in the area of risk management and risk controlling.

The rules of the limitation of mandates in accordance with § 25d (3) KWG must be complied with. Under this definition and in consideration of the legal permissibility of the aggregation of mandates, on 31 December 2015 the six members of the Supervisory Board of CBF held a total of nine directorships.

The Supervisory Board meets as often as business requires, but at least two meetings are scheduled each year, which generally take place around May and December.

Due to the risk profile of CBF no separate risk committee has been established. However, risk reports are provided by Clearstream Risk Management to the Supervisory Board of CBF on a regular, at least quarterly, basis.

During the meeting of the Supervisory Board of CBF on 14 December 2015, the Supervisory Board members recorded that there was no female representation in the board. The members of the Supervisory Board agreed to aim to increase the female participation in the course of the regular re-election in 2018 or, as far as possible, in case of vacancies to two out of six members.

They also agreed to support and make use of the existing Female Executive Mentoring (FEM) program which is a part of the gender diversity initiative of Deutsche Börse Group as well as the Deutsche Börse Group's Women's Network; both programs promote the underrepresented gender on different levels.

### 9.3.3 Executive Board

According to § 25a KWG and MaRisk certain functions and duties in several business areas have to be segregated up to the level of the Executive Board. In addition, all tasks have to be allocated in a clear manner to the responsible areas. Furthermore, the four-eyes principle as well as the role of a deputy should be determined. In order to fulfil the above mentioned organisational requirements and in the light of the systemic importance of CBF the size of the Executive Board is assumed to consist not less than two members.

The Executive Board is inter alia responsible for the proper business organisation (in accordance with § 25c (3) number 1 in connection with § 25a of the German Banking Act). Provided that all members of the Executive Board agree to the business distribution plan, the Executive Board is also responsible for the business distribution plan which regulates the allocation of tasks between the board members in order to enable a more efficient management. Nevertheless, the Executive Board as a whole remains responsible for the fulfilment of the duties as defined by law and set out in the Articles of Incorporation (overall responsibility).

Meetings of the Executive Board shall be held regularly; further details, including but not limited to the interval between the meetings, shall be determined by the chairperson. Meetings must take place if required for the well-being of CBF. In fact, the Executive Board meets monthly

The members of the Executive Board must be professionally suitable and reliable for the management of a credit institution and must be able to devote sufficient time to fulfil their tasks. Their professional competence requires sufficient theoretical and practical knowledge of the business of a credit institution.

## Governance arrangements

Members of the Executive Board must have:

- An understanding of financial markets, especially within the regulatory framework;
- Professional experience with credit institutions;
- Sufficient practical and professional experience in managerial positions.

The rules of the limitation of mandates in accordance with § 25c (2) KWG must be complied with. Under this definition and in consideration of the legal permissibility of the aggregation of mandates, on 31 December 2015 the three members of the Executive Board of CBF held a total of seven directorships.

## 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>CCP</b>    | Central Counterparty  |
| <b>CDO</b>    | Collateralised Debt Obligation  |
| <b>CET1</b>   | Common Equity Tier 1  |
| <b>CF</b>     | Conversion Factor   |
| <b>CFO</b>    | Chief Financial Officer   |
| <b>CFSI</b>   | Clearstream Fund Services Ireland Ltd   |
| <b>CH</b>     | Clearstream Holding AG  |
| <b>CGSS</b>   | Clearstream Global Securities Services Ltd  |
| <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>CRD IV</b> | Capital Requirements Directive IV   |
| <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>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   |
| <b>ESMA</b>   | European Securities and Markets Authority   |

# Abbreviations

|               |   |
|---------------|---|
| <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>GSF</b>    | Global Securities Financing   |
| <b>G-SIB</b>  | Global Systemically Important Bank  |
| <b>G-SII</b>  | Global Systemically Important Institution   |
| <b>HF-LI</b>  | High-Frequency, Low-Impact  |
| <b>HGB</b>    | Handelsgesetzbuch (German Commercial Code)  |
| <b>HQLA</b>   | High Quality Liquid Assets  |
| <b>IAS</b>    | International Accounting Standards  |
| <b>ICAAP</b>  | Internal Capital Adequacy Assessment Process  |
| <b>ICSD</b>   | International Central Securities Depository   |
| <b>IFRS</b>   | International Financial Reporting Standards   |
| <b>ILAAP</b>  | Internal Liquidity Adequacy Assessment Process  |
| <b>IRB</b>    | Internal Rating Based Approaches  |
| <b>IRBA</b>   | Advanced Internal Rating Based Approach   |
| <b>IRR</b>    | Interest Rate Risk  |
| <b>iTOF</b>   | Intraday Technical Overdraft Facility   |
| <b>KWG</b>    | Gesetz über das Kreditwesen (German Banking Act)  |
| <b>LCR</b>    | Liquidity Coverage Ratio  |
| <b>LDA</b>    | Loss Distribution Approach Models   |
| <b>LF-HI</b>  | Low-Frequency, High-Impact  |
| <b>LGD</b>    | Loss Given Default  |
| <b>LSI</b>    | Less Significant Institution  |
| <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>NSFR</b>   | Net Stable Funding Ratio  |
| <b>OECD</b>   | Organisation for Economic Cooperation and Development                                   |
| <b>O-SIB</b>  | Other Systemically Important Bank   |
| <b>O-SII</b>  | Other Systemically Important Institution  |
| <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>SFT</b>    | Securities Financing Transaction  |
| <b>SI</b>     | Significant Institution   |
| <b>SIB</b>    | Systematically Important Bank   |
| <b>SREP</b>   | Supervisory Review and Evaluation Process   |
| <b>SRP</b>    | Supervisory Review Process  |
| <b>SSM</b>    | Single Supervisory Mechanism  |
| <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>TLAC</b>   | Total Loss Absorbing Capacity   |
| <b>TOF</b>    | Technical Overdraft Facility  |
| <b>VaR</b>    | Value at Risk   |



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**Published by**  
**Clearstream Holding AG**

**Address**  
Clearstream Holding AG  
60485 Frankfurt/Main  
Germany

October 2016

Document number: 6475

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