30 June 2011

Risk Management at Euroclear

Including Pillar 3 disclosure 2010 – Euroclear plc

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Foreword of the Chief Risk Officer

Euroclear's Pillar 3 report for 2010, as in previous years, outlines the group's risk management strategy, governance and policies. It also summarises the risks run by the group's entities, in particular by Euroclear Bank. Euroclear believes in being transparent about risks. As a market infrastructure providing post-trade services, reducing risks and costs for the market is in the company's DNA. The Euroclear group's clearly defined objective is: post-trade made easy.

Euroclear Bank, the only credit institution in the group, is not like conventional credit institutions. It is a single-purpose bank providing a core portfolio of services including custody, settlement and asset-servicing, as well as complementary services such as securities lending and borrowing, and collateral management. In addition to providing delivery-versus-payment (DVP) settlement, moves to standardise and harmonise post-trade processes enable Euroclear Bank to reduce risks for market participants, and to benefit from efficiency gains.

Even though Euroclear's business model is low risk, it is important to manage residual risks. Euroclear Bank's business policy, for example, is to offer only fully collateralised short-term credit to clients, with conservative haircuts, to facilitate the settlement process. As a result, risks that are unrelated to Euroclear Bank's single-purpose nature are avoided; Euroclear Bank does not have a trading book nor does it seek to take market risk. In addition, Euroclear Bank has adopted a cautious approach to liquidity risk management, ensuring it can rely on sufficient sources of liquidity at all times, including the ability to use client collateral if the client has difficulty meeting its obligations to Euroclear Bank. It has developed a sophisticated approach to operational risk management, as it considers operational risk to be of prime importance for a market infrastructure service provider.

Finally, to prevent natural disasters or other incidents from disrupting settlement flows, it invests heavily in technical and operational resilience and is, to our knowledge, the only securities infrastructure service provider in Europe with three data centres. Euroclear Bank's low-risk profile, prudent risk management practices and conservative capitalisation levels allows Euroclear Bank to maintain its AA+ rating for the tenth consecutive year.

The macro-economic, financial and regulatory environment is likely to continue to experience significant change in the near future. Although Euroclear withstood the financial crisis well, it will need to comply with new regulatory initiatives, as will its clients. Euroclear's low-risk profile means that compliance with the new requirements should involve incremental rather than major change. Clients, on the other hand, may be affected more significantly and adapt some of their trading practices, which Euroclear will monitor vigilantly. The Euroclear group will continue in the coming years to provide the market infrastructure services its clients want in a low risk and efficient manner. Euroclear will continue to help clients manage their own risks with cost-effective and efficient services notably through secured transactions enabled with efficient collateral management.

Reducing risk in the market

Well-functioning clearing and settlement arrangements for financial instruments facilitate the efficient allocation of resources and, therefore, contribute to economic growth. They are also essential for preserving financial stability, as disruptions occurring in the post-trade processing of these transactions could lead to systemic risk, spreading to other market participants and to the financial market at large. With a sound understanding of these risks, central banks and the market issued a number of recommendations in the decade following the 1987 securities market crash.

The Euroclear group has acquired considerable expertise and built a strong risk culture and risk management framework with the aim of minimising the risks involved in the operation of settlement and custody services, as well as settlement-related banking activities.

Settlement risk

The major risks that can materialise during the settlement process and affect Participants are:

- **credit risk**, resulting from the possibility that one of the Participants in a transaction is unable to meet its obligations. The main credit risk is principal risk, as both the buyer and the seller of securities are exposed to the risk of losing the full amount of the transaction, from the moment they initiate a securities or funds transfer until settlement is completed. In addition, they incur replacement cost risk, as they need to enter into a new contract, potentially losing any unrealised gain; and

- **liquidity risk**, stemming from the lack of available cash or securities when due; the transaction might then settle at a later date.

Both credit and liquidity risk in settlement transactions can lead to systemic risk, if other Participants are unable to meet their own commitments following the first default or failed settlement. In the worst case, this can threaten the stability of financial markets.

Credit risk arises as a consequence of settlement lags and asynchronous settlement.

The settlement lag is the maximum amount of time between the date on which a trade is executed and the date on which the trade is settled. The longer the settlement lag, the greater the replacement cost risk if the transaction is not executed. The issue of lags in securities settlement has been addressed at a worldwide level, with the Group of Thirty, an industry group, recommending that settlement organisations switch to a T+3 standard. More recently, a move towards further shortening the settlement cycle may lead to further reductions in the replacement cost risk related to settlement lags.

Asynchronous settlement refers to situations in which the payment and the delivery of the assets bought take place as two separate processes. As a result, the buyer of the securities incurs the risk of non-delivery by the seller. If this occurs after the payment has been sent, the full principal amount of the transaction is at risk. Similarly, the buyer

faces the risk of not receiving the funds due after the securities have been delivered. The introduction of Delivery-versus-Payment (DVP) mechanisms has eliminated the principal risk in securities transactions. For information on DVP transactions, see the 'Delivery-versus-Payment' section below.

To further reduce credit risks in securities transactions, market participants have introduced netting arrangements, which, if legally and contractually sound, have the advantage of reducing the need for credit and the overall credit risk in the market, as well as reducing the size of individual market participants' balance sheets. By interposing themselves between the buyer and the seller and becoming the sole counterparty to both sides of securities transactions, Central Counterparties (CCPs) also bring similar credit risk reduction benefit to market participants.

Delivery-versus-Payment

(International) Central Securities Depositories ((I)CSDs) have contributed greatly to reducing the credit and liquidity risks involved in securities settlement transactions through the introduction of DVP mechanisms. Three broad DVP models were defined by the Committee on Payment and Settlement Systems (CPSS):

- **Model 1**: systems that settle transfer instructions for both securities and funds on a trade-by-trade (gross) basis, with the final (unconditional) transfer of securities from the seller to the buyer (delivery) occurring at the same time as the final transfer of funds from the buyer to the seller (payment);

- **Model 2**: systems that settle securities transfer instructions on a gross basis, with the final transfer of securities from the seller to the buyer (delivery) occurring throughout the processing cycle, but settle funds transfer instructions on a net basis, with the final transfer of funds from the buyer to the seller (payment) occurring at the end of the processing cycle;

- **Model 3**: systems that settle transfer instructions for both securities and funds on a net basis, with the final transfers of both securities and funds occurring at the end of the processing cycle.

The Euroclear system used by Euroclear Bank is a Model 1 DVP system, because transactions between Participants are settled on a trade-by-trade basis, with simultaneous and final transfers of cash and securities in the books of Euroclear Bank.

Settlement over the Bridge with Clearstream also takes place according to DVP Model 1, because there is simultaneous and final transfer of cash and securities between Euroclear Bank and Clearstream via the mutual cash and securities accounts that each holds with the other after each exchange. There are several exchanges each night and an Automated Daytime Bridge during the day.

External transactions (i.e. transactions that settle in a local market between a Euroclear Participant and a local counterpart, which is typically a member of the local Securities Settlement System (SSS)) follow the DVP rules (if any) of the local market.

DVP Model 1 systems often have a single delivery and payment intermediary, except when payments are in central bank money. This is the case of the Euroclear Group CSDs, which also operate a DVP Model 1 settlement system, in some cases alongside other models (e.g. Model 2 in Belgium) and Free-of-Payment settlement facilities (also offered in Euroclear Bank).

Please refer to the Disclosure Frameworks of each Euroclear (I)CSD on **www.euroclear.com** for more detailed information on the DVP models used.

Managing the risks of the settlement institution

Euroclear has adopted a strong risk management framework to protect its Participants from the risk of the settlement institution failing in its obligations. This framework ensures that any credit, liquidity, market, operational or other risks faced by entities of the Euroclear group are managed adequately. As described in subsequent chapters of this document, the Euroclear CSDs face very limited risks. Euroclear Bank is the only entity providing credit to its Participants, which it does in order to facilitate settlement. As a single-purpose institution, Euroclear Bank has a very low risk profile; it incurs risks that are derived only from its role in settlement, custody and related services.

Euroclear's risk management approach includes:

- rigorous risk policies;
- sophisticated risk assessment and measurement; and
- group-wide risk governance, including independent risk oversight and extensive internal auditing.

Euroclear follows the recommendations and best practices issued by various regulators and industry bodies. As settlement systems, the Euroclear (I)CSDs comply with the *Recommendations for Securities Settlement Systems* published by the CPSS and the International Organization of Securities Commissions (IOSCO), and with the Recommendations issued by the European Central Bank (ECB) and the Committee of European Securities Regulators (CESR). Euroclear also ensures that its practices comply with recommendations issued by the Group of Thirty.

Some Euroclear entities are also required to comply with the recommendations of the Basel Committee on Banking Supervision, including the *International Convergence of Capital Measurements and Capital Standards: a Revised Framework* (Basel II). In particular, this requirement applies to Euroclear Bank, as it is considered a credit institution. All consolidated levels above Euroclear Bank, as well as Euroclear Belgium (as a settlement institution) and Euroclear SA/NV (stand-alone, as an institution closely associated with a settlement institution), must comply with this requirement.

The implementation of Basel II at Euroclear

Euroclear plc is the ultimate holding company of, among others, Euroclear SA/NV, Euroclear Bank and the Central Securities Depositories (CSDs) of the Euroclear group. Euroclear Bank is the only credit institution in the Euroclear group: the CSDs are settlement institutions and Euroclear SA/NV is an entity closely associated with a settlement institution. Euroclear Bank and all consolidated levels above, as well as Euroclear Belgium and Euroclear SA/NV (stand-alone), have to comply with the requirements formulated in the transposition of the Basel II Accord into European and Belgian regulation (hereafter: "Basel II requirements").

What is Basel II?

In June 2004, the Basel Committee on Banking Supervision (BCBS), consisting of the banking regulators of the Group of Ten countries, published the *International Convergence of Capital Measurement and Capital Standards: a Revised Framework* (Basel II). This framework was designed to replace the 1988 Accord, which, since its publication, had served for assessing the capital adequacy of supervised institutions by prudential regulators worldwide. Compared to the original Accord, the revised framework is more risk-sensitive and takes into account banks' own risk management practices. Regulators recognise that strong risk management systems and practices contribute to the stability of individual institutions and that they play an important role in enhancing the overall soundness and stability of the banking sector. In various instances, banks are offered the possibility to use different risk measurement approaches, from simple or standardised methods to elaborate models. These more sophisticated approaches require the consistent understanding and use of data collected internally by the banks. They generally allow banks to economise on capital, thus introducing an additional incentive to develop and apply strong risk management methods.

Basel II differentiates between three so-called pillars, which are expected to be mutually reinforcing. Pillar 1 is centred on the capital requirements related to the credit, market and operational risks that banks run. Under Pillar 2, banks are expected to produce their own assessment of capital adequacy, based on the risks that they face in their activities, including additional risk types such as market risk in the banking book. Pillar 2 also lays out the interaction between the banks' own assessments and the banking supervisors' response. Pillar 3 aims to promote market discipline through the disclosure of information by institutions. The requirements expressed in the Basel II framework have been transposed into European and national regulations.[1]

[1] Euroclear needs to comply with the regulatory requirements included in the Directive relating to the taking up and pursuit of the business of credit institutions (2006/48/EC) and in the Directive on the capital adequacy of investment firms and credit institutions (2006/49/EC), as transposed into Belgian law (Art. 43 Banking Law and Art. 13 Royal Decree on (assimilated) settlement institutions, executed by Decree of the Banking, Finance and Insurance Commission of 17 October 2006 regarding the Regulation on the own funds of credit institutions and investment firms).

Pillar 3 requirements, which concern the regular disclosure of information of interest to the market, are included in Title XIV in the relevant Decree of the Banking, Finance and Insurance Commission (CBFA). The items to be disclosed are listed in the Decree, though there are currently no detailed requirements concerning qualitative disclosures.

Part of the disclosure concerns risk management methods and practices, and the organisation of the risk management function. Another part is focused on, among other things, the actual data relating to exposures and associated capital requirements. This publication contains Euroclear's Pillar 3 disclosure for 2010.

Pillar 1 at Euroclear

Euroclear has obtained approval from the CBFA to apply the **Foundation Internal Ratings-Based Approach (FIRBA)** for credit risk under Pillar 1 as from January 2007. Until 31 March 2011 the CBFA in Belgium was the main supervisor of Euroclear Bank and the lead regulator for Euroclear SA/NV and Euroclear plc. These responsibilities have now been transferred to the National Bank of Belgium (NBB).

The FIRBA is applied at the level of Euroclear Bank and at all consolidated levels above. Euroclear Bank has been using an internal ratings model since 2005. Euroclear Bank determines the ratings of counterparties and Participants, and assigns its own probabilities of default. As Euroclear Bank does not have any history of credit losses, it did not choose to apply an Advanced Internal Ratings-Based Approach (AIRBA). More information on Euroclear Bank's use of the FIRBA can be found in the chapter on credit risk management.

With respect to operational risk, Euroclear has been allowed by the CBFA to use the Advanced Measurement Approach (AMA) for the calculation of Pillar 1 capital requirements as from Q1 2008. Euroclear uses a hybrid approach at all consolidated levels above Euroclear Bank, by combining the AMA for Euroclear Bank with a Standardised or Basic Indicator Approach for the group's other entities.

This accreditation was accompanied by a number of terms and conditions which were implemented during 2008 and 2009. In 2008, the CBFA imposed an add-on, which was reduced in 2009. The add-on, and a worsening trend in market-wide operational losses recorded by the Operational Riskdata eXchange (ORX), which Euroclear uses in its operational risk model to complement data on internal losses, brought capital requirements for operational risk with the AMA to a higher level than would be the case with the Basic Indicator Approach (BIA) in those years.
The final regulatory decision on the AMA methodology was communicated in November 2010. The decision allowed Euroclear to lift the add-on and to rely on its model in full for the calculation of capital requirements for operational risk under Pillar 1.

The Standardised Approach (TSA) and the BIA are used respectively for the CSDs and the other group entities. More information on operational risk management can be found in the relevant chapter.

Pillar 2 at Euroclear

The scope of Pillar 2 is broader than that of Pillar 1. The **Supervisory Review Process (SRP)** aims at ensuring that institutions adequately understand and manage their risks through capital assessment and planning in a continuous dialogue with their supervisors. Under the **Internal Capital Adequacy Assessment Process (ICAAP)**, institutions are expected to identify and quantify the risks that they face and to relate these to the level of good quality capital needed to implement their plans. At the same time, the institutions' supervisors will evaluate these risks under the **Supervisory Review Evaluation Process (SREP)** and assess the adequacy of the ICAAP. If it is deemed unsatisfactory, regulators might ask for the capital requirements in Pillar 1 to be increased.

Euroclear's ICAAP framework, which is documented in an ICAAP file, is based on economic capital models and includes a capital planning process. The Board of Euroclear SA approved in December 2008 Euroclear's Internal Capital Measurement Approach (ICMA), which establishes common principles to determine an internal view on core equity requirements for each Euroclear group entity. The ICAAP process has been implemented at the level of each entity, with a simplified process for the CSDs, as warranted by the proportionality principle, which states that the sophistication of the approach should be determined with consideration for the size and risk profile of the relevant entity.

In December 2009, the CBFA initiated the SREP. Discussions are still ongoing on the outcome of the process. Euroclear has said that it intends broadly to maintain current levels of capital while the discussion continues.

In addition, Euroclear, in accordance with a Belgian requirement, delivers on a regular basis to regulators standardised reports on risks not covered under Pillar 1 (interest rate risk in the banking book, liquidity risk and concentration risk on specific sectors or geographic areas). Information on these risks is also included in the Pillar 3 disclosure.

Pillar 3 at Euroclear

The Euroclear plc Board sets the scope of application and the frequency of Pillar 3 disclosures, as well as the medium in which they are published and the verification, validation and approval processes.

Scope of application

Complete Pillar 3 information will be disclosed at the highest consolidated level, Euroclear plc. This is appropriate because Euroclear manages the risks that it faces at group level. In addition, specific information, mainly on capital structure and adequacy, will be published for Euroclear Bank, which is considered as a significant subsidiary for the purpose of this disclosure. Euroclear Bank is the only credit institution of the group and, as such, is by far the largest contributor to the credit and market risks faced by the group. Information on these risks therefore mainly concern Euroclear Bank. Specific figures for Euroclear Bank would be very close to the figures included in this publication, which apply to the group as a whole.

Basis of consolidation

In 2009, there were no differences in the basis of consolidation for accounting and prudential purposes at Euroclear. This remains the case in 2010.

Subsidiaries are all entities over which the group has the power to govern the financial and operating policies generally accompanying a shareholding of more than one half of the voting rights. Subsidiaries are fully consolidated from the date that control is transferred to the group. They are de-consolidated from the date that control ceases.

All subsidiaries are fully consolidated, with the exception of the nominee companies. The list of nominee companies can be found in the *Euroclear plc Consolidated financial statements and Parent company financial statements at 31 December 2010* (Consolidated financial statements) .

Name	Country of incorporation	Nature of business	Proportion of voting rights and ordinary shares held
Euroclear Belgium SA/NV[1]	Belgium	Central Securities Depository for Belgium	100%
Calar Belgium SA/NV[2]	Belgium	Property investment	100%
EMX Company Limited[1]	United Kingdom	Investment fund order routing	100%
Euroclear SA/NV[3]	Belgium	(I)CSD holding company, ownership of share processing platforms and delivery of shared non-operational services	100%
Euroclear Bank SA/NV[1]	Belgium	Banking, securities settlement and custody services	100%
Euroclear Finance 2 SA[2]	Luxembourg	Financing vehicle	100%
Euroclear France SA[1]	France	Central Securities Depository for France	100%
Euroclear Investments	Luxembourg	Investment holding	100%
Euroclear Properties France SAS[3]	France	Property investment	100%
Euroclear Re SA[3]	Luxembourg	Reinsurance	100%
Euroclear UK & Ireland Limited[1]	United Kingdom	Central Securities Depository for UK and Ireland	100%
NCSD Holding AB[1]	Sweden	Investment Holding	100%
NCSD Systems AB[4]	Sweden	Dormant	100%
Euroclear Nederland[1]	The Netherlands	Central Securities Depository for The Netherlands	100%
Euroclear NIEC[1]	The Netherlands	Central Securities Depository for The Netherlands	100%
Euroclear Finland Oy[4]	Finland	Central Securities Depository for Finland	100%
VKI AB[4]	Sweden	Dormant	100%
Euroclear Sweden AB[5]	Sweden	Central Securities Depository for Sweden	100%
Xtrakter Limited[1]	United Kingdom	TRAX trade matching and reporting	100%

[1] Held through Euroclear SA/NV

[2] Held through Euroclear Bank SA/NV

[3] Held through Euroclear Investments SA

[4] Held through Euroclear Sweden AB

[5] Held through NCSD Holding AB

EMX Company Limited's investment fund order routing business was transferred to Euroclear UK & Ireland Limited in September 2010.

Source: *Euroclear plc Consolidated financial statements and Parent company financial statements at 31 December 2010*, p.105.

Capital mobility between Euroclear companies

In addition to the capital requirements imposed by local company laws, some Euroclear companies are also subject to regulatory capital requirements. This is the case for Euroclear plc consolidated, Euroclear SA/NV, Euroclear Bank and Euroclear Belgium, which are subject to Basel II, as well as for the CSDs, which, as settlement institutions, are subject to specific local regulatory requirements. The other entities are not subject to regulatory requirements which limit the transfer of own funds.

At all times, Euroclear ensures that each entity maintains sufficient capital to:

- comply with its legal and local regulatory requirements; and
- allow it to continue to operate properly.

There are no other material impediments to the transfer of own funds between Euroclear entities.

Frequency and medium

Qualitative and quantitative information will be disclosed yearly shortly after the publication of the Annual Report based on the situation at the end of the previous year. The frequency of the disclosure might be increased in the future to respond to market needs. The full disclosure document is published on www.euroclear.com.

Content

Euroclear will disclose all the relevant information specified in Annex XII of the Capital Requirements Directive (CRD)[1] and in the related CBFA circular. As Pillar 3 is market-driven, Euroclear might decide to disclose additional information to market participants to give a fair view of its risk management practices. As from its Pillar 3 disclosure over 2008, Euroclear has included a chapter on liquidity risk management, as this is an essential part of its risk management processes. Not all requirements related to Pillar 3 disclosures apply to Euroclear, as Euroclear does not engage in all banking activities (e.g. securitisation). Items that do not apply will not appear in the publication.

Quantitative disclosures published in Euroclear's Pillar 3 report fall within the scope of Euroclear's internal and external verification processes, including auditing by an independent auditor. This is true for the disclosures that have already been published in the annual report or in the Consolidated financial statements under IFRS, as well as for the quantitative disclosures related to the calculation of regulatory capital requirements that are communicated to the NBB on a regular basis. Some of the qualitative disclosures published in the Consolidated financial statements are also reproduced in this document.

[1] This is the short name for the Directive on the capital adequacy of investment firms and credit institutions (2006/49/EC).

From Basel II to Basel III

In December 2010, the Basel Committee on Banking Supervision (BCBS) published *Basel III: A global regulatory framework for more resilient banks and banking systems* and *Basel III: International framework for liquidity risk measurement, standards and monitoring*. These documents present the future regulatory requirements with regards to banks' capital and liquidity management. The first document covers mainly aspects related to the quality, consistency and transparency of institutions' capital base; risk coverage, mainly in the area of counterparty credit risk; a leverage ratio to supplement the risk-based Basel II framework; and countercyclical measures through capital buffers. The second document introduces a 30-day liquidity coverage ratio and a longer-term net stable funding ratio, to ensure that institutions maintain a sufficient stock of high quality liquid assets to cover potential liquidity gaps, and adopt a healthy balance between short and long-term funding to cover their activities.

With its very conservative capital composition, limited leverage, and the room for manoeuvre provided by excess capital above regulatory requirements, Euroclear believes that it is unlikely to need to raise additional capital to comply with the new framework. On the basis of information currently available, Euroclear also believes that its limited liquidity risks at the defined time horizons will allow it to satisfy the proposed liquidity ratios. The European Commission is now preparing the draft legislation that will modify the CRD in accordance with Basel III. A precise impact assessment will be possible only once it is issued.

Capital structure and adequacy

The NBB (the CBFA until 31 March 2011) in Belgium is the main supervisor of Euroclear Bank and the lead regulator for Euroclear SA/NV and Euroclear plc. In addition, individual CSDs are regulated by their own local supervisors, which set and monitor their capital adequacy and liquidity requirements.

Composition of own funds

Euroclear Plc's total capital is divided into two Tiers: Tier 1 is essentially made up of shareholders' capital, share premium, consolidated reserves and retained earnings, while Tier 2 comprises undated subordinated loans. In accordance with capital adequacy regulations, Euroclear monitors the proportion of the Hybrid Tier 1 instrument (issued in 2005) that can be considered as Tier 1, and reclassifies the remainder to Tier 2.

Goodwill and intangible fixed assets are deducted in full from Tier 1 capital. The current regulatory framework stipulates that Tier 2 capital cannot exceed Tier 1 capital, a requirement that is very comfortably met by the group.

The group's policy is to maintain a strong capital base and to diversify its sources of capital appropriately, so that an adequate relationship between total capital and the underlying risks of the group's business exists at all times.

The table on the next page gives details of the total capital of both Euroclear plc and Euroclear Bank, which both comfortably exceed their regulatory requirements.

31 December 2010 (€'000)	**Euroclear plc consolidated**	**Euroclear Bank stand-alone**
Amount of original own funds (Tier 1 capital)[1]	**2,088,799**	**1,243,392**
- Paid up capital	3,831	285,497
- Share premium	143,223	558,008
- Eligible reserves	2,643,404	399,960
- Other	15	-
- Hybrid Tier 1 (innovative instruments subject to limit)	292,673	-
- Intangible assets	(994,347)	(73)
- Excess on limit for innovative instruments	-	-
Amount of additional own funds[1]	**2,420**	**297,173**
- Securities of indeterminate duration and other instruments	-	297,173
- Adjustments made to valuation differences in original own funds transferred to core additional own funds	2,420	-
- Excess on limit for original own funds transferred to core additional own funds	-	-
Deductions from original and additional own funds	**(2,719)**	**(2,952)**
- IRB measurement of expected losses	(2,719)	(2,952)
Total eligible own funds, net of deductions and limits[2]	**2,088,501**	**1,537,613**

Any differences between total amounts and the sum of components are due to rounding.

[1] Before deductions. Euroclear plc's Tier 1 capital (net of deductions) amounts to €2,087,440 thousand. Euroclear plc's Tier 2 capital (net of deductions) amounts to €1,061 thousand.

Capital adequacy

In accordance with the Basel II framework, the prudential supervisor requires each bank and banking group to maintain a ratio of total capital to risk-weighted assets that does not fall below 8%, and a ratio of Tier 1 capital to risk-weighted assets that must always exceed 4%. Furthermore, as a company closely associated with a settlement institution, Euroclear SA/NV is subject to certain specific requirements regarding its solvency and liquidity position.

Risk-weighted assets take into consideration balance sheet assets and off-balance-sheet exposures that may give rise to credit risk, as calculated for both Euroclear Bank and the group on a consolidated basis. Collateral and other eligible guarantees are taken into account appropriately.

As an entity that issues debt instruments periodically, Euroclear Bank has been assigned an AA+ rating by both Fitch and Standard & Poor's.

With effect as from 1 January 2007, the regulatory capital requirements for Euroclear Bank started to be determined by the Basel II framework, both on a stand-alone and consolidated basis, as well as for all consolidated levels above Euroclear Bank. Within this framework, Euroclear determines regulatory capital requirements both for credit and operational risk.

As far as credit risk is concerned, Euroclear has been using the FIRBA since 1 January 2007, in accordance with the accreditation received from the CBFA at the end of 2006. Since then, Euroclear has also computed its capital needs under Basel I, in parallel with the Basel II methodology, in order to be able to apply, if necessary, the so-called Basel I floors set out in the capital adequacy regulation.

With respect to operational risk, Euroclear has been allowed by the CBFA to use the AMA for the calculation of Pillar 1 capital requirements as from Q1 2008. Euroclear uses a hybrid approach at all consolidated levels above Euroclear Bank by combining the AMA for Euroclear Bank with a Standardised or Basic Indicator Approach (BIA) for the group's other entities.

The table on the next page sets out the total capital requirements for the Euroclear group and Euroclear Bank. The available capital comfortably exceeds regulatory requirements.

The significant increase of the solvency ratios observed as of 31 December 2010 almost entirely results from the removal of the add on to the capital requirements for operational risk. The other capital requirements, as well as Euroclear's capital base, have remained relatively stable over the last year.

As of 31 December 2010 (€'000)	Euroclear plc consolidated	Euroclear Bank stand-alone
Total capital requirements	**391,200**	**280,626**
Capital requirements for credit risk, counterparty credit, dilution and delivery risks	**77,420**	**69,133**
Internal Ratings-Based approach	**77,420**	**69,133**
Foundation Internal Ratings-Based approach		
- central governments and central banks	8,831	9,106
- institutions	22,472	21,783
- corporates	10,100	10,014
- securitisation positions	-	-
Capital requirements for equity under IRB		
- Simple risk weight method	3,515	11,074
Other non-credit obligation assets	32,502	17,156
Capital requirements for position, foreign exchange and commodity risks	**16,789**	**377**
Standardised approach	16,789	377
- Foreign exchange[1]	16,789	377
Capital requirements for operational risk	**296,991**	**211,116**
Basic Indicator Approach	5,053	-
Standardised Approach	69,818	
Advanced Measurement Approach	222,120	211,116
Capital ratios		
Total	42,7%	43,8%
Tier 1	42,7%	35,4%

Any difference between total amounts and the sum of components are due to rounding.

[1] Risk on open foreign exchange positions, on- and off- balance sheet.

Economic capital

Economic capital is the internal view on the amount of capital that Euroclear needs to have in order to protect itself from unexpected losses resulting from the risks it faces in its various activities. Euroclear has an internal view on the amount of capital needed by each of its entities. Economic capital is one of the main building blocks of the ICAAP under Pillar 2.

The Internal Capital Measurement Approach

The objective of the Internal Capital Measurement Approach (ICMA) is to establish high level principles that can be applied to all entities of the Euroclear group, to ensure they have sufficient capital to cover their risks. The approach is consistent across all entities of the Euroclear group. It also clarifies the treatment of newly acquired entities.

In particular, the ICMA explicitly sets for each "material" entity[1] a 99.98% confidence level for the probability of not defaulting over a one year horizon. This confidence level, one of the most conservative used by financial institutions, is consistent with a AA+ credit rating and with the systemic importance of each material entity of the Euroclear group.

The ICMA is an essential component of Euroclear's Pillar 2.

[1] Entities which offer post-trading services (i.e. clearing, settlement, safekeeping, order routing and other related services) and/or support services to operate these post-trading activities are considered to be material.

Euroclear Bank

Euroclear Bank has adopted a three-step approach for the determination of its economic capital.

The first step aims at quantifying the capital required for Euroclear Bank to maintain an AA+ credit rating, given an expected portfolio of risks. A Value-at-Risk (VaR) model, based on the output of Monte Carlo simulations, is used for this exercise, while the targeted rating determines the required confidence interval, which is 99,98%.

In a second step, a buffer is added to ensure sufficient capital in difficult times. It is based on the assessment of the potential impact on capital of a number of stress scenarios, per risk type. The level of the buffer is equal to the difference between the economic capital required to withstand the highest impact stress test and the base case.

The chosen scenarios are approved by the relevant committees: the Credit and Assets and Liabilities Committee for the credit risk and market risk stress test scenarios, and the Operating Committee for the operational risk stress test scenarios.

In a third step, additional buffers are added, among others, as a provision against model risk and to ensure sufficient capital stability. The buffer for model risk aims to provide an additional protection for the uncertainty about the conceptual correctness and completeness of the model. The role of the buffer for capital stability is to balance the possible yearly variations of the capital requirement as a result of temporary changes in the risk profile of the Bank.

Risk appetite and risk tolerance

A risk appetite is set, which corresponds to the amount of risk that Euroclear Bank is prepared to run to carry out its business. It is set per risk type and is limited by the available capital set annually by the Board of Euroclear Bank for the whole portfolio of risks.

The upper tolerance level is set by the Board and is determined by calculating how much the risk profile of that risk type can increase before it, combined with the upper tolerance level for the other risk types, consumes the available capital buffer.

Capital planning

Euroclear establishes a multi-year capital plan that is reviewed annually, taking into account strategic developments and expected business evolution, as well as stress scenarios.

Euroclear SA/NV

The capital plan for Euroclear SA/NV is based on the following principles:

1. it is assumed that during the next five years each legal entity of the group will need to hold enough capital to cover its own risks.

   The ESA consolidated capital plan can thus be viewed as the sum of individual capital plans; for the time being, it does not take diversification benefits into account;

2. the different constraints on the capital are analysed for each entity and include internal (economic capital (EC), stress scenarios) and external (regulators, rating agencies) views on the capital required; and

3. for each entity, at least two scenarios are analysed: (i) a scenario based on the financial multi-year plan; and (ii) a "stressed" scenario with stronger than expected growth in business volumes.

Euroclear Bank

The recommendation for the minimum capital required is determined, subject to the following capital constraints, the first two applying to core equity[1], the others to total capital:

- **the Economic Capital (EC) requirement**, determined according to the methodology described above;

- the maintenance of **Euroclear Bank's credit rating**;

- **Pillar 1 of Basel II**, which sets the minimum regulatory own funds (Tier 1 + Tier 2) required to cover credit, market and operational risks;

- **the regulatory limit on credit exposure concentration**, which determines the maximum credit exposure that can be concentrated on a single family of Participants or counterparties. The level of regulatory own funds must be sufficient to allow the bank to operate without frequent breaches of the regulatory limit;

- **the internal credit policy**, which sets limits relative to capital on the total exposure that Euroclear Bank can incur on a single family of Participants or counterparties.

[1] Core equity broadly corresponds to Tier 1 capital for regulatory purposes. It corresponds to shareholders' equity, including year profit, and excluding intangible assets (essentially goodwill), financial fixed assets, dividends payable and (intra-group) loan arrangements.

Risk management framework and governance

Euroclear plays a central role in securities settlement in Europe. This confers the responsibility to ensure that settlement takes place safely and efficiently. This is true for the CSDs, which provide delivery-versus-payment (DVP) settlement services, and also for Euroclear Bank, which is the sole entity within the group that offers banking services to its Participants. With that in mind, Euroclear manages the risks that it faces with great care and conscious of its responsibilities vis-à-vis the market. Well-functioning settlement systems allow markets to perform their function well and resources to be allocated rapidly where they are most necessary.

Enterprise Risk Management (ERM)

Euroclear has developed and maintains its risk management framework in accordance with best practices for risk management and regulatory guidelines. These include the work of COSO (Committee of Sponsoring Organizations of the Treadway Commission), which has established a common internal control model against which companies may assess their control systems and on which Euroclear's Enterprise Risk Management (ERM) Framework is based, the ISO 31000:2009 principles and generic guidelines on risk management and ISO 27001:2005 guidelines for Information Security, CBFA circulars, as well as the standards and guidelines issued by the Basel Committee on Banking Supervision and the Committee of European Banking Supervisors.

Euroclear uses an ERM framework to ensure a coherent approach to risk management, with effective controls commensurate with Euroclear's intention to maintain a low risk profile. Biennially, the CRO presents the status of the ERM framework to the Risk Committee.

Risk register

At the heart of the framework is the Risk Register, which captures the risks that Euroclear faces in pursuing its corporate objectives. Seven principal risk categories have been identified ("enterprise risks"). Three arise from the provision of Euroclear's day-to-day services (credit, liquidity and operational risk). Another three are related to the environment in which Euroclear operates (market, business and strategic risk) and one risk (strategic programme risk) was addressed separately, as it was particularly important for the organisation and was managed independently from day-to-day services. With the stopping of the Single Platform, this risk is no longer separately identified; the risks of project developments are addressed under operational and business risks. The impact of these seven risks on the different entities within the group is assessed separately.

To manage these risks, the Board and management set limits on the amount of risk that Euroclear entities can absorb (risk tolerance) and/or are prepared to accept (risk appetite). Such limits are either explicit (for market, credit, liquidity and operational risk) or implicit (for business, strategic and strategic programme risk) through the definition of targets and objectives.

Risks related to the provision of our services

Credit	The risk of loss (direct or contingent) arising from the failure of a counterparty to meet its obligations to Euroclear.
Liquidity	The risk of loss (financial or non-financial) arising from Euroclear being unable to settle an obligation for full value when due. Liquidity risk does not imply that Euroclear is insolvent since it may be able to settle the required debit obligations at some unspecified time thereafter.
Operational	The risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events. Operational risk can have a financial or a reputational impact. Euroclear adopts the Basel II definition of operational risk which views operational risk as an umbrella risk, encompassing:
Processing risk	The risk of loss (financial or reputation) resulting from inadequate or failed internal processes, people, system or external events. Indirect consequences of operational risk on liquidity, credit and market risks are included, as well as relationship management risk (not knowing our customers or service partners when or after admitting them) and project risk (i.e. projects not considered as strategic which usually have an agreed time horizon shorter than 12 months). Risk related to breaches in corporate and information security (including business continuity), errors from third-party service providers and inadequate communication with the media is also included.
Accounting risk	The risk of loss (financial or reputational) arising from the failure to produce timely and accurate management reporting and financial statements which provide a fair representation of the company's financial situation.
Ethical conduct, legal and compliance risk	The risk of loss (financial or non-financial) arising from the failure to act with integrity, fairness and honesty; from a failure to adapt to changes in the legal and regulatory environment; from a failure to anticipate, identify, understand or comply with relevant laws and regulations; or from a failure to competently negotiate, implement, comply with or enforce contracts.

Risks related to the environment in which we operate

Market	The uncertainty on future earnings and on the value of assets and liabilities (on or off balance sheet) due to changes in interest rates, foreign exchange rates, equity prices or commodity prices.
Business	The risk of revenues being different from forecast as a result of the inherent uncertainty associated with business planning over a 2 year time horizon or of unanticipated changes in the nature or level of market activity serviced by Euroclear.
Strategic	The risk of the business model not being appropriate to deliver the corporate vision as a result of restrictions in the ability to implement internal change, external changes in the environment in which Euroclear operates or the inherent uncertainty associated with business planning over a medium to longterm horizon.

Internal Controls System (ICS)

In line with best market practice, Euroclear has adopted a three lines of defence model. The allocation of responsibilities within Euroclear's three lines of defence model is:

- **1st line of defence**: Business implements and operates required controls and reports on their effectiveness. Control functions provide support:
  - Compliance monitors changes in laws and regulations and advises as to what controls are required.
  - Risk Management makes available policies, a risk management framework and adequate tools to record and monitor controls.

- **2nd line of defence**: Risk Management monitors the Risk and Internal Control environment against changes in the internal and external environment and reports, challenges or escalates risks or control defects to management. Risk Management advises on remedial actions.
  - Compliance monitors, tests and reports to management on controls relating to laws and regulations and advises on remedial actions, if needed.
  - Other support functions like Finance or HR perform controls and escalate to management if they find control defects.

- **3rd line of defence**: Internal Audit independently reviews and tests the controls and reports to management and the Boards through the Audit Committees.

Control objectives

The Risk Register is supported by high level control objectives, established by the Euroclear SA/NV Management Committee to mitigate the risks in the Risk Register. These high-level control objectives encompass all high-level processes that need to be realised effectively to allow individual business areas to achieve their business objectives. Control objectives provide guidance to the organisation on the expected level of internal control in each entity and division of the group. Each of the high level control objectives has a senior business management owner who is overall accountable for ensuring that risks are appropriately mitigated.

The high level control objectives are supported by level two control objectives, agreed with business management, explaining in more detail how business areas can achieve their control objectives and providing a clear link to the mission of each business unit. Finally, the level two control objectives are supported by detailed controls and control processes, designed by the business and describing how the risks impacting business activities are to be mitigated.

These control objectives are the foundation of Euroclear's ICS. Euroclear's ICS has been designed in line with the guidance set out in the Turnbull Report and with reference to guidance provided by the Committee of Sponsoring Organizations of the Treadway Commission (COSO), Basel II and the CBFA circular on the responsibility of executive management and the Board in the establishment of an appropriate ICS.

Risk Management offers guidance and tools to support the roll-out of the controls underpinning these control objectives. Business management maintains Control Maps to link the detailed controls in place with the overall control objectives, aiming at building a sound and complete control environment. They are also used to monitor controls activity, highlighting missing or ineffective controls and help to ensure the completeness of the action plans necessary to close control gaps.

Risk Monitoring through Self-Assessments

The control objectives are the basis of the annual Risk & Control Self-Assessments (RCSAs). These qualitative self-assessments and the complementary quantitative Horizontal Self-Assessments (HSAs) are key components of the ERM framework. The RCSAs and HSAs aim to achieve the following objectives:

- build an accurate and consistent assessment of the ICS, i.e. to achieve a good understanding of the risk profile of the business;
- increase risk awareness and promote an ongoing assessment of risks and controls by business managers;
- identify new risks by bringing together experts and less experienced people in brainstorming sessions ;
- obtain quantification of the risks faced by Euroclear at 'risk event level', service level and entity level;
- ensure that individual risks in the ICS are identified proactively and that they are addressed adequately; and
- help management make a well-founded statement on the effectiveness of the ICS.

Both the high level and level two control objectives are re-validated with each of the owners through workshops across the group, facilitated by Risk Management and where Risk Management challenges business owners' assessments. Risk Management then consolidates and summarises the results of these self-assessments, discusses them with the Management Committee of Euroclear SA/NV and its subsidiaries and reports them to the Board of Euroclear SA/NV.

Risk Assessment and Measurement

Euroclear encourages the proactive identification of risks and control weaknesses, as opposed to the reactive logging of risks.

Among other things, the daily monitoring of key risk and key performance indicators (KRIs and KPIs), the systematic risk assessments associated with the new product or service approval process, and self-assessment processes contribute to facilitating pro-active identification.

Euroclear has developed an assessment and rating methodology which enables operational risks to be classified according to their impact on the risk profile of the relevant business areas or Euroclear entities. Determining the criticality of other risks also entails an assessment of their potential impact on Euroclear's risk profile.

Risk response

There are four different ways in which business management can respond to risks.

- **Mitigate** – mitigating risks entails reducing the likelihood that they materialise or reducing their potential impact. This can be done e.g. by adding controls or, in the case of credit risk, by making use of collateral. Mitigating action plans and their target dates are all logged. The business areas are responsible for developing solutions to mitigate risks effectively, with Risk Management providing an advisory role for material risks. The successful implementation of these mitigating actions is monitored through KPI reporting and RCSAs. The timeliness of risk resolution is a key indicator in the group's Balanced Scorecard. The time allowed for mitigating risks is commensurate with the impact of the risk (i.e. 6 months for a high priority risk, 12 months for a medium).

- **Accept** - risks can be accepted when the costs required to mitigate the risk outweigh the benefits. The decision to accept a risk is made by the business owners or by the relevant Management Committee depending upon the impact of the risk. There is a formal process to re-certifiy all accepted risks regularly.

- **Transfer / Insure / Hedge** - business owners can transfer a risk to a third party, typically through insurance. Euroclear has a group insurance programme that covers most insurable risks. Situations are tracked where large risk exposures can be transferred to a third party via insurance or a hedge at corporate level, e.g. macro-hedges to cover interest rate or foreign exchange risks. In cases where such a transfer is not possible, other business resilience measures are considered.

- **Avoid** - risk are avoided if Euroclear opts not to engage in certain activities (e.g. particular transactions, credit provision, the launch of a new product or service) or to change its business model, because the risk of having large losses exceeds the risk appetite for any relevant risk type.

Euroclear aims to implement the framework consistently across the group. Detailed implementation may vary slightly to reflect each entity's specificities (e.g. its size, its relations with local regulators, local requirements etc.) Overall, tools and practices are largely harmonised.

Specific information on the risk management of credit, market, liquidity and operational risks is provided separately in the report.

Governance

Euroclear Plc and Euroclear SA/NV

Euroclear Plc is governed by the **Euroclear Plc Board**, which has delegated authority to the **Audit Committee** for the review of the control environment.

Euroclear SA/NV is governed by the **Euroclear SA/NV Board** which is advised on topics related to risk by the following committees:

- the **Risk Committee**, which advises the various boards on risk matters relating to the management of operational, credit, market, liquidity, investment and legal risks and makes recommendations with regard to the approval or revision of relevant policies. The Risk Committee also hosts an annual risk forum, to consider together with external risk experts key topics of importance to the Euroclear group.

- the **Audit Committees**. The Audit Committee of Euroclear SA/NV has the same composition as the Audit Committee of Euroclear plc. These two committees generally meet in joint sessions. They assist the boards in fulfilling their oversight responsibilities, review and make recommendations in relation to ESA's and the group's financial results, the financial reporting process, as well as the effectiveness of ESA and group internal controls, the group's process for monitoring compliance with laws and regulations and approval of annual internal and external audit plans.

The Euroclear SA/NV Board has delegated authority to the Euroclear SA/NV Management Committee to manage the day-to-day business of Euroclear SA/NV.

The Euroclear SA/NV Management Committee is advised on matters related to risk by the:

- **Group Risk Committee**, which monitors the ERM framework including the ICS. It reviews and advises on the group risk profile, the report on the effectiveness of the ICS, Board risk policies and risk issues with significant cross-divisional impacts. The committee is delegated the power to approve Management Resolutions relating mainly to operational risk policies, to validate material assumptions related to the operational risk models, as well as risk assessments of Euroclear SA/NV activities affecting at least two (I)CSDs.

- **Group Admission Committee**, which reviews regularly the new client profiles and their impact on the overall business portfolio.

Euroclear Bank

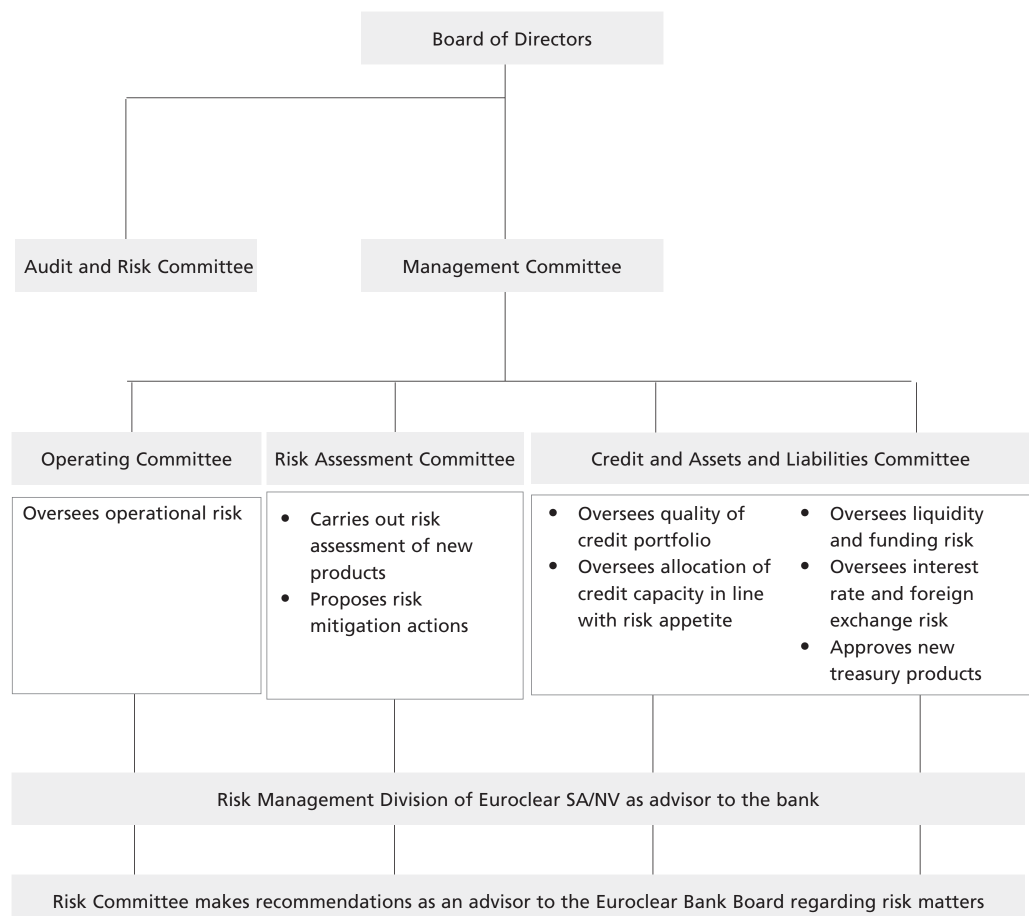
Euroclear Bank's **Board of Directors** determines the strategic direction and establishes the governing policies of Euroclear Bank, including risk and audit policies. The Board of Directors is supported by the Euroclear SA/NV Risk Committee and a Euroclear Bank Audit and Risk Committee.

The Euroclear Bank **Management Committee** is the major decision-making committee running the day-to-day business of Euroclear Bank. It is responsible for implementing the strategy, policies and objectives set by the Euroclear Bank Board and for managing all risks (e.g. operational, market, credit, liquidity, investment and legal risks) within the guidelines set by the Euroclear Bank Board.

Several internal committees have been established to assist the Management Committee, including the:

- **Operating Committee**, which oversees operational risks;
- **Credit and Assets and Liabilities Committee (CALCO)**, which oversees liquidity and funding risk, interest rate and foreign exchange risk, and approves new treasury products, and also oversees the quality of the credit portfolio and the allocation of credit capacity in line with the risk appetite;
- **Risk Assessment Committee**, which carries out risk assessment of new products and services, and proposes risk mitigation actions.

These committees also propose policy changes.



Other Euroclear entities

For the CSDs of the Euroclear group, risk committees or operating committees are responsible for monitoring (potential) risks faced by each entity and advising local management teams with regard to risk matters. This is the case of the Euroclear UK and Ireland Risk Committee (ERIC) and of the ESES Operating Committee.

Risk management responsibilities

To ensure complete and consistent management of the risks faced by each of its services, Euroclear has organised its risk management function at group level. The Risk Management Division is part of Euroclear SA/NV and supports all the other entities of the group.

The Euroclear SA/NV Risk Management Division seeks to ensure that risk acceptance by Euroclear companies is consistent with their risk appetites and their role as market infrastructure, and that stakeholders have confidence in the quality of risk management across the group.

The Risk Management Division implements an approach which enables the identification and understanding of all material current and prospective risks and the management of appropriate responses.

This is done by providing:
- a coherent effective framework,
- suitable training,
- useful tools,
- expert impartial advice,
- timely risk assessments,
- escalation of material risk issues,
- informed relevant reporting,

which enable risks to be managed well.

More specifically, Risk Management develops and oversees appropriate risk management policies and procedures and advises on related risk activities. Risk Management is responsible for the following generic types of activity for each of the risks it covers:

- Risk Policy Setting: the definition of the corporate rules of conduct related to those risk areas where a violation of the corporate policy may lead to (i) severe losses affecting the creditworthiness of any company of the Group; (ii) permanent damage to its reputation or (iii) unacceptable levels of systemic risk;

- Risk Assessment & Measurement: tools and methods for risk definition and measurement; identification and assessment of the various risk exposures, their likelihood of occurrence and the required loss absorption capacity;

- Risk Advice: expert impartial risk advice;

- Risk Monitoring: the follow-up of exceptions, action plans, new products and changes in risk profile; oversight over the various risk portfolios and reporting to the appropriate levels (local and Group);

- If needed, escalation of material risk issues to the various Management Committees and Board Risk Committees or local Audit and Risk Committees; and

- Risk Transfer: the identification and tracking of situations where large risk exposures can be transferred to a third party via insurance or a hedge at the corporate level (e.g. macro-hedges to cover interest rate or foreign exchange risks). In cases where such a transfer is not possible, other business resilience measures are considered.

Risk Management operates independently from other functions in the group and reports directly to the CEO. It is headed by a Chief Risk Officer (CRO) who is also a member of the Euroclear Bank Management Committee and of the Extended Management Committee of the Group.

The performance and compensation of the CRO is reviewed and approved by the Board Risk Committee. The independence of the CRO is reinforced through his direct access to the Chairman and members of the Euroclear SA/NV Risk Committee, the Chairman of the Boards of Directors of Euroclear SA/NV and Euroclear Bank SA/NV, and the external auditors. The CRO and his staff are authorised to have direct communication with any member of staff, to examine any activity or entity of the Euroclear Group, as well as to access any records, files or data, including management information and the minutes of the Board and its committees, whenever relevant in the performance of their work.

Corporate risk managers (CRMs) help different entities or group level divisions identify and assess the risks that they run, and monitor and report on their risk profile.

The Risk Middle Office function has a number of day-to-day monitoring and control functions, and has various responsibilities with regard to controlling the appropriate use of the securities valuation model and of the internal credit rating model. This is discussed in the chapter on credit risk management.

Reporting and Escalation

Risk Management ensures that risks are known and understood by management. Risk Management escalates to the appropriate level material risk issues to ensure that the relevant management, Board, Audit or Risk Committee is aware of the emergence of new risks, of the evolution of identified risks, and of any cases where the mitigating actions for an existing risk may be insufficient in scope or put in place later than originally intended.

Risk Management regularly reports risk issues relating to operational, credit, liquidity, market, business and strategic risks to business management. Reporting is tailored to the audience, ranging from detailed information on actual risks to line management, to high level summaries of major risks and incidents, as well as calculations of related regulatory and economic capital requirements for senior management and the Board of Directors.

At least quarterly, Risk Management reports formally to the local management teams, their risk committees, the Group Risk Committee, and the Risk Committee of the Board of Euroclear SA/NV, detailing the status and trend of the risk profile and commenting on the key risks. This reporting is in addition to the frequent input of Risk Management to the relevant governance bodies on business matters.

With the same frequency, the CRO reports on the overall Group Risk Profile, summarising the key risks at group level, to the Euroclear SA/NV Management Committee and to the Risk Committee of the Board of Euroclear SA/NV. Based on this Risk Profile, risk reports per division or entity are prepared and discussed with the respective management teams.

Other divisions with risk and control responsibilities

Other divisions have certain risk management and control responsibilities:

- the Euroclear Bank **Credit** Department (within the Network and Banking Division) is responsible for assessing the creditworthiness of Participants, negotiating credit documentation, as well as setting and reviewing credit lines;

- the Euroclear Bank **Treasury** assesses the adequacy of Euroclear Bank's liquidity sources, defines and reviews regularly the size of the liquidity contingency plan and defines and maintains the relevant models and procedures. On a day-to-day basis, it ensures that sufficient liquidity is available to enable Euroclear Bank to meet its commitments;

- the Euroclear SA/NV **Legal** Division is responsible for identifying and advising on the legal, regulatory and compliance issues arising from the provision of Euroclear services;

- the Euroclear SA/NV **Financial** Division is primarily responsible for accounting, corporate taxes, financial, regulatory and management reporting. The Financial Division maintains the primary co-ordination function for the reporting relationship with the regulatory agencies; and

- the Euroclear SA/NV **Audit** Division is primarily responsible for objectively evaluating and reporting the appropriateness and adequate usage of risks and controls.

In addition, business managers are directly responsible for managing all aspects of risk relevant to their business areas, including the implementation of the necessary mitigating controls.

Credit risk management

Credit risk is the risk of loss (direct or contingent) arising from the default or failure of a Participant or counterparty to meet its obligations to Euroclear. The degree of credit risk depends on the credit standing of the Participant or counterparty and on the duration, amount and nature of the exposure that Euroclear has on that Participant or counterparty.

Strategies and processes for credit risk management

Euroclear Bank

Credit decisions are made at the discretion of Euroclear Bank, which accepts credit risk only within its risk appetite. The risk appetite for credit risk in Euroclear Bank is limited by:

- the available capital allocated annually for credit risk (the "upper tolerance level") by the Euroclear Bank Board;
- regulatory limits - caps - including risk concentration limits and capital adequacy ratios; and
- internal limits, for example, credit limits, country limits, treasury limits proposed by the Risk Management Division and approved by the Euroclear Bank Management Committee.

The risk of a credit loss for Euroclear Bank is very low and Euroclear Bank has never suffered a credit loss in its entire history, not even during the period of market turmoil. This is largely due to the very short duration of the credit exposure which, in general, is intra-day.

Additionally, Euroclear Bank applies very strict collateralisation rules, resulting in average collateralisation levels, for its client exposure above 99%. These exposures are mostly secured with very high quality collateral.

Euroclear Bank also has treasury exposures resulting from Participants' end-of-day positions. Such positions are usually redeposited in the market with high quality counterparties. Where possible, repos are used, but some exposure remains unsecured. The risks are limited by their short duration (mainly overnight), as well as by policy limits.

To comply with the qualitative and quantitative requirements of Basel II, Euroclear Bank has been using an internal rating model since the end of 2005. The model allows credit officers to rate all Participants and counterparties granted credit or market facilities and all the countries where Euroclear Bank has credit exposure. Box 1 on page 34 provides more information on the short-term credit exposures of Euroclear Bank.

Short-term credit provision by Euroclear Bank

Euroclear Bank extends short-term credit to its Participants to facilitate the settlement of securities transactions. When the buyer does not have sufficient cash in its account to settle a transaction, temporary credit is extended, allowing settlement to take place efficiently. Such credit extensions, which create 'operating exposure', can occur when:

- Participants do not hold their cash reserves in Euroclear Bank; and/or
- There are structural time lags in the flow of funds as a result of time-zone differences and differences in operating hours of the various intermediaries involved in the payments.

In other words, operating exposure results from temporary mismatches between incoming and outgoing funds on a Participant's account.

Outgoing cash flows can:

- Fund purchases of securities within the Euroclear system;
- Fund cross-border receipts of securities; or
- Be sent out of the Euroclear system in the form of wire transfers.

Incoming funds can come from:

- Sales of securities within the Euroclear system;
- Cross-border deliveries of securities; and
- Credit on Participants accounts from external intermediaries.

Generally, the duration of operating exposure is less than 24 hours (i.e. intraday). The duration varies with the sources of exposure and funding. Participants for which cash flows are mainly driven by purchases and sales within the Euroclear system in a back-to-back mode, need credit only for a few milliseconds, to allow the transactions to settle. Operating exposure that needs to be funded by either cross-border deliveries or credits on Participant accounts from external intermediaries tends to last longer, up to several hours. Only in unforeseen circumstances (primarily as the result of settlement failures or delayed credits) can part of the operating exposure become an end-of-day overdraft retained in the books of the bank until the next day.

In addition, Euroclear Bank may extend short-term credit in advance of the receipt of income and redemption proceeds on securities. This allows Participants to use the funds on the day on which these payment are received. This is common market practice. Euroclear Bank applies strict risk management criteria on such credit, advancing funds only for well-rated securities and Participants.

Admission criteria

Euroclear Bank controls the credit risks on its Participants by using stringent criteria for both the admission of new clients and the provision of credit.

Applications from financial institutions that want to become Participants are reviewed by the Euroclear Group Admission Committee, taking into consideration, among others, the following factors:

- **Financial resources**: an applicant must demonstrate its ability to maintain adequate financial strength to support the use of Euroclear Bank's services.
- **Operational and technical capabilities**: an applicant must demonstrate that it has personnel capable of efficiently administering the organisation's use of the Euroclear system, and that it has adequate facilities (e.g. technological infrastructure, communication systems, books, records and procedures) to meet the operational requirements of the Euroclear system.
- **Need for Euroclear Bank's services**: an applicant must demonstrate that it expects to derive material benefit from direct access to Euroclear Bank, and generate a sufficient volume of depot or transactions to justify admission.
- **Reputation in the market**: the applicant's name must have good standing in the market; regulatory status may be taken into account when evaluating an applicant's reputation.
- **Anti-money laundering programme**: an applicant must demonstrate that it has an adequate anti-money laundering programme designed to comply with local law on the prevention and detection of money laundering and provide sufficient identification, control and reporting procedures.

Credit facilities for Euroclear Bank Participants

Euroclear Bank may offer credit facilities to Participants on an uncommitted basis. Such facilities are always multi-currency and multi-purpose and can be reduced or withdrawn at any time, without notice. Credit officers within the Credit department determine whether or not credit facilities can be offered to a given Participant, and the size of such facilities. The size of the credit facilities is reviewed annually.

Participants may receive temporary credit in excess of their credit facilities, upon appropriate approvals. The objective of the temporary credit is to unblock transactions that would otherwise prevent the settlement of a chain of transactions, which could result in liquidity risks for Euroclear Participants. Such additional credit thus contains systemic risk.

Euroclear Bank limits the aggregate operating exposure to any family of Participants, as explained in the chapter on Liquidity risk management.

Participants that benefit from credit facilities are required to execute special credit documentation with Euroclear Bank. More information on this can be found in the chapter on Operational risk management.

Credit facilities are primarily used for the following purposes:

- Intraday cash borrowing: Use of credit can allow for securities settlement without the need for pre-funding accounts.

- Commitments in connection with local market settlements: Euroclear Bank may extend credit to Participants to facilitate local market settlements, as from when it sends instructions to the local market for either matching or settlement purposes.

- Securities borrowing: Participants must have credit arrangements in place with Euroclear Bank as a prerequisite to borrowing securities through the Euroclear Securities Lending and Borrowing Programme. A securities borrowing constitutes an extension of credit to a borrower, to cover the guarantee given by Euroclear Bank to the lender that it will be reimbursed. Securities borrowings are subject to a cap set per Participant.

Credit exposures to other counterparties

In addition to the operating exposure on Participants, Euroclear Bank is exposed to financial institutions as a result of regular treasury operations, including:

- placements of funds at end-of-day in the market: though Euroclear Bank makes regular use of reverse repos, some of its treasury exposure is unsecured. This type of exposure is usually very short-term;

- short-term derivative transactions: Euroclear Bank faces counterparty credit risk when it buys options or enters into future contracts to hedge its foreign exchange and interest rate exposures. More information on this can be found in the chapter on Market risk management; and

- foreign exchange transactions: as an institution located in multiple countries and active in many markets, Euroclear Bank needs to conduct foreign exchange operations, including FX swaps. Such transactions expose Euroclear Bank to settlement risk.

These credit exposures are limited by specific facilities for market transactions. Additionally, aggregate unsecured exposures to any family of Participants and/or counterparties are expected to remain within the limits set by the Board of Directors.

Credit officers within the credit department determine whether or not market facilities can be offered to a given counterparty, and the size of such facilities. Voluntary exposure on non-investment grade counterparties is not allowed. The rules are more strict for exposures that last longer than two weeks.

The Euroclear CSDs

As their transactions settle in central bank money, the CSDs have no direct cash relationship with their clients. Consequently, they cannot extend loans or credit facilities to their customers. The CSDs can potentially face a low level of credit risk arising from the non-payment of fees by their clients. These are limited amounts, considering both the frequency of the billing and their relatively broad customer base. Each CSD of the group is required by its home regulator to hold enough liquidity to cover such risks. Finally, the CSDs are also exposed to the credit risk related to the reinvestment of their cash surplus with their bank counterparties. To limit the credit risk taken on such counterparties, the banks that are considered for these investments should have a rating of at least AA- or above. However, in the current market context, where a large number of institutions have suffered from credit rating downgrades, a list of A+ rated banks has exceptionally been considered, in case government support is provided to them. The type of instruments used is limited to short-term or overnight deposits.

Concentration risk

Concentration limits are set to ensure that the group does not take too large exposures on too few Participants or counterparties. European and Belgian banking regulations also impose risk concentration limits that have to be respected for each applicable exposure. Individual exposures above 25% of the own funds (Tier 1 + Tier 2 – deductions) are reported as breaches under the large exposures regulation. Until 31 December 2010, the sum of all large exposures combined also had to remain below 800% of the own funds.

Euroclear SA/NV and Euroclear Belgium, both located in Belgium, are subject to capital adequacy regulations equivalent to those applicable to Euroclear Bank. This stems from their regulatory status, as a settlement institution for Euroclear Belgium, and as a company closely related to a settlement institution for Euroclear SA/NV. Consequently, both entities have to make sure that they do not breach the same concentration limits as defined above for Euroclear Bank.

In order to mitigate their concentration risk, Euroclear SA/NV and Euroclear Belgium invest their cash surplus with a minimum of two external counterparties. Euroclear policy applies this approach to other group CSDs, even though they are not subject to the same capital adequacy rules.

Rating concentration of financial assets

On average, in 2010, some 98% of the settlement exposure (secured and unsecured) Euroclear Bank took was on investment grade rated Participants, while about 99% of treasury exposure was on investment grade institutions. In addition, on average close to 99% of the settlement exposure is secured and most of this exposure is intra-day. Therefore, there are no expected credit losses and no impairment provision has ever been required.

As for the exposure taken on its investment book, Euroclear Bank follows a conservative approach. Any security held in the investment book, which in IFRS terms is to be understood as all fixed income securities belonging to the available-for-sale or held-to-maturity portfolios, needs to have a credit rating equal to, or greater than, AA-.

In March 2011, 100% of the securities held by Euroclear Bank were rated AAA.

Finally, as mentioned earlier, the surplus cash of Euroclear SA/NV and of the CSDs is invested short-term with counterparties whose rating is at least equal to AA-. This places strong limits on the credit risk they face.

Credit risk monitoring and controls

The Risk Middle Office function in the Risk Management Division performs extensive controls at various frequencies. Daily, weekly, monthly and quarterly reports are produced for various stakeholders within the organisation to ensure compliance with and correct implementation of the risk framework defined and approved by the Board of Directors.

Credit exposures

Standardised approach

Euroclear applies the standardised approach at the level of Euroclear SA/NV stand-alone, and at the level of Euroclear Belgium, as these entities bear very little credit risk. For these entities, there is no intention to evolve towards an Internal Ratings-Based (IRB) approach in the short term, though this might be reassessed at a later stage, if deemed necessary.

For exposures that can be allocated to specific counterparties, Euroclear makes use of external ratings from the three major rating agencies, Moody's, Standard & Poor's and Fitch. In line with Belgian law, the second-best rating is chosen.

Internal ratings-based approach

For credit risk, the FIRBA is used for Euroclear Bank stand-alone and consolidated, Euroclear SA/NV consolidated and Euroclear plc consolidated. Euroclear makes its own judgements about the ratings of counterparties and Participants, and assigns its own probabilities of default. This gives significant capital benefits compared to the standardised approach. The AIRBA would have required the use of internal Loss-Given-Default statistics, which Euroclear does not have, as it has not incurred any credit loss to date.

Euroclear has been authorised by the CBFA to use a maturity-adjustment factor in its model, to account for the very short durations of its exposures. At 14 days, this maturity adjustment factor has been chosen very conservatively to reflect the delays that Euroclear would face when trying to realise the collateral of a defaulting Participant. The maturity adjustment factor is not used for exposures with a clearly defined or longer maturity (e.g. derivatives contracts or investments held in the investment book).

The table on the next page shows total and average exposures under the FIRBA.

	Euroclear plc consolidated and Euroclear SA/NV consolidated[1]			
31 December 2010 (€'000)	**Total exposures**	**Central governments and central banks**	**Institutions**	**Corporates**
Total gross credit exposures Euroclear plc	20,235,920	2,024,833	17,863,315	347,772
Total gross credit exposures Euroclear SA/NV	20,257,828	2,024,833	17,885,253	347,772
Average gross credit exposures Euroclear SA/NV[2]	24,267,661	3,641,444	20,222,985	403,232

(1) Any difference between total amounts and the sum of components are due to rounding.

(2) Average gross exposure is based on four data points taken at the end of each quarter. There are some important fluctuations in the data. Figures for Euroclear plc are only available for Q2 and Q4; the resulting average would be less accurate.

The table below provides information on the geographical concentration of exposures, before credit risk mitigation, which are mostly concentrated in (Western) Europe and North America. The geographical regions are those in which Euroclear Participants or counterparties are located. Cash is always classified under the country of the issuing central bank.

Geographical concentration of credit exposures

	Euroclear plc consolidated[1]			
31 December 2010 (€'000)	**Total exposures**	**Central governments and central banks**	**Institutions**	**Corporates**
Western Europe[2]	19,114,582	2,024,827	16,827,688	262,067
North America	517,548	3	433,741	83,804
Asia	290,886	0	290,880	6
Latin America and Carribean	148,393	0	148,391	2
Oceania	75,578	0	75,574	4
Other Europe[3]	57,381	0	57,381	0
Africa	21,186	4	19,294	1,888
Middle East	2,703	0	2,703	0
Other	7,663	0	7,663	0

(1) Any difference between total amounts and the sum of components are due to rounding. The classification of countries does not correspond to the *Consolidated financial statements*, where Europe is limited to the European Union, and The Americas encompasses fewer countries than here the total of North and Latin America.

(2) Including Switzerland.

(3) Including Turkey.

Given Euroclear's role as a provider of post-trade commoditised services to financial markets, its exposures are highly concentrated on the financial sector and it does not incur exposures to non-financial industrial sectors.

The table below provides information on the residual contract maturity breakdown of the entire portfolio. Most exposures are very short-term, generally one day.

Residual maturity breakdown of credit exposures

	Euroclear plc consolidated[1]			
31 December 2010 (€'000)	**Total exposures**	**Central governments and central banks**	**Institutions**	**Corporates**
Less than two weeks[2]	16,340,876	11,311	15,981,793	347,772
2 weeks - 1 month	2,023,565	432,859	1,590,706	0
1 - 6 months	203,917	201,012	2,905	0
6 months - 1 year	332,027	50,318	281,709	0
1 year and longer	1,335,535	1,329,334	6,201	0

(1) Any difference between total amounts and the sum of components are due to rounding.

(2) Nearly all exposures have a maturity of one day. The two weeks correspond to the maturity adjustment accepted for Euroclear by the CBFA under FIRBA.

Credit exposure on equities

Euroclear applies the simple risk weight method to its banking book equity holdings, as the amount and complexity of its equity holdings is relatively limited. Under that method, a 190% risk weight is to be applied to private equity in a sufficiently diversified portfolio, 290% to exchange traded equity exposure and 370% to all other equity holdings.

The table below shows the gross exposure on equity investments, by risk weight.

Equity exposure, simple risk weights

31 December 2010 (€'000)	**Euroclear plc consolidated**
Risk weight	**Total gross exposure**
190%	0
290%	1,347
370%	10,820

Other non credit-obligation assets

Euroclear applies a 100% risk weight to exposures that are considered as non-material and not related to its core activities. These include other assets, accruals and tangible fixed assets. These exposures cannot be allocated to specific counterparties.

The table below shows total exposures related to non credit-obligation assets.

31 December 2010 (€'000)	**Euroclear plc consolidated**
Total exposures under standardised approach	406,272
On balance sheet items	406,272
Risk weight	100%

Impaired exposures

Definition of past due and impaired

In accordance with IFRS 7, assets qualify as past due when a counterparty has failed to make a payment when contractually due.

The group 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 is **impaired**. A financial asset or portfolio of financial assets is impaired or and an impairment loss is recognised where there is objective evidence that an event occurring after initial recognition of the asset has adversely affected the amount or timing of future cash flows, and this effect can be reliably estimated.

For financial assets carried at amortised cost, the amount of the impairment loss is measured as the difference between the carrying amount of the financial asset and the present value of estimated future cash flows discounted at the original market rate of return for a similar financial asset. Cash flows relating to short-term receivables (less than three months) are generally not discounted. Impairment losses are recognised immediately in profit and loss. If, in a subsequent period, the amount of the impairment or bad debt loss decreases and the decrease can be related objectively to an event occurring after the recognition of the original loss, the loss is reversed.

The reversal shall not result in a carrying amount of the financial asset that exceeds what the amortised cost would have been had the impairment not been recognised at the date the impairment is reversed.

For financial assets carried at fair value, if there is objective evidence of the impairment of an available-for-sale financial asset, the cumulative net loss (difference between amortised acquisition cost and current fair value less any impairment loss previously recognised in profit or loss) that has previously been recognised in equity is removed and recognised in the income statement. If in a subsequent period, the fair value of an available-for-sale debt instrument increases and the increase can be related objectively to an event occurring after recognition of the original loss, the loss may be reversed through profit and loss. Impairments on investments in equities cannot be reversed.

Value adjustments and provisions

According to its policies, and in line with sound banking practices and banking regulations, Euroclear makes risk provisions for credit exposures when necessary. Such provisions are made for “doubtful debt”, i.e. loans which reimbursement is uncertain. Euroclear does not have any risk provision for credit exposure at present, because it does not have any impaired assets.

Credit risk mitigation

Secured exposures

Entities of the Euroclear group other than Euroclear Bank face only limited credit risks, as they do not extend any credit to their clients or counterparties.

Euroclear Bank takes short-term (mainly intraday) credit risk by granting credit to its Participants to maximise the efficiency of securities settlement and related operations. These Participant exposures are generally collateralised.

Due to the international scope of its activities and the multi-purpose and multi-currency nature of the credit facilities granted to its Participants, the collateral pledged to Euroclear Bank is not specifically attributable to any of the different types of credit exposures Euroclear Bank has on one Participant. This means that all the collateral pledged from a specific Participant is there to guarantee all the obligations it has with Euroclear Bank without differentiating within the nature of the exposure and the original currency.

Euroclear Bank's unsecured exposure is almost exclusively treasury exposure resulting from Participants' end-of-day positions that are usually redeposited in the market. Where possible, repos are used but the remainder of the exposure is unsecured. The risks are limited by the high quality of the counterparties, the short duration (mainly overnight) of the exposure, and policy limits. In case of market-wide stress, Euroclear Bank may deposit excess cash balances at the central bank for each of the major currencies.

The paragraphs below explain how Euroclear Bank applies credit risk mitigation techniques to its intra-day and longer exposures. Appropriate credit risk mitigation has contributed to the fact that Euroclear Bank has not incurred any credit loss to date.

Use of netting

Euroclear Bank vis-à-vis its Participants

In its relationship with its Participants, Euroclear Bank has a right of set-off upon termination of participation or resignation of Participants based on the *Terms and Conditions Governing Use of Euroclear*. In these situations Euroclear Bank has the right to:

(i) set off or retain from the amounts held by Participants in their cash accounts, any amounts that are due to, or may become due to Euroclear Bank; and

(ii) retain securities held in Securities Clearance Accounts for the payment in full of any amounts which are due to, or which may become due to, Euroclear Bank.

If a Participant has a credit line, it is also bound by the General Conditions Governing Extensions of Credit and the Collateral Agreement. If such Participant is in breach of the Collateral Agreement (event of default), then Euroclear Bank may exercise its rights on the collateral deposited by that Participant. In this respect, Euroclear Bank can exercise its right of set-off or close-out netting as provided under Belgian law.

Participant positions are not netted on a day-to-day basis, as Participant positions on sub-accounts (e.g. in different currencies) are considered separately. However, Participants can use their cash as collateral to mitigate an outstanding position in another currency.

Euroclear Bank vis-à-vis its counterparties

For its treasury activities, Euroclear Bank enters into master agreements with its counterparties. These agreements allow for close-out netting of positions in case of a counterparty default. In practice, however, the impact of the netting of positions on the aggregate value of these positions might be expected to be lower than for other banks given the limited scope of Euroclear Bank's activities in the market.

Nettable positions might, for example, come from opposite treasury operations intra-day and at end-of-day. During the day, Euroclear Bank tries to forecast its end-of-day treasury position and, as that position tends to be positive, generally redeposits funds into the market. In practice, the end-of-day position may diverge from the forecast, forcing Euroclear Bank to cover an unexpected debit position or to place any unexpected cash positions it might have. In situations in which Euroclear Bank would have attracted funds from the market during the day and placed funds at the end of the day, or vice versa, with any particular counterparty, exposures on that counterparty might be calculated in case of default by netting the respective positions.

Euroclear Bank uses payment netting for margin payments on its derivatives positions. (margining is limited to interest rate futures).

Collateral valuation and management

Intra-day credit offered to Participants is generally secured by financial collateral or other recourse. Every day, Euroclear Bank assesses the collateral value of the securities held, based on prices obtained from a number of recognised external information providers, whereby the most appropriate price is selected according to the quotation selection rules. More than 80% of securities pledged in Euroclear Bank are priced every day or every second day. Securities for which Euroclear Bank does not obtain external quotations regularly can also be valued according to the price associated with securities transactions in the Euroclear system, or according to theoretical models.

In order to determine the collateral value of securities, the (estimated) market price is reduced by a haircut that depends on, among other elements, the estimated market risk on the security, the creditworthiness of the issuer of the security, the country in which the issuer is located, the denomination and the liquidity risk associated with the security. The delay since the last quotation was obtained is also taken into account, with increasing haircuts associated with longer delays. Securities whose price is not considered as a real market price are also strongly discounted. For debt securities, accrued interest is added to the clean price to obtain the market value, which is used to calculate the collateral value. The collateral valuation methodology is stress-tested and back-tested yearly.

In contrast with exposures on Participants, exposures on treasury counterparties are often not collateralised. When possible, (reverse) repos are used to mitigate the credit risk incurred on these transactions. In addition to haircuts, the risks on these transactions are limited by their short duration (mainly overnight), the use of highly-rated counter-parties, and policy limits.

The haircuts applied in the valuation of collateral are used in the calculation of economic capital needs. For regulatory capital requirements, standard supervisory haircuts are used.

Types of collateral taken

Securities or cash used as collateral are preferably held within Euroclear Bank, although Participants may also deposit certain types of collateral (some of which are not accepted in Euroclear Bank) with designated custodians in New York or Tokyo. Frequent monitoring shows that more than 95% of the collateral pledged in the Euroclear system is of investment grade quality.

Other means of recourse are also possible, in addition to external collateral or securities deposits outside the Euroclear system, including letters of credit and guarantees, double claim[1] and statutory lien[2]. All recourses must be legally valid, binding and enforceable.

Euroclear Bank does not engage in credit derivatives transactions. It does, however, in some circumstances, accept guarantees as credit risk mitigation. Guarantees are generally provided by parent financial institutions or other financial institutions, and sometimes by third parties, in favour of Euroclear Bank Participants. A guarantee de facto transfers the unsecured credit exposure that Euroclear Bank has on its Participant to the guarantor.

The management of (market or credit) risk concentrations

Euroclear Bank uses collateral concentration thresholds as risk indicators to identify exceptional levels of specific collateral that have an impact on the credit risk exposure of the Bank. Particular attention is paid to the collateral issued and/or held by non-investment grade entities. Other dimensions monitored concern the region and country of the issuer, the liquidity of the collateral, whether it is ESCB eligible, as well as the type of security. Reaching a threshold leads to appropriate approval and reporting requirements.

Credit risk mitigation and capital requirements

To calculate the effect of credit risk mitigation, Euroclear Bank applies the so-called **comprehensive approach**. Collateral valuation is based on standard supervisory haircuts, taking into account holding and revaluation periods.

The table on the next page shows the exposures faced by the Euroclear group that are covered by eligible financial collateral.

All collateralised exposures are incurred by Euroclear Bank and are therefore subject to the FIRBA.

[1] Exposures are double claim when they are to be covered directly by an entity other than the one on which Euroclear Bank has the exposure, while Euroclear Bank also has full recourse on the latter. Such exposures can only be called “double claim” if they are appropriately controlled, monitored and documented.

[2] A statutory lien is the right to take and hold or sell the property of a debtor as security or payment for a debt or duty. Belgian law grants a statutory lien to clearing and settlement institutions on assets held by their clients.

Exposures (after netting) covered by (after haircuts) eligible financial collateral

	Euroclear plc consolidated			
31 December 2010 (€'000)	Total exposures	Central governments and central banks	Institutions	Corporates
Foundation Internal ratings-based approach (FIRBA)	13,550,123	0	13,369,213	180,909

Note that in the Consolidated financial statements, reverse repos, overdrafts and exposures related to securities lending and borrowing are considered as secured. In this table, they are only considered as secured when the related collateral is eligible under Basel II.

Only a few credit risk exposures that Euroclear Bank faces are covered by guarantees. Though these guarantees represent valid risk mitigation, they are not taken into account in Euroclear Bank's calculation of regulatory capital requirements. This leads to more conservative estimates of the risks incurred. One guarantee, however, is accurately captured in the model: the letter of credit issued by a syndicate of banks to cover part of Euroclear Bank's exposure arising from activity across the electronic Bridge with Clearstream Banking Luxemburg. Euroclear Bank applies the substitution approach, when relevant.
As this information concerns an individual Participant, the details are considered to be confidential and will not be disclosed.

Credit risk measurement and modelling

FIRBA at Euroclear

The CBFA has approved the use by Euroclear of the FIRBA, which is applied at the levels of Euroclear plc, Euroclear SA/NV consolidated, as well as Euroclear Bank stand-alone and consolidated. Given their simple balance-sheet structure, Euroclear SA/NV stand-alone and Euroclear Belgium apply the Standardised Approach.

The FIRBA is characterised by the use of an internal ratings system and associated probabilities of default for the calculation of an institution's capital requirements to cover the (unexpected) credit risk it faces on its exposures. The internal ratings system should also serve as a basis for the institution's credit risk management. Though the 'Foundation' approach implies an own assessment of the risk of default of the obligor, only institutions under the 'Advanced' approach need to apply internal estimates of loss given default. Under FIRBA, the estimates of additional risk factors are derived through the application of standard supervisory rules. For exposures under the Standardised Approach, external ratings and standard supervisory rules for other risk factors are used.

To comply with the qualitative and quantitative requirements of the FIRBA, Euroclear Bank has developed a new internal rating model. This has been used by credit officers since the end of 2005 to rate all Participants and counterparties granted credit or market facilities, and to rate all the countries where the Bank has credit exposure. The rating scale is composed of 15 different rating grades and each internal rating is mapped to a probability of default. Given Euroclear Bank's absence of its own default history, it had to use external data to calibrate the probabilities of default.

The internal ratings are used not only for regulatory capital requirements calculations, but also serve Euroclear Bank's own credit risk management and can therefore be found in many applications throughout the Bank. They are used, among others, in processes related to the provision of (intra-day) credit to Participants and counterparties (e.g. to determine credit lines as well as to extend additional credit if needed on a case-by-case basis, to determine the frequency of credit line reviews and to put Participants on the special care list, which allows for closer monitoring of lower rated Participants). They are also used as an essential input to Euroclear Bank's economic capital model.

The performance of internal ratings is assessed annually by comparing the internal ratings to similar ratings issued by the major rating agencies. This performance review is combined with an overall review and validation of the model. The Risk Management Division is responsible for validating the model annually.

Model governance

Roles and responsibilities in respect of the internal rating model are shared between various departments of Euroclear Bank and the Risk Management Division (which is part of Euroclear SA/NV), ensuring an appropriate independence of the controlling and validation functions:

- The Credit department of Euroclear Bank has the overall responsibility for the model. It uses the model daily to assign the internal ratings. Entities are rated annually. It is also responsible for maintaining adequate procedures. Finally, it contributes actively, as a user, to improving the model and the procedures and participates in the yearly review.

- The Risk Middle Office function in the Risk Management Division is responsible for controlling the use of the model. These controls aim at evidencing that, among other things, procedures have been followed correctly (including for the revision and approval of ratings), the ratings of groups and of components of these groups have been conducted appropriately and entities rated Eb (see below) or lower are rated more frequently (twice a year, compared to once a year for other entities). More specific controls are also performed, on the use of particular sub-models, on the quality and consistency of ratings, and on the (justification of the) overriding of model results by credit officers. Attention is also given to the migration of ratings over time.

- The Credit and Assets and Liabilities Committee approves changes to the model that are proposed by the Risk Management and Banking Division.

- The Banking Risk and Validation functions in the Risk Management Division perform the yearly validation, issue recommendations and verify compliance. The Risk Management Division also acts as necessary approver for changes in the model.

- Finally, Internal Audit reviews independently the processes related to the use of the model within Euroclear Bank.

Internal rating process

Euroclear uses different models to fit the particular characteristics of its different types of Participant: commercial banks, investment banks, asset managers, corporates, central banks and multilateral lending institutions. Euroclear Bank does not have any retail exposures or significant exposure to equities.

Each Participant with a credit facility is assigned an internal rating that is reviewed at least annually. Reviews are more frequent for lower rated entities and meaningful external news or external ratings changes also trigger a reassessment of the relevant internal ratings. Countries in which Euroclear Bank has an exposure are also rated once a year. The country ratings are an important determinant of the ratings of Euroclear Bank’s Participants.

Given Euroclear Bank’s long-standing relationship with its Participants, the ratings are long-term.

Euroclear Bank’s ratings scale has 15 grades. Given the relatively low risk profile of its Participants, granularity is highest for the better ratings. The table on the next page provides an overview of the various rating categories, and their meaning.

Overview of Euroclear Bank's internal rating grades

Investment grade	Eaaa	Extremely strong capacity to meet its financial commitments
	Eaa+	Very strong capacity to meet its financial commitments. Upper range of 'Eaa' ratings
	Eaa	Very strong capacity to meet its financial commitments
	Eaa-	Very strong capacity to meet its financial commitments. Lower range of 'Eaa' ratings
	Ea+	Strong capacity to meet its financial commitments. The Participant rated 'A' is somewhat more susceptible to the adverse effects of changes in circumstances and economic conditions than obligations in higher-rated categories. Upper range of 'Ea' ratings
	Ea	Strong capacity to meet its financial commitments. The Participant rated 'A' is somewhat more susceptible to the adverse effects of changes in circumstances and economic conditions than obligations in higher-rated categories
	Ea-	Strong capacity to meet its financial commitments. The Participant rated 'A' is somewhat more susceptible to the adverse effects of changes in circumstances and economic conditions than obligations in higher-rated categories. Lower range of 'Ea' ratings
	Ebbb+	Adequate capacity to meet its financial commitments. However, adverse economic conditions or changing circumstances are more likely to lead to a weakened capacity of the obligor to meet its financial commitments. Upper range of 'Ebbb' ratings
	Ebbb	Adequate capacity to meet its financial commitments. However, adverse economic conditions or changing circumstances are more likely to lead to a weakened capacity of the obligor to meet its financial commitments
	Ebbb	Adequate capacity to meet its financial commitments. However, adverse economic conditions or changing circumstances are more likely to lead to a weakened capacity of the obligor to meet its financial commitments. Lower range of 'Ebbb' ratings
Speculative	Ebb+	Major ongoing uncertainties or exposure to adverse business, financial, or economic conditions which could lead to the obligor's inadequate capacity to meet its financial commitment on the obligation. Upper range of 'Ebb' ratings
	Ebb	Major ongoing uncertainties or exposure to adverse business, financial, or economic conditions which could lead to the obligor's inadequate capacity to meet its financial commitment on the obligation
	Eb	Adverse business, financial, or economic conditions will likely impair the obligor's capacity or willingness to meet its financial commitment on the obligation
	Ec	Currently highly vulnerable to non-payment
Default	Ed	The institution has failed to pay one or more of its financial obligations when it became due

Estimation of exposures

Probabilities of default are associated with all Euroclear internal rating grades. These are based on 24 years of external historical default statistics gathered by a top rating agency, as Euroclear does not have sufficient default history of its own. The mapping of these default statistics to the agency's and to Euroclear's ratings scale allows Euroclear to derive Probabilities of Default (PDs) that fit its particular ratings structure.

Euroclear uses the mandatory PD floor (0,03%) for banks and corporates.

Euroclear also does not use own estimates of Loss-Given-Default (LGD), because of the absence of a default history, but instead it applies standard supervisory LGDs. These are 45% for senior unsecured claims, 75% for unsecured subordinated claims and 0% for secured exposure after credit risk mitigation.

For an estimate of Exposures At Default (EAD), Euroclear takes the nominal amount as reflected on its books. For some facilities (e.g. undrawn commitments) it includes an estimate of future lending prior to default.

The table below shows the credit risk exposure per PD class.

31 December 2010 (€'000) PD ranges (in %)	Total exposures[1] RWA Exposure-weighted Average (EWA) LGD	Euroclear plc consolidated Total	Central governments and central banks	Institutions	Corporates
0.00 - < 0.03[2]	Total exposures	15,645,988	1,991,974	13,569,071	84,942
	RWA	99,040	99,040	-	-
	EWA LGD	45%	45%	-	-
0.03 - < 0.06	Total exposures	2,954,349	-	2,857,666	96,683
	RWA[3]	149,924	-	149,892	31
	EWA LGD	10%	-	11%	-
0.06 - < 0.11	Total exposures	608,882	-	608,882	-
	RWA	27,243	-	27,243	-
	EWA LGD	24%	-	24%	-
0.11 - < 0.16	Total exposures	343,192	-	343,192	-
	RWA	1,858	-	1,858	-
	EWA LGD	2%		2%	-
0.16 - < 0.21	Total exposures	129,842	-	129,627	215
	RWA	17,583	-	17,583	-
	EWA LGD	26%	-	27%	-
0.31 - < 0.36	Total exposures	313,137	32,855	280,282	-
	RWA	37,837	11,343	26,494	-
	EWA LGD	15%	45%	12%	-
0.51 - < 0.61	Total exposures	2,812	-	2,812	-
	RWA	577	-	577	-
	EWA LGD	19%	-	19%	-
1.01 - < 2.01	Total exposures	235,109	-	69,179	165,930
	RWA	182,259	-	56,040	126,219
	EWA LGD	45%	-	44%	45%
5.01 - < 7.51	Total exposures	2,603	4	2,599	-
	RWA	1,217	5	1,212	-
	EWA LGD	16%	45%	16%	-
25.01 - < 100	Total exposures	6	-	6	-
	RWA	-	-	-	-
	EWA LGD	45%	-	45%	-
Total	**Total exposures**	20,235,920	2,024,833	17,863,315	347,772
	RWA	517,539	110,387	280,901	126,250
	EWA LGD	15%	45%	11%	21%

Any difference between total amounts and the sum of the components are due to rounding.

(1) Total exposure: exposure at default as defined under Basel II (pre conversion factors). This does not include intraday exposure.

(2) 0.03% represents a floor for institutions and corporates.
PD ranges for which there are no exposures do not appear in the table.

(3) Includes exposures on institutions and corporates in PD range 0.00 - < 0.03.

Economic capital for credit risk

The economic capital model for credit risk measures, over a one year period, the amount of capital that Euroclear Bank needs to set aside to protect itself from bankruptcy as a result of severe credit losses. The worst case loss is associated with a tail probability of 0.02%, reflecting a desired confidence level of 99.98%.

The model is run monthly to ensure compliance with the upper tolerance level set by the Board.

The economic capital model for credit considers three main elements: the Expected Default Frequency (EDF), the EAD and the LGD.

- The EDF is the probability that an obligor will default on its obligations over a one year period. Each Participant with a credit exposure has an internal rating assigned and hence an associated probability of default.

- The EAD is the amount of credit exposure that Euroclear Bank could be exposed to if an obligor were to default. A number of different exposure types are considered in the model and they are calculated (based on historical data) for each Participant or treasury counterparty.

- The LGD is the amount of credit exposure that could not be recovered in the event of default. The LGD varies dependent on the degree to which the exposures are secured (by collateral) and the level that these collateral agreements are enforceable.

Stress tests are performed to assess the impact on capital of extreme, but plausible, events. Extreme scenarios are applied to key Participants, macro-economic factors and sensitive model parameters.

Counterparty credit risk

Counterparty credit risk is defined by the Basel Committee on Banking Supervision as “the risk that the counterparty to a transaction could default before the final settlement of the transaction’s cash flows. Unlike a firm’s exposure to credit risk through a loan, where the exposure to credit risk is unilateral and only the lending bank faces the risk of loss, counterparty credit risk generates a bilateral risk of loss.”

Counterparty credit risk is relevant only for Euroclear Bank. The information below therefore applies only to Euroclear Bank.

By policy, Euroclear Bank does not engage in any activity that is not part of its normal course of business or a consequence of Participant activity.

This means that Euroclear Bank’s treasury operations are related to either the management of Participant balances, or long-term investments intended to preserve its capital base. In these activities, Euroclear Bank incurs counterparty credit risk only on the treasury counterparties used to hedge its future earnings or its currency exposures against detrimental market movements.

Euroclear Bank does not have a trading book. Due to their purpose, and their limited scope, Euroclear Bank’s hedging activities do not constitute trading book activities but are included in the banking book. Hedging is further described in the chapter on market risk management.

For further details on Euroclear Bank's banking book activities, and on the management of market risk, see the chapter on market risk management.

Derivatives instruments used by Euroclear Bank to hedge its future earnings are limited to interest rate swaps, foreign-exchange forward transactions, foreign exchange options, interest rate floors and collars, and interest rate futures. Euroclear Bank does not hold any credit derivatives nor any structured products, as doing this for trading purposes would not be in line with its policy.

Counterparty credit risk is managed through global limits at counterparty family level and limits at individual counterparty level for all types of exposures. These limits depend on both the internal counterparty credit rating and the maturity of the deal. In addition, there are very specific restrictions on longer maturities (longer than one year). Euroclear Bank's treasury activities tend to be very short term.

Collateral for counterparty credit risk

Exposures to derivatives counterparties in exchange-traded interest rate futures transactions are managed through bilateral margin agreements. These exposures are reset fully on a regular basis with the transfer of cash margin. Margin payments may be netted.

Euroclar Bank does not take or give collateral for OTC contracts, as Euroclear Bank enters into such contracts only with high-rated counterparties. Euroclear Bank also only acts as buyer in option contracts, except when it enters into cap-and-collar agreements, as part of its hedging strategy, and does not face the risk of loss. It does not hedge the replacement cost risk, which is relatively limited.

Euroclear Bank is rated AA+ by Standard and Poors and Fitch Ratings. The consequences of a rating downgrade on collateral demand can be considered nil, as Euroclear Bank is structurally a collateral-taker. Euroclear Bank needs to post collateral only at the National Bank of Belgium to obtain liquidity for use in the TARGET system or uses collateral (through collateral providers) to support its settlement in local markets. Cash margin transferred to support exchange-traded futures is not material.

Wrong-way risk

Wrong-way risk occurs when exposure to a counterparty is adversely correlated with the credit quality of that counterparty. In the case of general wrong-way risk, this is due to the evolution of general market risk factors, e.g. interest rates, while in the case of specific wrong-way risk, it is due to the nature of the transactions with that counterparty. Specific wrong-way risk would arise if a transaction with a counterparty was backed by own or related party collateral. General or conjectural wrong-way risk would arise if the evolution of an economic variable would affect both the value of exposures and the credit quality of the counterparty.

Wrong-way risk is not a major concern for Euroclear Bank, given the limited scope of its derivatives activity. In addition, Euroclear Bank avoids specific wrong-way risk in its settlement activity as it does not, as a rule, grant credit to Participants based on collateral issued by themselves or related parties.

Counterparty credit exposures

The table on the next page shows the gross fair value of contracts that have been entered into by Euroclear group.

31 December 2010 (€'000)	Euroclear plc consolidated	
Gross fair value of contracts	**Assets**	**Liabilities**
Interest rates derivatives	-	-
- Interest rate options	-	-
- Interest rate swaps	-	-
- Interest rate futures	-	-
Foreign exchange derivatives	**4,406**	**4,662**
- Forward foreign exchange instruments held for trading	2,883	2,688
- Forward foreign exchange designated as cash flow hedges	269	412
- Foreign exchange options designed as cash flow hedges	-	1,446
- Forward foreign exchange hedges of net investments in a foreign operation	1,254	116
Stock options[1]	**2,819**	**2,819**
Netting benefits	**-**	
Collateral held	**-**	
Net derivatives credit exposure under the FIRBA[2]	**9,721**	

Source: Euroclear plc Consolidated financial statements 2010.

[1] See *Consolidated financial statements* for more information on this item.

[2] Expressed as exposure at default (notional value X add-on).

Market risk management

Market risk is the uncertainty about the value of assets and liabilities (on or off balance sheet) and of the future earnings (linked to foreign exchange or interest rate movements).

Euroclear does not have any regulatory capital requirements for market risk, with the exception of foreign exchange risk, as none of its entities has a trading book.

Strategies and processes for market risk management

Euroclear Bank does not seek market risk, but some risks arise as a by-product of the investment of its capital, business earnings and hedging strategy. Euroclear Bank is not exposed to equity or to commodity risks.

Market risk exists only to a very limited extent in the CSDs and in Euroclear SA/NV as they do not operate commercial cash accounts but invest their cash position linked to the regulatory liquidity requirements, for entities where such requirements apply, and their surplus.

To avoid the potential foreign exchange risk that would arise from these investments, they can only be made in their local currency, i.e. in euro for the entities whose functional currency is euro, in pound sterling for the entities located in the United Kingdom, and in Swedish Krona for the Swedish entities. This is also true for Euroclear Bank.

Furthermore, only limited interest rate risk can be taken. Euroclear policy is that the duration of investments made by the CSDs should not exceed six months, and the type of instruments to be used is limited to straight overnight or term deposits. Investments made by Euroclear Bank should have a maturity shorter than 5 years.

Market risk appetite for Euroclear Bank

Market transactions are carried out at the discretion of Euroclear Bank which accepts market risk only within its risk appetite. The risk appetite for market risk in Euroclear Bank is limited by the available capital allocated annually to market risk by the Euroclear Bank Board. In addition, Euroclear Bank complies with internal market limits, such as Value at Risk (VaR), proposed by the CALCO and approved by the Euroclear Bank Management Committee.

Euroclear Bank adheres to the following principles relating to the management of market risk:

- Euroclear Bank does not engage in any activity that is not considered as part of its normal business or a consequence of its Participants' activity and as such will not engage in trading activity (even if, under IFRS definitions, certain transactions in derivatives do not qualify as hedges and are therefore recognised under trading activities).

- The activities and instruments that Euroclear Bank can engage in must be in line with its low risk profile. Euroclear Bank is not exposed to equity risk or to commodity risk.

- A prudent investment strategy is applied in order to preserve the core equity of Euroclear Bank, in particular, the assets of the investment book can only be invested in highly rated and liquid debt instruments (with the exception of intra-company loans), and an appropriate hedging strategy may be applied so as to protect future earnings against adverse market conditions.

Market risk mitigation (hedging)

Euroclear Bank has engaged in a series of market derivative transactions in order to hedge the market risk exposure resulting from future income streams, with the aim of ensuring that the financial results are not adversely affected by market evolutions ("predictability of future revenues").
It is compliant with market expectations that Euroclear Bank conducts its business prudently, as a single purpose bank. This hedging strategy is carried out on a rolling five quarters time horizon and must comply with strict guidelines:

- to be hedged, a future cash flow must be expected with a sufficiently high level of certainty;

- a position, once hedged, may not be re-opened; and

- any position above the anticipated level must be reversed.

Given the exceptionally low level of interest rates, and therefore the marginal downside risk, Euroclear Bank did not have any outstanding interest rate hedges at end December 2010.

Market risk monitoring and controls

The Risk Middle office function in the Risk Management Division performs extensive controls at various frequencies. Daily, weekly, monthly and quarterly reports are produced for various stakeholders within the organisation to ensure compliance and correct implementation of the risk framework defined and approved by the Board of Directors.

Market risk measurement

Value-at-Risk

The market risk relative to the management of the available-for-sale and held-to-maturity portfolios of Euroclear Bank is measured using a VaR methodology. The VaR for a portfolio is the maximum loss over a determined time horizon at a given confidence level (99%). The VaR model assumes a holding period of one day, until positions can be closed. The market parameters are derived from the volatility and correlation observed either from historical daily changes or from option prices. Euroclear Bank has to comply with a global VaR limit, as well as VaR limits by book.

The market risk exposure that Euroclear Bank takes is segregated in the following books:

- Investment Book: all securities purchased by Euroclear Bank with the proceeds of its subordinated debt issues and its own equity.
- Treasury Book: assets, liabilities and commitments resulting from the activity of the Euroclear Bank Participants.
- Hedging Book: market transactions that are conducted to manage the risk exposure resulting from future income streams.

Given the low market risk appetite and the fact that Euroclear Bank will not engage in trading activities, the VaR figures are low.

The increase in the VaR between 2009 and 2010 is related mainly to changes in the composition and maturity of the investment book, as well as to higher volatilities in the market for the debt of Eurozone countries.

The table below shows the average, as well as the minimum and maximum VaR over 2010 and 2009 for the different books and types of risks that Euroclear bank faces.

The VaR model is back-tested and stress-tested twice a year.

	Euroclear Bank SA/NV					
2010 *(€'000)*	**average**		**minimum**		**maximum**	
	2010	**2009**	**2010**	**2009**	**2010**	**2009**
Investment book interest rate risk	3,320	2,576	1,614	1,751	6,247	4,017
Treasury book interest rate risk	75	73	11	10	261	697
Treasury book foreign exchange risk	22	16	2	3	1,021	70
Hedging book	1,606	931	254	182	4,493	2,690
Total VaR	3,962	3,186	1,786	1,874	8,148	4,769

Benchmarking of outstanding hedges

Until December 2009, the market risk relative to future earnings was measured through an internally developed Earnings-at-Risk (EaR) methodology. The EaR measured the interest rate risk exposure and the foreign exchange risk on future income streams. The EaR for a portfolio estimated, based on a Monte Carlo simulation and for a given confidence interval (99%), the potential values of Euroclear Bank's future income, converted to the base currency, at a fixed time horizon, under normal market conditions.

The time horizon was limited to a rolling five-quarter period. The market parameters were derived from the implied volatility and from historical daily changes.

The EaR framework required a certain level of earnings to be guaranteed with a sufficiently high confidence level. This minimum level was set at a certain percentage of the revenues that would have been obtained based upon the forward rates applicable at the moment of fixing.

As from January 2010, the EaR framework has, in principle, been replaced by a more transparent and comprehensive benchmarking of performance of the outstanding hedges, to be applied when relevant. It was not applied at end December 2010 as Euroclear Bank did not have any outstanding interest rate hedges. Regarding foreign exchange risk, as plan rates have been locked in for the whole year, monitoring daily the performance of outstanding hedges would not be meaningful. This benchmark compares the future earnings taking into account the actual hedges, simulated hedges or no hedge at all.

Economic capital for market risk

As of 2008, a new methodology has been put in place to estimate the uncertainty on the loss absorption capacity of Euroclear Bank over a one-year horizon due to movements in market risk factors (interest rates and foreign exchange rates). The loss absorption capacity is defined as the buffer that would be available to Euroclear in the case that it would face a loss. It is made up of the market value of the investment book (Tier 1 capital), the unrealised gain or loss on the hedging book and the earnings over the next twelve months. The economic capital model takes both the interest rate risk on the economic value of the banks' books and the risk on future interest rate earnings into account. Based on a Monte-Carlo process, an economic capital amount for market risk is determined assuming a confidence level that allows Euroclear Bank to obtain a AA+ rating.

The economic capital model for market risk evaluates the risk that Euroclear Bank faces over a one-year horizon due to changes in interest rates and foreign exchange rates. The methodology combines the market risk on the current position (VaR) and the market risk on future income streams through a Monte Carlo process. The economic capital is calculated assuming a 99.98% confidence level (which is in line with Euroclear Bank's objective to maintain a AA+ rating).

The economic capital for market risk on 31 December 2010 was only EUR 69 million.

Back tests

Back-testing is a control process used to validate the accuracy of market risk models by comparing daily measures to corresponding real profits and losses. The Risk Management Division conducts back-testing of the market risk models. It documents (explanations of) excesses to the market risk measures, proposes enhancements to the methodology, as necessary, and reports results to the CALCO. The CALCO is responsible for ensuring that any material sustained exception is resolved.

VaR models are back-tested semi-annually. The back testing compares the daily forecasts (VaR) with the (ex-post) change in market value of the portfolio from one day to the next. When comparing the market value of the position on day 1 with the market value on day 2, the portfolio is kept constant, i.e.

it takes the portfolio on day 1, but applies the market data of day 2 for the valuation. There was one exception to the total VaR measure over a period of one year and no exception over the last six months which is consistent with the confidence level of its model.

Stress tests

Stress tests provide an indication of the size of potential losses that could arise in extreme conditions. Stress movements are applied to the different risk factors, including movements in interest and foreign exchange rates.

The stress tests follow the *Principles for the management and supervision of interest rate risk* (July 2004) issued by the Basel Committee on Banking Supervision.

Foreign exchange risk

The group's entities have the euro as their functional currency with the exception of subsidiaries located in the United Kingdom and Sweden. The Euroclear group's structural currency exposures can be found in the *Consolidated financial statements*.

The majority of the foreign exchange risk is concentrated at Euroclear Bank. As part of the Market Risk Board Policy, an adequate risk framework has been put in place to measure, monitor and control the foreign exchange risk supported by Euroclear Bank. VaR methodologies are used to measure the currency risk.

Euroclear Bank's Management Committee sets VaR limits for all currencies combined, which are monitored daily. In essence, the limits do not allow Euroclear Bank to take any foreign exchange positions and require Euroclear Bank to hedge the conversion of future cash flows denominated in each of the major currencies.

In the other entities of the Euroclear group, the foreign exchange risk is residual and considered as non-material. Indeed, to avoid the potential foreign exchange risk that would arise from the investment of their surplus cash, their investments can only be made in their local currency. The most significant source of foreign exchange risk in the CSDs and in Euroclear SA/NV stems from the potential change in the net asset values of the non-EUR participation of Euroclear SA/NV in e.g. Euroclear UK and Ireland and Euroclear Sweden. This exposure is hedged on a rolling basis.

The Euroclear group's exposure to foreign currency exchange rate risk can be found in the *Consolidated financial statements.*

Capital requirements for market risk

Euroclear uses the **Standardised Approach** to calculate its regulatory capital requirements for market risk. As Euroclear does not seek market risk and does not have a trading book, using the internal model approach was not deemed appropriate.

The table below shows regulatory capital requirements for market risk. Only foreign exchange risk, which is calculated on all exposures, including non-trading book exposures, is reflected in this table. Other items do not apply to Euroclear. Other market risks in the banking book are discussed below.

31 December 2010 (€'000)	**Euroclear plc consolidated**
Total	**16,789**
Settlement risk	-
Position risk in traded debt instruments	-
Position risk in equities	-
Interest rate risk	-
FX risk	16,789
Commodity risk	-

Equities in the banking book

Equities held in the banking book concern participations in companies with a business related to the business of Euroclear. They are either strategic participations, or they are held for historical reasons. None of them are held in order to make capital gains.

Valuation and accounting of equity holdings in the banking book

Available-for-sale investments are those financial assets, including debt securities and equity shares, which are intended to be held for an indefinite period but which may be sold in response to changes in the Euroclear group's financial environment.
Available-for-sale investments are recognised in the balance sheet on the settlement date at fair value. Gains or losses arising from changes in the fair value of such assets are recognised directly in equity, until the asset is either sold, reaches maturity or becomes impaired, at which time the cumulative gain or loss previously recognised in equity is released to the income statement. The fair value of listed debt securities and equity shares reflects the published price on the balance sheet date.
In the case of investments with no listed market price, a valuation technique is applied (e.g. recent transactions between willing and knowledgeable parties, discounted cash flows and market multiples). Where the fair value of unlisted equity investments cannot be reliably measured, they continue to be valued at cost.

Impairment of available for-sale equity investments

The Euroclear group determines that available-for-sale equity investments are impaired when there has been a significant or prolonged decline in the fair value below its cost. This determination of what is significant or prolonged requires judgement. In making this judgement, the group evaluates, among other factors, the normal volatility of the share price.

In addition, impairment may be appropriate when there is evidence of a deterioration in the financial health of the investee, industry and sector performance, changes in technology, and operational and financing cash flows.

As far as such investments are concerned, no clear indicator of impairment has been detected in 2010. The Euroclear group therefore estimates that their respective values in the accounts of the relevant acquiring company are still justified.

The table below shows the fair value of equity investments held by the Euroclear group.

Equities in the banking book

31 December 2010 (€'000)	**Euroclear plc consolidated**
Fair value of investments disclosed in balance sheet	**12,441**
Publicly quoted share values when different from fair value	-
Exchange-traded exposures	**1,482**
- equity shares	1,482
Private equity exposures in diversified portfolios	-
Other (unlisted, but fair value determinable)	**10,959**
Cumulative realised gains (losses) from sales and liquidations	-
Total unrealised gains (losses)	2,689
Total unrealised gains included in Tier 2 capital[1]	2,420

[1] 90% of unrealised gains can be included in Tier 2 capital

Interest rate risk in the banking book

The majority of the interest rate risk is concentrated in Euroclear Bank. As part of the Market Risk Board Policy, an adequate risk framework has been put in place to measure, monitor and control the interest rate risk supported by Euroclear Bank. VaR methodologies are used to measure the interest rate risk. Euroclear Bank's Management Committee sets VaR limits for all currencies combined, which are monitored daily. In essence, the limits do not allow Euroclear Bank to take any material interest rate positions. Euroclear Bank hedges its interest rate risk, so as to guarantee a minimum interest earning level on anticipated cash positions denominated in each of the major currencies.

The core equity (shareholder equity plus retained earnings) is invested in risk-free assets. The duration of these assets is limited to five years by policy and is currently around three years. The VaR is limited. Regarding the reinvestment of subordinated debt issued by the entities of the Euroclear group, Euroclear applied the matching principle, which allows for the best risk reduction: all proceeds from the debt issued were invested in high-quality assets with maturity close to the maturity of the debt. It eliminates any uncertainty on the value of the cash flows and considerably reduces the interest rate risk on the mark-to-market of the portfolio. The interest rates VaR on the treasury book and the hedging book are also very limited.

The table below shows the interest rate sensitivity of Euroclear's banking book positions. The figures relate to Euroclear SA/NV consolidated, as communicated to the CBFA in the framework of the standardised reporting under Pillar 2 of Basel II. The figures for Euroclear plc are not expected to diverge materially from the content of this table. Assets and liabilities held in the banking book are predominantly denominated in euro, and they are expressed at market value for the purpose of this disclosure. The economic value of the banking book is computed by discounting the future cash-flows for assets and liabilities present in this book.

The sensitivity of the economic value of the banking book to interest rate shocks is presented in the 1st column of the table below. The change in value mainly arises from the assets held in the investment and hedging books of Euroclear Bank. Indeed, assets and liabilities of the treasury book are almost fully matched and have no material impact on this sensitivity measure. The remainder of the table illustrates to which extent the net interest income of Euroclear Bank is sensitive to interest rate movements, compared to the amount earned in 2010. For the purpose of this disclosure, the latter is limited to pounds sterling, US dollars and euros, as is the analysis of the future earnings sensitivity.

Interest rate risk in the banking book

At 31 December 2010 (€'000) **Euroclear SA/NV consolidated[1]**

Interest rate increases/decreases, in basis points	Economical value of banking book	Interest result Effective	Income sensitivity – interest result Expected		
		2010	2011	2012	2013
+ 300	1,442,296		183,473	248,589	281,407
+ 200	1,477,133		157,759	210,570	245,413
+ 100	1,513,789		131,345	171,372	207,445
+/- 0	1,552,385	62,854	101,541	130,204	167,394
- 100	1,593,052		68,805	77,806	124,648
- 200	1,635,931		54,732	48,958	65,021
- 300	1,681,177		49,012	44,559	39,177

[1] The figures for Euroclear plc are not expected to diverge materially from the content of this table.

Erratum: the table on interest rate risk in the banking book at 31/12/09 showed negative changes in economic value for all interest rate shocks, irrespectively of their direction. This was not correct: increases in interest rates would have lead to an increase in the economic value of the banking book.

Liquidity risk management

Liquidity risk is the risk of loss (financial and non-financial) arising from Euroclear being unable to settle an obligation for full value when due. The purpose of liquidity risk management is to help Euroclear avoid liquidity risk by ensuring that it has adequate funds to meet its obligations.

Strategies and processes for liquidity risk management

Euroclear Bank

Euroclear Bank is the main entity within the Euroclear group facing liquidity risk. Liquidity is an important factor in offering efficient settlement and custody services in Euroclear Bank. Liquidity ensures timely payments and timely cross-border settlement with domestic markets, supports new issues and custody activity and allows clients to receive sales and income proceeds in a timely manner. The successful management of liquidity risk allows Euroclear Bank to provide liquidity to the market and facilitate settlement and related operations.

Euroclear Bank's liquidity risk is largely intra-day and transactional and results from the secured intra-day credit it extends to facilitate settlement on a Delivery Versus Payment (DVP) basis. Euroclear Bank's overnight settlement process, which allows clients to settle a wide range of currencies within a single time window, efficiently recycles and minimises liquidity needs, as clients have to fund only the resulting net debit position. Although the daily incoming and outgoing cash payments are typically matched, Euroclear Bank may still end up with residual cash positions at the end of the day. On a daily basis, Euroclear Bank is typically long cash, which it invests mainly on an overnight basis to match the volatility of clients' settlement and money transfer activity. Because Euroclear Bank settles against payment and extends credit to its Participants, the credit extended during the overnight settlement process can translate into intra-day liquidity needs. Euroclear Bank needs a sufficient liquidity cushion to make timely payments (cross border settlement and wire transfers) while cash confirmations are being received throughout the day.

Euroclear Bank liquidity is managed centrally, at the head office. Specific policies exist to describe how Euroclear Bank liquidity risks are monitored and controlled. Euroclear Bank does not depend on other Euroclear group entities for its liquidity.

In addition to other requirements, Euroclear is expected to comply with the requirements detailed in the *Principles for Sound Liquidity Management and Supervision* published by the Basel Committee on banking Supervision.[1] This applies to the level of Euroclear Bank and above.

(1) CBFA circular 2009-18 dated 8 May 2009.

The Euroclear CSDs and Euroclear SA/NV

The Euroclear CSDs and Euroclear SA/NV face very little liquidity risk. That which they face arises from the related credit risk that they are exposed to when awaiting the payment of fees from their Participants or depositing their cash surplus with their bank counterparties (including Euroclear Bank).

The chapter on Credit risk management outlines how these risks are managed.

Euroclear SA/NV, Euroclear Belgium, Euroclear France and Euroclear UK and Ireland are subject to regulatory liquidity requirements. These entities are required to hold liquid reserves equal to a few months' operating expenses or be able to rely on appropriate liquidity facilities, to ensure that they can continue operating under all circumstances.

The investment guidelines that apply to Euroclear SA/NV and the group CSDs distinguish between two types of cash as it concerns liquidity:

- the cash position linked to the regulatory liquidity requirements, for entities for which such requirements apply. This cash position should be invested on a roll-over basis; and
- the surplus cash, including the working cash requirements of these entities. Surplus cash investments should always be cash-flow driven. This means that the amount of cash and the period of the investments should take into account the evolution of working cash needs and capital expenditure needs.

For both types of cash, in accordance with the low interest rate risk objective, the investments should not exceed six-month terms. The type of instrument used is limited to overnight or term deposits.

Intra-group liquidity management

The capital/dividend policy applicable to all Euroclear group entities reflects the following principles:

- each entity manages its level of capital in line with its local needs, taking into account its (i) minimum regulatory requirements; (ii) specificity of risk profile; and (iii) future investment programme and earnings expectations;
- any available free capital is transferred to the parent company to be used for Group initiatives. For the (I)CSDs specifically, this means that all available free capital is to be transferred to the group level, where it can be used to finance group investments, or support special initiatives. Available free capital of any (I)CSD should however not be used to cover possible shortfalls in other (I)CSDs.

However, the following arrangements are in place to allow for intra-group liquidity support:

- ESA will support the CSDs (support letters are in place) in the case of liquidity shortfalls.
- ESA has a line of liquidity in place with Euroclear plc to cover its regulatory obligations.

The remainder of this chapter applies to Euroclear Bank only, except where otherwise stated.

Liquidity risk appetite

Given the criticality of intra-day liquidity for the efficient delivery of settlement and custody services, Euroclear Bank's liquidity risk appetite is very low.

In particular:

- Euroclear Bank should not fail on its settlement and payment activity to the extent that it causes significant financial loss or damage to the reputation of Euroclear Bank; and
- an adequate liquidity contingency plan should be in place to ensure the continuity of Euroclear Bank's settlement and payment activities, even under exceptional circumstances. The objective of the contingency plan is to maintain an adequate level of intra-day liquidity even if the Participant with the largest payment obligation to Euroclear Bank were unable to make payment when due, as per recommendation 9 of the ESCB-CESR and CPSS-IOSCO *Recommendations for Securities Settlement Systems*."

Euroclear Bank has adopted a strong risk management framework to anticipate, monitor and manage intra-day liquidity flows to ensure the quality of its services and prevent problems. Liquidity risk is further mitigated by Euroclear Bank's strict admission policy and the continuous assessment of the risk profile of its clients, by the fact that the transactional credit is secured and extended on an intra-day basis, and by limits on the total amount of credit to any single family of Participants.

Funding liquidity

Euroclear Bank's settlement system allows for an efficient recycling of liquidity. Although Euroclear Bank settles transactions amounting to over EUR 1,000 billion each day (2010 average), it extends only between EUR 80 and 100 billion in secured intra-day credit to its clients. The large amount of back-to-back transactions and Euroclear Bank's efficient lending and borrowing programme allow it to reduce Participants' liquidity needs. Since Euroclear Bank's daily cash flows are typically matched (i.e. the receipts match the payment obligations), additional liquidity is only needed to smoothe or accelerate the payment process and address timed payments throughout the day.

To support daily payment activity, Euroclear Bank relies on a large network of highly rated cash correspondents, and direct access to TARGET2 for EUR payments. Euroclear Bank has access to a wide range of liquidity sources, including the intra-day liquidity provided by its cash correspondents, settlement banks and the National Bank of Belgium. Furthermore, Euroclear Bank has broad access to the inter-bank market and has contingency liquidity sources in place for the major currencies. Most of Euroclear Bank's capital is reinvested in ESCB eligible securities that can be pledged to obtain liquidity.

Euroclear Bank continues to develop strategic initiatives to ensure adequate access to liquidity on a day-to-day basis and in contingency situations. These initiatives include extending the ability for Euroclear Bank to re-use collateral from Participants to obain funding intraday and overnight.

The adequacy of the bank's liquidity capacity is assessed and approved quarterly by the Credit and Assets and Liabilities Committee (CALCO). It monitors the trend of liquidity risk that Euroclear Bank faces through liquidity key risk indicators, which allow it to identify, among other things, changes in Participants' cash management practices that may affect Euroclear Bank's liquidity. A first indicator shows the timing at which funds are received throughout the day, as late credit confirmations can impact remaining wire transfers. A second indicator focuses on the adequacy of collateral to support cross-border activity. A third finally monitors whether the liquidity risk arising from credit provision to Participants can be supported by Euroclear Bank's liquidity sources. A complementary analysis focuses on all elements that could create further pressure on Euroclear Bank's liquidity management across all currencies by looking at events that may detrimentally affect Euroclear Bank if they materialise or if they become more frequent or more severe. Additionally, the Banking and Risk Management Divisions inform the CALCO of any notable change in Euroclear Bank liquidity capacity in the major currencies.

Liquidity contingency plan

In accordance with CPSS/IOSCO and ESCB/CFSR recommendation 9, Euroclear Bank maintains an appropriate liquidity contingency plan to ensure the business continuity of its core settlement and custody services. The plan documents the relevant operational procedures and ensures access to (contingency) liquidity in the event of an operational or financial crisis.

Euroclear Bank can rely on a wide access to the interbank market and a selective network of highly rated cash correspondents to ensure that it can raise sufficient amounts of liquidity to meet its commitments. It can also use its own capital – the investment book - in case of need. The investment book, funded by the long-term debt, equity and retained earnings of Euroclear Bank, must be invested with the objective of capital preservation. As a consequence, the assets in the investment book are invested only in debt instruments with a rating at least equal to AA-. This may include Pfandbriefe, but not other asset-backed securities. These instruments are ESCB-eligible. Upon approval from the CALCO, the investment book can be used as collateral to guarantee credit facilities set up for the purpose of Euroclear activity, taking into account defined limits and constraints.

Furthermore, Euroclear Bank has negotiated additional committed liquidity lines and can call upon a EUR 1.37 billion syndicated backstop facility. The contingency plan and the availability of contingency liquidity is tested regularly and subject to stress-testing.

The table below shows the size and composition of Euroclear's liquidity buffer. It is one of the standardised tables used for the reporting of Pillar 2 information to the CBFA. It shows liquid financial assets available at the end of the day on the reporting date, and excludes encumbered financial assets.

At 31 December 2010 (€'000)[1]	Euroclear SA/NV consolidated[2]
Cash and balances at central banks	**44,186**
Cash	16
Credit balances at central banks	44,170
Securities and loans available at ECB/Eurosystem, Bank of England (BoE) or Swiss National Bank(SNB)	**1,572,620**
Debt certificates issued by central governments and central banks	1,572,620
Debt certificates issued by credit institutions	0
Securities and loans available as repo-transactions (or other type of loan against guarantee)	**–**
Securities realisable through sale operation	**–**
Potentially reusable securities received as guarantee	**4,132,427**
Securities available at ECB/Eurosysteem, BoE or SNB	2,084,570
Securities available as repo-transactions (or other type of loan against guarantee)	2,047,856

[1] Aggregate value, expressed in EUR, of liquid financial assets denominated in any currency (including EUR). Does not include accrued interest.

[2] The figures for Euroclear plc are not expected to diverge materially from the content of this table.

Internal allocation of liquidity costs

Euroclear Bank does not allocate liquidity costs to business lines. Euroclear Bank is a single-purpose provider, and all of the liquidity-demanding services that it provides are designed to facilitate settlement. Euroclear Bank considers this to be part of a single business line, "payment and settlement", as defined under the Basel 2 framework.[1]

Liquidity risk monitoring and controls

The Risk Middle Office function in the Risk Management Division performs extensive controls at various frequencies. Regular reports are produced for various stakeholders within the organisation to ensure compliance and correct implementation of the risk framework defined and approved by the Board of Directors.

[1] Annex 8 Mapping of business lines, in Basel 2: International Convergence of Capital Measurement and Capital Standards: A Revised Framework

Liquidity risk measurement and modelling

Cash flow projections and management of intra-day and end-of-day liquidity

At all times, Euroclear Bank ensures that it has access to sufficient liquidity to support its core services. To achieve this, Euroclear Bank forecasts, monitors and measures the net intra-day funding requirements, which are derived from the cross-border settlement activity, Clearstream Bridge activity, new issues and advanced income payments, in a timely manner and at various critical moments throughout the day.

The intra-day liquidity need is assessed:

- the previous day, by forecasting the funding requirements; and

- throughout the day, by controlling sufficiently the intra-day liquidity position at the cash correspondents and monitoring the liquidity flow.

Euroclear Bank anticipates and monitors the end-of-day position at each of the cash correspondent banks. End-of-day long balances may be invested at short term, provided that the reinvestment complies with end-of day liquidity limits, defined by currency and maturity buckets, taking into account the volatility of clients' cash balances.

Euroclear Bank also realises longer-term cash flow projections to identify future liquidity needs and available sources. As a single-purpose institution, however, Euroclear Bank's balance sheet is very short–term. Therefore, these projections tend to exhibit a high degree of stability.

Except for treasury transactions between trade date and settlement date, typically Tom-Next transactions, and some limited derivatives transactions[1], Euroclear Bank has no significant potential cash-flows relating to off-balance sheet positions. Euroclear Bank is not subject to liquidity risk arising from special purpose vehicles because the company does not engage in securitisation.

The table below shows liquidity inflows and outflows at Euroclear, per time bucket, as reported to the NBB (monthly) under the standardised Pillar 2 reporting. These figures are not cumulative, which means that in- or outflows expected in the coming week are not included in in- or outflows for the coming month.

[1] This concerns Euroclear Bank stand-alone. All consolidated levels above Euroclear Bank report fair values under IFRS; derivatives transactions are treated as being on balance sheet.

	Euroclear SA/NV consolidated[1]				
At 31 December 2010 (€'000)	***< 1 week***	***< 1 month***	***< 3 months***	***< 6 months***	***< 12 months***
Inflow of liquidity (not cumulative)					
Provisioned inflow related to credit supply without liquid financial assets as a guarantee					
Central governments	-	-	-	-	-
Credit institutions	2,906,492	220,137	-	114,090	-
Other institutions[3]	-	-	-	-	-
Others	-	-	-	-	-
Provisioned inflow related to transactions with liquid securities and loans					
Cash	2,798,692	478,734	822,413	-	-
Liquid securities and loans	-	-	-	-	-
Provisioned and potential net cash flows related to derivatives[4]					
Foreign exchange derivatives	170	80	116	2,789	365
Interest rate derivatives	-	-	-	-	-
Provisioned inflow coming from related parties					
Cash	5	-	-	55,967	-
Liquid securities and loans	-	-	-	-	-
Potential inflow	-	-	-	-	-
Related parties – confirmed credit lines	20,000	-	-	-	-
Third parties – confirmed credit lines	2,995,646	-	-	-	-
Outflows of liquidity (not cumulative)					
Outflow related to financing without liquid financial assets as a guarantee					
Central governments	2,686	-	-	-	-
Credit institutions	6,968,274	242,997	56,353	4,341	-
Other institutions[3]	87,086	-	-	-	-
Others	143,263	6,366	-	-	-
Provisioned outflow related to transactions with liquid securities and loans					
Cash	-	-	-	-	-
Liquid securities and loans	-	-	-	-	-
Outflow to related parties					
Cash	3,981	16,000	-	-	-
Liquid securities and loans	-	-	-	-	-
Potential outflow	-	-	-	-	-
Related parties	-	-	-	-	-
Third parties	-	-	-	-	-

[1] Aggregate value, expressed in EUR, of liquid financial assets denominated in any currency (including EUR). Does not include accrued interest.

[2] The figures for Euroclear plc are not expected to diverge materially from the content of this table.

[3] This includes local governments, multilateral development banks and public institutions.

[4] Excluding credit derivatives. Note that Euroclear is not active in credit derivatives. Expressed as exposure at default (notional value x add-on), not in fair value, in contrast to the Consolidated financial statements.

Global family limit

To fulfill the CPSS/IOSCO and ESCB/CESR recommendation 9, Euroclear Bank has defined a methodology to determine an aggregate limit, which limits the maximum exposure that Euroclear Bank could face on any family of Participants.

The extent to which credit is limited is based on Euroclear Bank's assessment of available sources of liquidity. The residual credit risk on Participants is considered relatively minor, because this credit is secured, primarily with collateral held within the Euroclear system. However, between the time that the Participant defaults on its payment and the receipt of the proceeds from the sale of the collateral, Euroclear Bank must be able to fulfill its commitments, and therefore needs to control its liquidity risk ex ante by limiting the credit it may offer to its Participants, given the available liquidity sources.

Liquidity preservation limits

Euroclear Bank defines 'liquidity preservation limits' to protect it from liquidity strains resulting from liquidity mismatches. As Euroclear Bank is structurally long at the end of the day, it can decide to invest part of these funds, under some circumstances, longer than overnight. On some days, when a longer-term transaction is in place, Euroclear Bank's end-of-day net position might become negative, and Euroclear Bank might need to fund itself overnight in the market.

Liquidity preservation limits, which target treasury short-term lending activity and apply at the maturities of up to two weeks, one month, and three months, are designed to limit the resulting liquidity gap. The liquidity gap measures, for each maturity date, the actual net amount that is invested through term deals. It is equal to the sum of all on balance-sheet term borrowings outstanding on that date (liabilities), minus the sum of all balance sheet deposits outstanding (assets).

Regulatory stress test ratio

The CBFA has introduced a liquidity 'stress test ratio', which was monitored as an 'observation ratio' between Q2 2009 and Q4 2010 and became a regulatory requirement in January 2010. It is designed to reflect the liquidity position of the institution under exceptional circums-tances (combining an idiosynchratic shock with a general liquidity crisis), by comparing the potential liquidity needed and the potential liquidity available. In this exercise, the CBFA assumes that unsecured financing or credit lines from counterparties are unavailable, and 100% of the on-demand deposits from wholesale clients are lost. Credit lines at the central bank, financing through repos, sale of assets and re-use of collateral are considered accessible.

It is defined as:

$$\frac{\text{liquidity inflows – outflows}}{\text{liquidity assets}}$$

The resulting stress ratio should be less than 100%. The ratio is calculated for maturities of one week and one month.

The liquidity stress test ratio is related to the Basel III liquidity coverage ratio (LCR). There are, however, some differences between these two ratios, mainly with regards to the definition of liquid assets ; the implementation of the scenarios through assumed inflows and outflows ; and the expression of the ratio, which in the case of the LCR is defined as:

$$\frac{\text{liquidity assets}}{\text{liquidity inflows – outflows}}$$

and should be higher than 100%.

Euroclear applies the test to Euroclear Bank and other relevant entities. The available liquidity comfortably exceeds regulatory expectations.

Liquidity stress testing

Currently, three types of stress-tests are conducted regularly:

- quarterly stress-tests based on historical data enable Euroclear Bank to assess whether or not it complies with recommendation 9 of the CPSS/IOSCO and ESCB/CESR *Recommendations for Securities Settlement Systems*, which states that securities settlement systems should be able to withstand a payment failure from the Participant with the largest net debit obligation;

- a set of scenarios that assess the potential impact on Euroclear Bank's liquidity during exceptional, but not impossible, events. It allows to quantify the potential liquidity gap which would materialise under a variety of idiosyncratic and market strains. At the same time, it allows to verify the adequacy of mitigating actions and to check the readiness of operational contingency procedures; and

- ad hoc stress-tests, conducted as role-plays based on plausible extreme scenarios. This type of stress-test, which involves different layers of management, from the operational managers to the senior management of the company, is conducted at least once a year. It includes stress-testing for liquidity risk and all relevant risks to which Euroclear Bank is exposed.

Operational risk management

All Euroclear entities face operational risk. In line with Basel II, Euroclear defines operational risk as 'the risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events'. However, in contrast to Basel II, Euroclear also includes reputational risk in its definition of operational risk. Euroclear considers operational risk to encompass:

1. **Processing risk:** The risk of loss resulting from inadequate or failed internal processes, people or systems, or from external events, not related to the risks described in points 2 and 3 below. This includes the indirect consequences of operational risk on liquidity, credit and market risks, as well as relationship management risk (lack of adequate knowledge of customers and service partners) and project risk (the risk on projects not considered as strategic, i.e. with a time horizon shorter than 12 months). Risk related to breaches in corporate security and information security (including business continuity), errors from third-party service providers and inadequate communication with the media, are also included.

2. **Accounting risk:** The risk of loss arising from the failure to produce timely and accurate management reporting and financial statements that provide a fair representation of the company's financial situation.

3. **Ethical conduct, legal and compliance risk:** The risk of loss arising from a failure to

   - act with integrity, fairness and honesty;
   - adapt to changes in the legal and regulatory environment;
   - anticipate, identify, understand or comply with relevant laws and regulations; or
   - competently negotiate, implement, comply with or enforce contracts.

Strategies and processes for operational risk management

The Enterprise Risk Management framework applied to operational risk management

Euroclear uses an ERM framework to ensure the coherence of its risk management activities, in particular in the area of operational risk management.

The ERM framework describes how operational risks are identified, who bears responsibility for managing these risks, and how they can be mitigated. The ERM framework also describes all relevant operational risk processes, the role of people within the processes, and the information needed to make sound management decisions. It has been implemented consistently across the group, but in ways that are appropriate to the businesses of the different entities.

Security and resilience

Information security

The corporate objective of the group security activity is to assure management that Information Security (IS) risks are properly identified and correctly ranked and that IS control processes are effective and in line with the defined risk appetite. Euroclear has adopted a standardised threat profile that is supplemented annually by a more strategic IS threat assessment. Together these provide the baseline for the annual IS risk assessment from which risk treatment plans are derived.

The IS internal control system has been included in the ERM framework, allowing compliance with the requirements associated with Euroclear's adoption of the AMA under Basel II and full alignment with other internationally recognised reference frameworks such as ISO 27001: 2005, Control Objectives for Information and related Technology (CobIT) and Information Technology Infrastructure Library (ITIL).

Euroclear is designated as critical infrastructure in Belgium, Finland, France, The Netherlands and the United Kingdom. Euroclear receives threat assessments from the national security agencies of these countries on a regular basis and can draw upon their expertise to resolve IS issues. These agencies conduct periodic assurance reviews of Euroclear's security standards and procedures.

Business resilience

To ensure continuous availability of business-critical services, Euroclear carefully reviews its use of technology, buildings and staff using ESCB/CESR *Recommandations for Securities Settlement Systems*, and BS25999:2005 as a reference framework. Since 2007, Euroclear has had three data centres sufficiently distanced from each other to sustain operations in the event of a regional-scale disaster. Euroclear remains, to our knowledge, the only securities infrastructure service provider in Europe to do so. The effectiveness of data centres and recovery procedures is assured through the transfer of production activity between sites every two months and regional disaster recovery exercises twice a year. In addition Euroclear Bank, Euroclear France and Euroclear UK & Ireland follow a dual office structure, to ensure the availability of critical expertise in different locations.

Euroclear Belgium and Euroclear Nederland can use office space in Brussels as a remote backup, should a localised event disrupt access to their main facilities. Euroclear Finland and Euroclear Sweden each run two geographically separated IT centres between which all critical servers are duplicated and data is mirrored in real time. In addition, each entity has access to a separate backup office outside the respective city centre with enough capacity for staff to run all critical business processes, including the IT operations and maintenance. All entities perform annual business impact analyses to identify their critical business services and recovery time objectives. Business continuity plans have been harmonised at corporate and departmental levels throughout the group. Finally, each element of the strategy is regularly maintained and tested.

A comprehensive crisis management training programme is in place and uses increasingly sophisticated market-based scenarios to further develop the capabilities of the crisis response teams, including those involving top management.

Legal protection

The Euroclear CSDs

The Euroclear CSDs have in place a robust legal framework applicable to the relationship with their clients, including a liability regime reflecting their risk-averse nature and their role as market infrastructure. The respective duties of the CSDs and their clients are well-defined.

Euroclear Bank

Euroclear Bank is protected against the consequences of a bankruptcy of any one of its Participants by a number of provisions contained in the credit documentation signed with the Participants. Euroclear Bank also aims to ensure the protection of Participants' assets, even if held with a sub-custodian.

Contractual protection

Euroclear Bank may offer credit facilities to its Participants on an uncommitted basis. Participants benefitting from credit facilities are required to execute special credit documentation with Euroclear Bank.

Credit facilities are generally required to be secured. Secured credit facilities are typically collateralised by Participant assets held within the Euroclear system. Participants that pledge assets within the Euroclear system sign a collateral agreement with Euroclear Bank.

The principal legal risk that arises in connection with collateral pledged to Euroclear Bank is the uncertainty that exists as to whether or not, in the event of bankruptcy of a Participant, a court would recognise and enforce a Belgian law pledge.

To limit the risk associated with such uncertainty, Euroclear has obtained opinions from reputable local counsel in the relevant jurisdictions, on whether or not such jurisdictions recognise that securities in the Euroclear system are located in Belgium for purposes of conflict-of-law issues, and accordingly recognise the Belgian law pledge. This has been further strengthened for European Union countries since the adoption of the Settlement Finality Directive, which confirmed that Belgian law (the jurisdiction where the security rights are recorded) would apply, for the purposes of enforceability of the collateral, if a Euroclear Bank Participant becomes insolvent.

The Terms and Conditions that Participants are required to sign before becoming Euroclear Bank Participants include clauses that protect Euroclear Bank. The most important clauses are the following:

- Right of set-off: upon the resignation or termination of a Participant, all amounts that are due to the Participant may be set off against any amounts which are due to Euroclear Bank from the Participant;

- Right of retention: upon the resignation or termination of a Participant, Euroclear Bank may retain the securities held in the Participant's Securities Clearance Account to provide for the payment in full of any amounts which are due, or may become due, to Euroclear Bank from the Participant;

- Principle of unity of accounts: Participants agree that all Cash Accounts opened with Euroclear Bank form part of one indivisible account. Therefore, Euroclear Bank may, whenever necessary, treat these as subdivisions of the same account and transfer balances between such subdivisions.

Liens, rights and obligations

In addition to any pledge of Securities Clearance Accounts, Transit Accounts, Cash Accounts and other assets held in the Euroclear system specifically agreed to by a Participant, Participants' assets held in the Euroclear system (except, unless otherwise agreed, assets held for customers and identified as such) are subject to a statutory lien in favour of Euroclear Bank, pursuant to Article 31 of the Belgian Law of August 2, 2002.

Asset protection

Due to the fact that Euroclear Bank holds its interest in securities in a network of sub-custodians located in more than 40 countries, its holdings may also be subject to legal uncertainty in the event of the bankruptcy of a given sub-custodian. Euroclear Bank Participants' assets need protection from the risk of a sub-custodian becoming insolvent and from the risk of attachment by the creditors of such sub-custodians.

To limit the legal risk arising in connection with the holdings of securities with sub-custodians, Euroclear Bank has obtained formal legal opinions from reputable local counsel in each jurisdiction in which it holds securities with a custodian.

Operational risk monitoring and controls

Operational risk is monitored and managed with the help of a number of tools:

- Euroclear has set up a database of potential risks and carefully records incidents. Euroclear's database now has more than ten years of historical data on operational losses. Internal data is complemented by external loss data, as Euroclear is among the banks that provide information to the ORX-database[1]. In benchmarking exercises conducted among the banks that contribute to the ORX database, losses related to operational risks (expressed relative to gross income), appeared to be significantly lower for Euroclear, compared to the other contributors to the database;

- Each of the departments within the group participates in annual self-conducted risk assessments. They are conducted by each department and facilitated by risk management. The assessments allow business managers to detect and report risks before they materialise, and discuss issues that are being solved;

- Standard operating procedures, drafted by each department in which they are to be used, help employees to execute their tasks appropriately and reduce the risk of errors;

- In recent years, Euroclear has developed control maps or equivalent tools that map key processes and key controls against stated control objectives as a continuous controls effectiveness monitoring tool.

Insurance

In addition to these control processes, Euroclear maintains a comprehensive insurance programme to protect against operational risk. All insurance policies are held with first-rank insurance companies, rated at least A-. The programme includes coverage for crime and civil liability, physical securities loss and cyber risks.

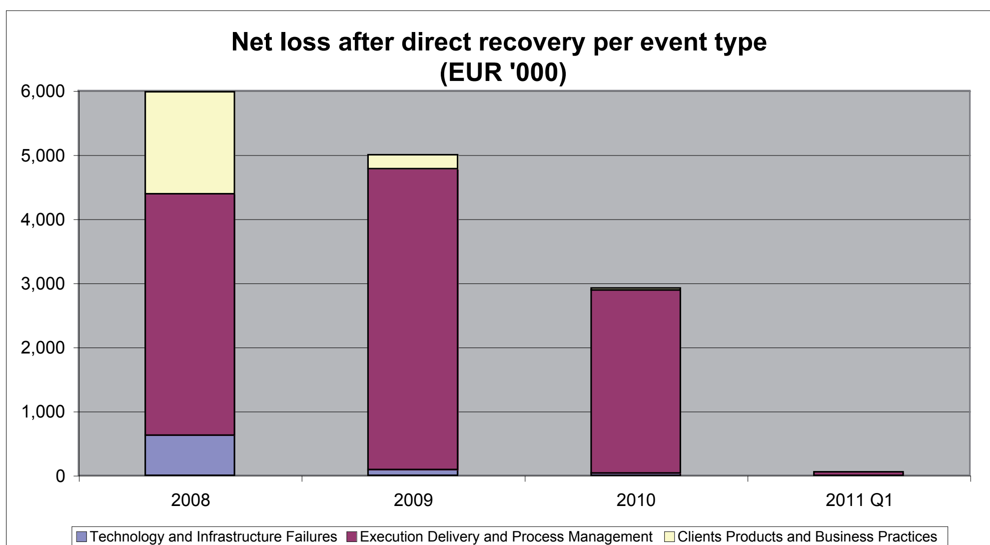
[1] The Operational Riskdata eXchange Association (ORX) was founded in 2002 with the primary objective of creating a platform for the secure exchange of (anonymous) high-quality operational risk loss data. ORX currently has 57 members and has, developed a database with more than 193,750 operational risk losses, each over €20,000 in value, totalling €68 billion.

Operational risk measurement and modelling

Regulatory capital requirement

Euroclear Bank, Euroclear SA/NV and Euroclear plc received the accreditation from the CBFA in March 2008 to use the AMA to calculate their capital requirements for operational risk as from Q1 2008. This accreditation was accompanied by a number of terms and conditions which were implemented during 2008 and 2009. In 2008, the CBFA imposed an add-on, which was reduced in 2009. The add-on, and a worsening trend in market-wide operational losses recorded by the Operational Riskdata eXchange (ORX), which Euroclear uses in its operational risk model to complement data on internal losses, brought capital requirements for operational risk with the AMA to a higher level than would be the case with a less sophisticated methodology. The final regulatory decision on the AMA methodology was communicated in November 2010. The decision allowed Euroclear to lift the add-on and to rely on its model in full for the calculation of capital requirements for operational risk under Pillar 1.

Changes in the level of capital requirements for operational risk between 2008 and 2010 do not reflect the evolution of losses over time, as can be seen in the graph below. The graph shows that Euroclear's operational risk losses have decreased over that period of time, with "execution, delivery and process management" being the main category in which such losses tend to materialise. The classification of losses corresponds to the Basel II event type categories. No losses have been recorded in the event types relating to internal or external fraud, employment practices and workplace safety or damages to physical assets.



Euroclear uses a hybrid approach at all consolidated levels above Euroclear Bank and Euroclear SA (stand-alone), by combining the AMA for Euroclear Bank and the simplified AMA for Euroclear SA, with a Standardised Approach (TSA) for the group CSDs or a BIA for the group's other entities.

The main building blocks of the AMA model are scenarios that describe potential severe losses. The set of scenarios is defined to cover all event types defined under Basel II. For each scenario, the risk is expressed by way of frequency and severity distributions, the parameters of which are estimated or calculated using data that is compliant with the Basel II soundness standards. They include the four required elements: internal losses, relevant external ORX losses, scenarios, and business environment and internal control factors. For each scenario, the tail of the severity distribution is modelled using Pareto statistical distributions, based on Extreme Value Theory.

Though Euroclear uses insurance to mitigate operational risk, it does not take insurance into account when calculating regulatory capital requirements for operational risk under the AMA.

The following table shows the capital requirements for operational risk for Euroclear plc.

31 December 2010 (€'000)	**Euroclear plc consolidated**
Capital requirements for operational risk[1]	
Basic Indicator Approach component	5,053
Standardised Approach component	69,818
Advanced Measurement Approach component	222,120
Total	296,991

[1] Basic Indicator Approach is used for the administrative entities of the group, Standardised Approach is used for the CSDs and Advanced Measurement Approach is used for Euroclear Bank and Euroclear SA/NV.

Economic capital

For Euroclear Bank, the AMA is used both for the determination of minimum operational risk regulatory capital under Pillar 1 of Basel II, and for the calculation of economic capital. For the regulatory capital calculation, a confidence level of 99.9% is used. For the economic capital calculation, a confidence level of 99.98% is used, consistent with Euroclear Bank's AA+ rating.

For the economic capital calculation, the model recognises the mitigation of operational risk due to insurance. The insurance policies have been mapped to the Basel II event types to identify insurance coverage gaps. This allows for a clear assessment of the coverage of each scenario of the model by the different insurance policies.

For the other material entities of the Euroclear group, which incur almost no operational losses, no sound and relevant economic capital model can be built. Therefore, for the Internal Capital Measurement Approach, the internal view on the capital requirement is calculated using the Basel II TSA approach. Though TSA is normally calibrated to a 99.9% confidence level, it is sufficiently conservative to be used as a proxy for a confidence level of 99.98%, as TSA does not take into account insurance mitigation or the liability caps applied to the CSDs.

Assessment and Rating Methodology

The Assessment and Rating Methodology (ARM) helps business experts to assess and rate operational risk with financial and/or reputation impact, at aggregated (entity, service) risk levels and at individual risk levels.

Under the ARM, the impact of these risks is assessed at a lower confidence level than for the calculation of economic capital requirements. The assessment focuses on operational losses that have one chance out of ten to materialise over a one-year horizon. It is more intuitive for business experts than the level set for economic capital calculations, which considers events that have one chance out of 5,000 to occur in any given year. The capital level required to cover such losses is called management capital.

Any risk impact is then compared to the risk appetite and upper tolerance levels set relative to the management capital level, which allows these risks to be rated and relevant mitigation actions to be prioritised.

The risk appetite and upper tolerance levels relative to the management capital level are derived from the risk appetite and upper tolerance levels set relative to the economic capital level. These are set for each material entity of the Euroclear group, respectively by its management committee and by its board of directors.

Remuneration policies and practices

The Basel Committee on Banking Supervision consulted the industry at the end of 2010 on "Pillar 3 disclosure requirements for remuneration". In parallel, the Committee of European Banking Supervisors published on 10 December 2010 "Guidelines on remuneration policies and practices". By way of circular letter CBFA_2011_05 of 4 February 2011, the CBFA required that institutions established in Belgium should respect these Guidelines, which include a disclosure requirement under Pillar 3, to be undertaken for the first time in the course of 2011.

Euroclear has proposed amendments to its remuneration policies to reflect the new regulatory requirements and has communicated the proposals to the NBB. These amendments will subsequently be submitted to the various entities' boards for approval. Only after the finalisation of that process will disclosure be possible. As a consequence, this Pillar 3 report does not include any detailed disclosures on remuneration. These disclosures will appear separately on the Euroclear website later in 2011, and will be included in the Pillar 3 report covering 2011.

It can be noted, however, that Euroclear does not have a trading room and that it engages only in market activities related to the services that it provides to its clients (see, among others, the chapter on market risk management). This Pillar 3 report describes the low risk profile of the group and staff do not have strong incentives to take material risks. Euroclear did not suffer from the excessive short termism related to remuneration practices that triggered the regulatory requirements in this area. Although remuneration in Euroclear Bank includes a variable component, this component is relatively limited, and not related to trading gains.

Securitisation

Euroclear does not engage in any securitisation activities.

List of acronyms

AIRBA	Advanced Internal Ratings-Based Approach for credit risk
AMA	Advanced Measurement Approach for operational risk
ARM	Assessment and Rating Methodology
BCBS	Basel Committee on Banking Supervision
BIA	Basic Indicator Approach for operational risk
CALCO	Credit, Assets and Liabilities Committee
CBFA	Banking, Finance and Insurance Commission
CCP	Central Counterparty
CEBS	Committee of European Banking Supervisors
CESR	Committee of European Securities Regulators
COSO	Committee of Sponsoring Organizations of the Treadway Commission
CPSS	Committee on Payment and Settlement Systems
CRD	Capital Requirements Directive
CRM	Corporate Risk Manager
CRO	Chief Risk Officer
CSD	Central Securities Depository
DVP	Delivery-versus-Payment
EAD	Exposure At Default
EAR	Earnings-at-Risk
EC	Economic Capital
EDF	Expected Default Frequency
ERM	Enterprise Risk Management
ESA	Euroclear SA/NV
ESCB	European System of Central Banks
FIRBA	Foundation Internal Ratings-Based Approach for credit risk
HSA	Horizontal Self-Assessment
ICAAP	Internal Capital Adequacy Assessment Process
ICMA	Internal Capital Measurement Approach
ICS	Internal Controls System
ICSD	International Central Securities Depository
IFRS	International Financial Reporting Standards
IOSCO	International Organization of Securities Commissions
IRB	Internal Ratings-Based approach for credit risk
IS	Information Security
KPI	Key Performance Indicator

KRI	Key Risk Indicator
LCR	Liquidity Coverage Ratio
LGD	Loss-Given-Default
NBB	National Bank of Belgium
OTC	Over-the-Counter
ORX	Operational Riskdata eXchange
PD	Probability of Default
RCSA	Risk and Control Self-Assessment
SREP	Supervisory Review Evaluation Process
SRP	Supervisory Review Process
SSS	Securities Settlement System
TARGET	Trans-Automated Real-time Gross Express Transfer system, the Real-Time Gross Settlement System of the ESCB
TSA	The Standardised Approach for operational risk
VaR	Value-At-Risk

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