# International arrangements

# Contents

# List of abbreviations

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|---|---|
| ASL | Automated Securities Lending |
| CBL | Clearstream Banking SA, Luxembourg |
| CBF | Clearstream Banking AG, Frankfurt Clearstream |
| CCBM | Correspondent Central Banking Model |
| CGN | classical global note |
| CS | Clearstream Services SA, Luxembourg |
| CSD | Central Securities Depository |
| COP | Clearstream Operations Prague sro |
| ERM | enterprise risk management |
| GTCs | CBL's General Terms and Conditions |
| ICSD | International Central Securities Depository |
| NBB | National Bank of Belgium |
| NGN | new global note |
| SSS | securities settlement system |

# 1. CLS Bank International

## 1.1 Institutional framework

CLS Bank International (CLS Bank) provides a multicurrency settlement service that mitigates the settlement risk arising from foreign exchange transactions. CLS Bank simultaneously settles both payment obligations (“legs”) that arise from a single foreign exchange transaction. Its payment-versus-payment (PVP) settlement model ensures that one payment leg of a foreign exchange transaction is settled if and only if the corresponding payment leg is also settled, eliminating the principal risk that arises when each leg is settled separately. To facilitate its multicurrency operations, CLS Bank maintains an account at each of the central banks whose currencies it settles.

The CLS organisation includes (i) CLS Group Holdings, a holding company incorporated under the laws of Switzerland and supervised by the Federal Reserve Board as a bank holding company in the United States; (ii) CLS UK Intermediate Holdings, a limited company incorporated under the laws of England and Wales that provides corporate services (ie finance, legal, human resources, audit and communications) to CLS Bank and its affiliated companies; (iii) CLS Bank, an Edge Act corporation organised under the laws of the United States, and a financial market utility designated as systemically important by the FSOC and supervised by the Federal Reserve Board; (iv) CLS Services, a limited company incorporated under laws of England and Wales, which provides operational and back-office support to CLS Bank and its affiliated companies; (v) CLS Aggregation, a limited liability company organised under the laws of the State of Delaware which provides an aggregation service that compresses multiple foreign exchange transactions into a single foreign exchange transaction.

## 1.2 Participation

Participants must meet certain financial and operating requirements in order to become a CLS Bank settlement member. Each settlement member maintains a single multicurrency account at CLS Bank. Settlement members can submit instructions on their own behalf as well as on behalf of their customers, which may include banks, non-bank financial institutions or multinational corporations. Customers can settle indirectly in CLS Bank as a third party of a settlement member that agrees to be responsible for those payment instructions in CLS Bank. All funding takes place between CLS Bank and the settlement member that is providing the third-party service. As of end-September 2011, CLS Bank had 61 settlement members and more than 13,000 third-party participants.

## 1.3 Types of transactions

CLS Bank currently provides settlement of foreign exchange transactions in 17 currencies[1] for six main financial instruments: FX spot, FX forwards, FX swaps, FX option exercises, non-deliverable forwards (NDFs) and credit derivatives.[2] In 2011, CLS Bank settled an average daily value equivalent to USD 4.8 trillion.

[1] CLS Bank provides settlement for the US dollar (USD), euro (EUR), pound sterling (GBP), Japanese yen (JPY), Swiss franc (CHF), Canadian dollar (CAD), Australian dollar (AUD), Swedish krona (SEK), Danish krone (DKK), Norwegian krone (NOK), Singapore dollar (SGD), Hong Kong dollar (HKD), New Zealand dollar (NZD), Korean won (KRW), South African rand (ZAR), Israeli shekel (ILS), and Mexican peso (MXN).

[2] Credit derivatives transactions are settled in nine currencies.

## 1.4 Operation of the system and settlement procedures

Upon receipt of any payment instruction, the CLS system authenticates and validates certain information included in the instruction.[3] During settlement processing, CLS Bank attempts to settle each payment instruction, subject to certain risk management tests (see Section 1.5), by making the appropriate debit and credit across the accounts of the relevant settlement members. These debits and credits are final upon execution of the transfers on the books of CLS Bank. As instructions are settled over the course of the day, settlement members accumulate net debit balances in currencies where they and their customers are net sellers and net credit balances in those where they and their customers are net purchasers.

Each settlement member funds its multicurrency account at CLS Bank each business day. CLS Bank receives payments from and makes payments to its settlement members in each respective currency using the real-time gross settlement (RTGS) systems of each central bank whose currencies it settles. All transfers of funds occur during a three-hour period for Asia-Pacific currencies (07:00–10:00 CET), and a five-hour period for all other currencies (07:00–12:00 CET).

CLS Bank makes payouts to members during the settlement day in currencies in which they have a net credit position, subject to the constraint that the sum of all currency balances (positive and negative) in a member's account, calculated as a US dollar equivalent, is not negative. Payouts are made according to an algorithm that, among other things, accords priority to members and currencies with the highest balances. In normal circumstances, settlement members will have zero balances in their CLS Bank accounts at the end of each day, and CLS Bank will have zero balances in its central bank accounts at the end of each day.

## 1.5 Risk management

CLS Bank is subject to the Federal Reserve Board's Policy Statement on Payments System Risk, which incorporates the international standards set out in the CPSS *Core Principles for Systemically Important Payment Systems*. CLS Bank's risk management tools include membership requirements, account position limits, currency haircuts on positions, committed liquidity facilities and loss-sharing arrangements. In particular, CLS Bank imposes aggregate short position limits that are member-specific and determined by an assessment of a member's credit, liquidity and operational capabilities. CLS Bank also imposes currency-specific short position limits at levels that are directly related to CLS Bank's committed liquidity facilities in that currency. Finally, CLS Bank requires members to have a positive account balance across all currencies adjusted for haircuts.

CLS Bank does not guarantee that all instructions submitted will be accepted for settlement. As the CLS settlement algorithm processes the queue of payment instructions accepted for settlement, only instructions that pass all of CLS Bank's risk controls can be settled through CLS. Instructions remaining in the queue at the end of the settlement period are returned to the sender.

The design of the CLS system ensures access to sufficient liquidity from contracted liquidity providers in the event that any single member fails to pay required amounts, even if the failing member also serves as one of the liquidity providers. CLS Bank could incur losses in the unlikely event that a member fails to make a required payment to CLS Bank and exchange rate movements exceed the haircuts CLS Bank has built into the system to guard

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[3] If the payment instruction is not successfully authenticated and validated, it will be rejected by the CLS system.

against risk from extreme exchange rate movements. In such cases, CLS Bank would employ a loss-sharing arrangement.

### 1.6 Major ongoing and future projects

CLS Bank is continuing its efforts to extend coverage of its settlement service to further reduce settlement risk in the FX market. CLS Bank is actively engaged in extending its settlement service to additional currencies with the launch of new currency programme in 2011. In addition, CLS Bank is collaborating with its settlement members to extend its settlement service to additional participants and to offer settlement of same-day FX trading activity.

## 2. Clearstream International

### 2.1 Introduction

Clearstream International SA[4] is an international clearing and settlement corporation for equities and bonds for both domestic and international business. Offering a wide range of services, the company is owned 100% by the Deutsche Börse AG via Clearstream Holding AG, both incorporated in Germany. Clearstream International SA is incorporated in Luxembourg and has four main subsidiaries: Clearstream Banking SA, Luxembourg (CBL), Clearstream Banking AG, Frankfurt (CBF), Clearstream Services SA Luxembourg (CS) and Clearstream Operations Prague sro (COP) established in 2008.

Clearstream International provides two fundamental types of service to the industry: (i) an international central securities depository (ICSD) through CBL and (ii) a central securities depository (CSD) through CBF.

CBL also has a subsidiary in Japan (Clearstream Banking Japan Ltd, opened in 2009), a branch in Singapore and representative offices in major financial centres such as Dubai, Hong Kong, London, New York and Tokyo.

CBL also operates LuxClear, a service that offers all the securities services required in collateralisation with the Central Bank of Luxembourg, both for Luxembourg-domiciled banks and for foreign banks according to the CCBM (Correspondent Central Banking Model).

With the Central Bank of Luxembourg, Clearstream International has also jointly established a new Luxembourg-based CSD, LuxCSD, which provides settlement in central bank money and will provide local access to T2S when it is implemented in 2015. LuxCSD is co-owned in equal shares by the two founding partners.

CBF offers clearing and settlement facilities as a CSD for the German securities markets and for international securities via direct links to CBL and other CSDs. CBF maintains relationships with more than 400 German banks as well as with remote international

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[4] Cedel was founded on 28 September 1970 in order to provide for the clearing, settlement, custody and management of securities and precious metals. On 1 January 1995, Cedel became Cedel Bank (later Cedelbank). At the same time, Cedel International was established as the parent company of the Cedel Group. In May 1999, Cedel International (the Luxembourg-based ISCD) and Deutsche Börse Clearing AG (German CSD) merged and formed Clearstream International (effective as of January 2000). Deutsche Börse initially held a 50% stake in Clearstream International, but acquired the remaining 50% stake in July 2002, when Clearstream International became a wholly owned subsidiary of Deutsche Börse Group. In July 2009, Deutsche Börse AG transferred 51% of Clearstream International's shares to Clearstream Holding AG, which in turn became the holding company of the Clearstream Group.

participants, serving more than 50 markets via indirect usage of the CBL links network. See the country chapter for Germany for more information on CBF.

CS provides a single IT platform known as Creation for the clearing, settlement and custody of international transactions through both CBL and CBF in commercial bank money. This secure and capable settlement platform operates in real time for 21 hours a day. CBF continues to operate the settlement system for the German market in central bank money on a separate platform (CASCADE).

COP is an additional operation centre, which services group activities.

For the structure of the Clearstream Group, see Section 4.4.3 in the descriptive Red Book chapter on the euro area.

## 2.2 Institutional framework

CBL is a licensed credit institution incorporated under Luxembourg law and is thus authorised to carry out a complete range of banking activities. However, CBL's by-laws stipulate that its core business consists of acting as a depository and providing clearing and settlement services in respect of securities deposited with CBL. Consequently, CBL's other banking activities are limited to facilitating its settlement and clearing services.

As a licensed credit institution, CBL is subject to supervision by the Commission de Supervision du Secteur Financier (CSSF).

Following the transposition of the EC Settlement Finality Directive into Luxembourg law, the European Commission has been notified of the SSS status of CBL, which is thus covered by this directive. As such, CBL is overseen by the Central Bank of Luxembourg.

## 2.3 Participation

Participation is open to banks, broker-dealers, investment banks, central banks, CSDs etc. New participants have to meet certain criteria when applying for participation. The credit standing of participants is continuously monitored. The participation criteria include the institution's net worth, its legal structure, its management reputation and the underlying country risk. Today, the Clearstream Group including CBL and CBF maintains relationships with around 2,500 customers in more than 110 countries.

## 2.4 Types of transactions

### *Securities settlement*

CBL as an ICSD offers clearing, settlement and asset servicing facilities for the Eurobond market and for securities issued in more than 50 countries. More than 400,000 domestic and internationally traded bonds, equities and investment funds are currently deposited with Clearstream. CBL also offers investment funds solutions such as CFF (Central Facility Funds issuance and redemption of investment fund units through the books of CBL) and Vestima (investment fund order routing). Finally, CBL provides securities lending, collateral and cash management services to its customers.

### *Securities lending and borrowing*

CBL offers two distinct but complementary securities lending and borrowing services: ASL (Automated Securities Lending), which is an automated process designed to prevent failed settlements, maximise settlement efficiency and improve settlement reliability; and ASLplus, which provides access to credit via the wholesale securities lending market. In ASL, CBL acts as an agent in arranging loans of securities to customers in order to maximise the number of transactions settled and to provide revenue to lenders. In ASLplus, CBL acts as the single principal borrower to all the lenders, negotiating rates with selected borrowers on a loan by loan basis with the aim of increasing revenues by matching market demand with the supply afforded by the lender securities portfolios held at Clearstream.

#### *Triparty Collateral Management Service*

CBL also provides a Triparty Collateral Management Service to its customers. This service frees customers from collateral management and administrative tasks from the moment a transaction takes place through to final settlement. CBL monitors the credit exposure and collateral coverage throughout the duration of a deal. CBL marks positions to market daily, makes margin calls and provides comprehensive daily transaction and settlement reports.

#### *Triparty Repo Service*

CBL's Triparty Repo Service simplifies the process of administering multicurrency repurchase agreements for both the giver and receiver of collateral, and mitigates the operational risks associated with some types of repurchase agreements by offering a comprehensive delivery-versus-payment and securities safekeeping service. Collateral received under a triparty repo agreement is monitored, reviewed and marked to market daily to ensure that collateral margin requirements are maintained.

#### *New issues services*

Custody, together with clearing and settlement, constitutes CBL's core business. Before securities become available for secondary market settlement and for CBL's custody management services, CBL can also handle both the closing operations and the distribution of allotments in new issues. A comprehensive range of services is provided for the eligibility assessment, issuance and distribution of new issues in both international and domestic markets. CBL can offer these services in respect of domestic, European and international securities (including certificates of deposit, depository receipts, treasury bills, commercial paper, short- and medium-term notes, bonds, equities, warrants, equity-linked notes and investment funds).

CBL assists lead managers, lawyers and issuing agents in launching new issues. It reviews issue structures and can provide guidance on operational procedures for specific new issue features or requirements. CBL also advises on the documentation of these procedures in the offering memorandum, prospectus and agency agreement.

### 2.5 Operation of the system

CBL's book-entry IT system for the simultaneous exchange of cash and securities is a DVP mechanism designed to eliminate principal risk. Where customers cannot deliver securities or cash at the designated time, CBL offers a comprehensive securities lending programme and also provides cash lending facilities. These support mechanisms are closely monitored via dedicated cash and collateral management systems.

The CBL "settlement day" consists of one main settlement processing, the real-time processing, followed by the end-of-day processing, as described in detail below.

#### *Real-time and end-of-day processing*

Transactions in CBL are processed during the real-time processing, which is followed by the end-of-day processing.

The real-time processing starts at 21:00 on the evening of the business day preceding the settlement date (SD) and runs continuously until 14:55 on SD, followed by the end-of-day processing, which is completed by 19:00 on SD.

CBL differentiates between mandatory and optional settlement periods. This distinction is particularly relevant for the acceptance of transfer orders relating to external settlement in Euroclear and other CSDs.

- The mandatory settlement period begins at 21:00 on SD–1 and runs continuously until 14:55 on SD.
- The optional settlement period follows the mandatory settlement period and is completed by 19:00 on SD.

### *Internal settlement*

Securities held in the CBL system and traded between CBL counterparties are settled in accordance with the counterparties' instructions on a DVP or FOP basis through the simultaneous book-entry transfer of securities and cash between the accounts of the buyer and the seller.

### *Bridge settlement*

The first Bridge Agreement between CBL and Euroclear was concluded in 1993. Trades with counterparties in Euroclear were settled overnight via the electronic Bridge on a DVP or FOP basis. The Bridge allowed transactions to be settled between customers of CBL and Euroclear by crediting or debiting the accounts that the clearing and settlement systems hold with each other.

On 29 November 2000, Clearstream International and Euroclear signed an agreement to supplement the existing overnight Bridge with a new daytime transaction processing feature. A manual version of this daytime Bridge for multiple intraday exchanges of securities and cash deliveries started operations in 2001. The main benefits of this enhancement were increased efficiency, greater liquidity for customer transactions and the ability to distribute new issues on a same-day basis.

In 2004 and 2008, Clearstream and Euroclear introduced further significant enhancements by implementing the automated Daytime Bridge and extending its operation times. The new Bridge improves cross-border settlement efficiency, in particular by extending instruction deadlines and allowing same-day (T+0) Bridge transactions, thereby increasing interoperability between the two ICSDs.

- Concerning the mandatory settlement period, customers can submit instructions for Bridge settlement until 13:00 SD and internal instructions until 14:45 SD.
- Concerning the optional settlement period, the deadlines for submission of customers' instructions are 15:00 SD for Bridge instructions against payment, 16:00 SD for Bridge instructions free of payment and 18:00 SD for internal instructions.

### *External settlement*

Trades with counterparties on other domestic markets are settled through one of CBL's depositories (either a national CSD or a custodian bank, depending on the market).

### *The Creation platform*

The Creation settlement system is a central application that allows CBL to offer customers a rapid daytime settlement service. In addition to features such as eligibility checking, provision checking, technical netting, settlement and transaction booking, the Creation system includes functions such as automatic reimbursement of securities lending, automatic substitution of collateral, automatic collateral top-up and return of specific collateral pledged, and settlement of securities financing transactions.

By virtue of its continuous intraday DVP settlement process, the Creation IT platform improves liquidity for customers by providing for technical netting facilities.

### *Transaction processing environment*

CBL accepts settlement instructions through CreationConnect, its proprietary communications system, by authenticated SWIFT and through CPU-CPU links. CreationConnect products provide real-time access to enhanced information provision, instruction input, position and transaction reporting and offer a choice of web browser (CreationOnline), file transfer (CreationDirect) and SWIFT access (Creation via SWIFT). Most instructions are processed without human intervention. Certain transactions may be processed or entered into the system by CBL staff, based on customer instructions.

Once an instruction is received by CBL, it is checked automatically against validation criteria such as the International Securities Identification Number (ISIN) to ensure that the instruction has been input correctly. Once validated, the instruction must be matched with the instruction from the counterparty. It will then be deemed a valid settlement order. If the instruction is not validated, the customer is informed immediately so that the instruction can be rectified and a new instruction sent in advance of the processing deadline.

Reports of settled and unsettled trades are available at regular intervals intraday (some reports are available on a continuous basis) throughout the real-time processing. Full reporting, including information on cash and securities balances and total holdings, is provided to customers during the end-of-day processing

## 2.6 Risk management

To ensure that risks can be identified and dealt with at an early stage, Clearstream International has a group-wide risk management concept for processes, roles and responsibilities that is applicable to all staff and organisational entities of Deutsche Börse Group.

The Clearstream risk management framework, as stated in the Group Risk Management Policy, aims to ensure that all threats as well as causes of loss and potential disruption are properly and promptly identified, centrally recorded and assessed (as far as possible in terms of potential financial loss), so that appropriate action is taken and a consolidated report promptly submitted to the Executive Boards.

Clearstream International provides annual public disclosure in line with Pillar 3 of Basel II.

### *Legal risk*

CBL is subject to the Law of 5 April 1993 on the financial sector, as recently amended. The law sets forth the authorisation process for and obligations of banks, operators of securities settlement systems and other financial sector institutions established in Luxembourg, and the relevant prudential supervision regime. Under the provisions of this legislation, CBL is designated as a securities settlement system under Luxembourg law.

As such, CBL is also subject to the Law of 10 November 2009 on payment services, the business of electronic money and settlement finality in payment and securities settlement systems, as recently amended by the Law of 20 May 2011 transposing inter alia the EC Directive 2009/44/EC. This law sets out the requirements for SSS.

The transfer of securities is mainly governed by the Law of 1 August 2001 on the circulation of securities and other fungible instruments (the "Securities Law"), as modified. The provisions of the Securities Law apply to all securities and other financial instruments, whether in physical form or dematerialised, bearer or registered, domestic or foreign, or other form under applicable legislation. Securities and other financial instruments are fungible or are deemed to be so when they are interchangeable during the settlement process. Fungible securities are booked in accounts and may be transferred from one account to another by book entry.

Agreements on financial collateral are governed by the Law of 5 August 2005 on financial collateral arrangements (the "2005 Law"), as recently amended by the Law of 20 May 2011, which together provide a legal framework for the implementation and enforcement of pledges, repos, nettings, and transfer of title operations.

CBL's general terms and conditions (GTCs) specify Luxembourg law as applicable to all services provided by CBL including settlement. As regards ownership, the depositor has co-ownership rights in the securities – a right in rem of an intangible nature (Article 6 of the Securities Law). However, this right in rem can only be enforced by the participant against CBL. The rights in case of a pledge or other collateral arrangements are governed by the 2005 Law.

Luxembourg law provides that CBL is under no obligation to keep the securities deposited with it at the place where the deposit is made and is entitled to sub-deposit the securities with other depositories in Luxembourg or abroad (Article 12 of the Securities Law). Customers' securities are segregated from its own securities. Such sub-deposit alters neither the location of securities, which remains at the registered office of CBL, nor the validity and enforceability of a pledge created over such securities (Article 23 of the 2005 Law). Formal legal opinions under the national law where assets are sub-deposited confirm that the securities would not be part of the general assets of the other depositories and that those assets should not be subject to attachment by their creditors. These opinions represent a confirmation of key legal requirements including enforceability of depository's obligations, enforceability of a judgement of a Luxembourg court, recoverability of assets in case of default by the depository and the legal status and authority of the depository.

If an event occurs that CBL reasonably believes would materially affect the customer's ability to fulfil its obligations towards CBL or any agreement between CBL and the customer, CBL may terminate or suspend the provision of the services to this customer with immediate effect and without prior notice.

In accordance with its GTCs, CBL accepts liability towards its participants for negligence or wilful misconduct. It is only liable for gross negligence or wilful misconduct concerning indirect or unforeseeable damages. If such an event occurs, CBL is entitled to undertake measures to mitigate damages and protect the interests of CBL and its customers. However, CBL will only be liable for its own acts and omissions. CBL's liability is excluded for events beyond its control. Nevertheless, CBL will undertake all relevant actions, including steps against another Clearstream subsidiary, in the event of its insolvency or if it has committed harmful acts or omissions. The costs of any such actions will be for the account of the relevant participant.

In addition to this liability regime, CBL is covered by insurance policies. They include a comprehensive crime and depository insurance for customer claims and an insurance for all risks of physical loss or damage, for losses or damage of instruments held by CBL on behalf of its customers or in transit in CBL's system. In addition, coverage is held against fraud, negligence, or omissions of employees that result in a direct loss sustained by a customer for which CBL is held to be legally liable. However, the insurance does not cover failures of mandatory infrastructure services or goods providers, such as telecommunications services, electricity and power supply services, or SWIFT services.

### *Settlement risk*

CBL operates a DVP Model 1 system ensuring simultaneous settlement of securities and funds transfers on a gross (trade-by-trade) basis. CBL settles transactions between customers by simultaneous book-entry debits and credits in their respective securities and/or cash accounts. These book entries are passed after completion of a processing run that takes account of customers' instructions transaction by transaction, in an iterative process, to determine which of the transactions can settle in such a way as to optimise settlement while remaining within predefined limits.

External transactions settling through domestic market links established by CBL settle in accordance with domestic market finality rules. As a rule, CBL only credits the account of a participant with securities after the receipt of the securities in CBL's domestic account after finality.

### *Credit risk*

CBL provides banking and custody services to its participants in multicurrency securities settlement activities. CBL has an external AA rating.

CBL only extends credit to customers who meet its stringent requirements. Limits are applied to all credit facilities extended to customers, and are always individually negotiated.

CBL determines which securities are eligible as collateral and which haircuts apply to them. To facilitate the collateral management process, the same securities are eligible and the same haircuts are applicable to CBL's settlement credit facility and ASL, although the party to whom the collateral is pledged differs. Haircuts may range from 1% to 100%. In general, securities eligible as collateral are investment-grade issues, with the exception of some sub-investment grade sovereign debt. Collateral is marked to market daily. Decisions on changes in eligible collateral, applicable haircuts and valuation methodologies for the purposes of securing credit granted by CBL and for securities lending and borrowing programmes are developed and reviewed by the Credit Department. Changes in eligible collateral or haircuts in the Triparty Collateral Management services suite can be made at any time with the mutual agreement of the counterparties to the transaction.

Collateral policies are set out in CBL's Customer Handbook and in its customer communications whenever there is a change. Collateral policies concerning ASL and ASLplus are covered in the legal agreements for these services. Collateral policies concerning the triparty services are an integral part of the Collateral Management Service Agreement (CMSA) signed by the receiver and the giver of collateral.

For customers to which it has an approved credit exposure, CBL sets a secured intraday credit limit in the form of an Unconfirmed Funds Facility (UCF) that allows the customer to use the funds that CBL expects to receive on that account for settlement purposes, provided that the customer has sufficient collateral on its account. CBL may also grant a Technical Overdraft Facility (TOF), another intraday limit that may be used for settlement purposes only.

Under CBL's GTCs, all proprietary assets held by the customer in CBL are pledged in favour of CBL to the extent of any credit facilities granted to the customer. The customer is required to notify CBL if it holds on account with CBL any assets that the customer is not entitled to use as collateral against its own liabilities vis-à-vis CBL. Securities and other holdings that are pledged against a credit facility provided for securities borrowing are excluded from the calculation of collateral to cover any other credit arrangements. Collateral values are calculated on the basis of recent market prices less the deduction of haircuts in line with international banking standards. Collateral must be investment grade (BBB– and above).

### Liquidity risk

Liquidity risk is managed by matching the duration of investments and liabilities, restricting investments in potentially illiquid or volatile asset classes, authorising CBL to repledge securities received with central banks and maintaining sufficient financing facilities to overcome unexpected demands for liquidity.

CBL's current liabilities, including customer demand deposits, are adequately covered by loans to banks and customers, which may be invested up to a maximum of six months, and by other debt instruments and fixed income securities. The fixed income securities can be pledged to central banks should the need for additional short-term liquidity arise.

CBL is required to maintain a cash balance at the Central Bank of Luxembourg based on liabilities other than amounts due to credit institutions, subject to minimum reserve requirements. As the investment policy of the Clearstream Group only allows investment in fixed income securities with a credit rating of AA– or higher, it is expected that all such securities could be liquidated within a short time period without significant loss.

### Market risk

According to its GTCs, CBL has a general right of retention and setoff on all assets held on the customer's account that secure obligations towards CBL by the customer for the services rendered by CBL. All assets held by the customer in CBL are pledged in favour of CBL to the extent of any credit facilities granted to the customer. The customer is required to notify CBL if it holds on account with CBL any assets that the customer is not entitled to use as collateral against its own liabilities vis-à-vis CBL. This may apply, for example, to securities held on behalf of the customer's own clients.

The collateral value of all securities and other holdings on the customer's account must at all times be equal to, or greater than, the total value of all obligations that CBL undertakes on behalf of the customer. In general, securities are monitored against credit limit usage. CBL automatically monitors the limits on its secured credit lines. All securities are reviewed for collateral eligibility in terms of issues, liquidity and market risk. Positions pledged as collateral are reviewed in accordance with fluctuations in market values. Pledged collateral is also monitored to identify whether the securities pledged are required to execute forthcoming deliveries. If this is the case, alternative collateral is sought in order to release the pledged securities for settlement. Valuation can be done at any time with the mutual agreement of the transaction counterparties.

### Operational risk

CBL's business continuity management policy provides for a central team, organisationally independent from the operations and IT departments, which is responsible for coordinating the business continuity plan and for providing a planning framework for all other units and departments. Business functions and systems are classified by varying degrees of criticality in accordance with the risk management framework. This analysis identifies the point in time when non-delivery of all or part of a service will have a non-tolerable impact on the business. It also designates the services, staff, systems, facilities and other requirements that are mission-critical and that must be included in the business continuity plan. These are tested annually.

### Liability of CBL

Except in the case of negligence or wilful misconduct, CBL is not liable to customers for any loss, claim, liability, expense or damage arising from any action taken or not taken by CBL. In addition, CBL's activities are covered by comprehensive insurance policies. These include a comprehensive crime and depository indemnity of up to EUR 20 million, with a deductible of

EUR 5 million; and, an insurance policy covering all risks of physical loss or damage. Coverage is up to EUR 75 million for each and every loss per transport or on premises with an excess of EUR 50 million. The level of deductible depends on the risk category. Additionally, CBL has a EUR 300 million line of cover for directors and officers.

### 2.7 Links to other systems

CBL has a long history of establishing links with other countries to facilitate the custody of foreign securities. It currently offers its customers access to more than 50 markets around the world via a network of local sub-custodians and CSDs, including via the Bridge with Euroclear Bank.

Worldwide access to different markets is provided via (i) direct links, in which CBL has an account in its own name with the CSD; (ii) operated links, where CBL also has an account in its own name with a CSD but which is technically operated by a third party; and (iii) indirect links, via an account with a sub-custodian which has an account in its own name with the CSD.

CBL's cross-border settlement network allows its customers to trade and settle multimarket securities in the home market (generally the issuer's market), in a remote market (a domestic market other than the issuer's) and in cross-border transactions between the home market and a remote market.

### 2.8 Pricing

On its website, CBL publicly discloses its fee schedule, including fees for safekeeping services, settlement and cash services, custody administration services, information provision services, investment funds services and the fees for the different securities lending programmes. CBL informs its customers about changes to the fee schedule via customer communications. CBL applies a unified price structure for combined internal and Bridge settlement volumes. This set of fees is calculated on one sliding scale combining both debt and equity instruments across all markets offered by Clearstream.

The safekeeping fee calculation is based on the average daily value of securities per month, which is derived from the nominal value of debt securities and on the market value for all other securities. In addition, a family grouping discount mechanism (family groups and account grouping) and the core market concept applies. The core market concept groups together the markets in which CBL's customers are most active. Special sliding scales depending on the group and account deposit are also applied.

The custody administration services fee is charged on mandatory corporate events based on the number of executed events (compensations, cash payments, redemptions, stock dividends etc) and for voluntary events, for which customer instructions are required, according to the number of customer instructions. Securities lending and borrowing fees are calculated once a day after the end-of-day processing has been completed. Fees are charged and income is paid pro rata temporis based on a 360-day year and on the market value of the securities (plus accrued interest where applicable).

## 3. Euroclear Bank

### 3.1 Introduction

Euroclear Bank provides both international central securities depository (ICSD) and securities settlement services, including custody, new issues distribution, securities lending and money transfer. It is one of the entities of the Euroclear group that also comprises the

CSDs of the United Kingdom (Euroclear UK & Ireland), France (Euroclear France), the Netherlands (Euroclear Nederland), Sweden (Euroclear Sweden), Finland (Euroclear Finland) and the Belgian CSD for private debt and equities (Euroclear Belgium). For the structure of the Euroclear group, see Section 4.4.1 in the descriptive Red Book chapter on the euro area.

## 3.2 Institutional framework

Euroclear Bank, a credit institution incorporated under Belgian law, operates the Euroclear system.

### *Oversight and prudential supervision*

Euroclear Bank is subject to oversight by the National Bank of Belgium (NBB) according to Article 8 of the NBB Organic Law of February 1998 and Article 23 of the law of 2 August 2002. As a credit institution incorporated in Belgium, Euroclear Bank is also subject to prudential supervision in accordance with the law on the legal statute and supervision of credit institutions (22 March 1993) and the law on the supervision of the financial sector and financial services (2 August 2002).

With effect from 1 April 2011, the NBB is in charge of prudential supervision of Euroclear Bank while a new entity, the Financial Services and Markets Authority (FSMA),[5] is responsible for financial market supervision and consumer protection.

## 3.3 Participation

Euroclear Bank has about 1,300 participants from more than 80 countries. The vast majority of participants are broker-dealers, custodians, investment managers and central banks. Applicants must meet five criteria as set out in system’s admission policy:

- adequate financial resources;
- technological capability to use the Euroclear system;
- need for and potential use of the Euroclear system;
- sound reputation in the market; and
- an adequate anti-money laundering programme.

In order to evaluate potential risks, the assessment of applicants according to these criteria takes into account their specific characteristics, such as the business they are engaged in.

## 3.4 Types of transactions

### *Securities settlement*

About 200,000 national and international securities are accepted in Euroclear Bank, including debt securities, depository receipts, equities, warrants and investment funds. Participants in Euroclear Bank can settle against payment securities transactions by book entry.[6]

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5 The FSMA is the successor to the Banking Finance and Insurance Commission (CBFA).

6 Euroclear Bank also processes investment funds on a dedicated platform called FundSettle.

Transactions in Euroclear Bank are settled on a DVP1 basis in commercial bank money in more than 50 settlement currencies. Euroclear Bank has only direct participants (no tiering). Many of them do not have access to central bank money. As a consequence, Euroclear Bank does not rely on central bank accounts/facilities in all settlement currencies but makes use of a network of cash correspondents to provide its multicurrency settlement services. The cash correspondents are the link between Euroclear Bank and the national payment system in the country of the relevant currency.

For the four main currencies (EUR, USD, GBP and JPY), Euroclear Bank relies on several cash correspondents.

### *Securities lending and borrowing*

Euroclear Bank offers a securities lending and borrowing programme that is fully integrated into its settlement process. It comprises several real-time lending and borrowing processing windows. The last opportunity to borrow is at 14:00 and the last opportunity to reimburse is at 17:00 or 17:30 depending on the market.

All securities made available by lenders are aggregated in an anonymous lending pool. Borrowings are allocated whenever a borrower's account lacks securities to execute a delivery instruction, provided that a sufficient lendable supply of the relevant issue is available. Euroclear Bank guarantees to each lender the return of lent securities. Through the intermediation of Euroclear Bank (a borrower has a contractual relationship with Euroclear Bank only), confidentiality is ensured.

### *New issues*

Euroclear Bank acts as primary place of deposit for eurobonds and other international securities. These types of security are always issued on a physical basis either in the form of a global physical certificate (global note) representing the whole issue or in the form of individual notes (marginal share of the issues) that are immobilised with their depositary.

Different custody structures can be chosen by the issuer (or its agent) for these securities in either bearer or registered form. Depending on the structure chosen (ie new or classical global notes), issued securities are eligible as collateral for Eurosystem monetary policy and intraday credit operations. In order to be ESCB-eligible,[7] all newly issued global bearer form securities with the ICSDs as primary place of deposit should be issued in new global note (NGN) form, and deposited with either Euroclear Bank or Clearstream Banking Luxembourg as ICSD common safekeeper. In accordance with Eurosystem rules, the NGN is serviced by a common service provider (in charge of providing asset services to the ICSDs) and a common safekeeper (in charge of safekeeping the NGN throughout its life). Similarly, new global form registered securities issued after 1 October 2010 have to be safekept by and registered in the name of a nominee of the ICSD as common safekeeper and serviced by a common service provider in order to be ESCB-eligible. Newly issued securities with a classical global note (CGN) structure, represented by a bearer or registered form global note that is deposited with a common depositary on behalf of the two ICSDs that provide safekeeping and asset servicing for such securities, are no longer ESCB-eligible (whereas older CGN issues remain ESCB-eligible until their maturity).

[7] As of 1 January 2007.

### *Triparty collateral management services*

Euroclear Bank participants can collateralise all types of exposures across instruments and counterparties using one collateral pool. These services include repos, securities lending, derivatives (collateralising credit exposures arising from over-the-counter derivatives transactions) and secured loans (collateralising credit exposures arising from various credit agreements). For each collateral management product, a specific triparty agreement must be concluded between the collateral giver, the collateral taker and Euroclear Bank. The latter acts as the neutral triparty agent service provider on behalf of both the collateral giver and the collateral taker. AutoSelect, the automated collateral allocation and monitoring tool, enables the selection and substitution of collateral securities. It also ensures that the transaction remains fully collateralised at all times. Collateral valuation is done on at least a daily basis, automatically generating and reporting margin calls.

### *Asset servicing*

Euroclear Bank offers a large number of custody services facilitating the exercise of securities holders' rights and corporate actions, including tax services, proxy voting, information on corporate events and processing for collection of income and redemption proceeds, market claims and subscription rights.

## 3.5 Operation of the system

### *Settlement model*

On the settlement date, securities are transferred by book entry from the securities account of the seller to that of the buyer, provided that settlement conditions are met. Simultaneously, cash is transferred from the account of the buyer to that of the seller. Securities and cash transfers between buyer and seller accounts are final and irrevocable upon generation of the settlement records in the books of Euroclear Bank.[8]

### *Settlement windows*

The securities settlement process includes batch and real-time processes.

The overnight batch process comprises two batches[9] that run during the night. The batch process starts the positioning of matched transactions that have reached their settlement date. This process settles the main volume and value of transactions.

The real-time process is used to recycle the pending/unsettled transactions from the overnight batch process but also for settlement instructions received for same day settlement which are introduced, validated and matched during that working day. All instructions for real-time settlement which are not settled at the end of the process are automatically recycled for settlement in the next batch process.

The system's processing window starts at 22:00 on T–1 with the batch process and ends at around 18:30 on day T with the close of the optional real-time process. After 14:30, real-time settlement is not mandatory, meaning that the buyer and the seller must both explicitly authorise settlement in that part of the real-time process otherwise the settlement is postponed until the next night's processing. The rationale behind this optional settlement

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8 DVP1.

9 SET1 (from 22:00 (T–1) until 23:30 (T–1)) and SET2 (from 01:00 (T) until 02:30 (T)).

window is related to potential liquidity management issues that might arise among the system participants as cash deadlines approach.

Whenever possible, external instructions for same day value, including settlement feedback from local markets, are also processed within the Euroclear Bank processing window for same day value. Securities transactions are settled via domestic market links in accordance with local market rules.

Settlement efficiency is further optimised through dynamic recycling of securities and cash positions throughout the securities settlement processing. After each securities settlement processing, Euroclear Bank provides participants with a report of settled and unsettled securities transactions and, at the beginning of each business day, with a report of positions resulting from the overnight processing.

## 3.6 Risk management

The Euroclear group manages its risks under an enterprise risk management (ERM) framework with policies related to each of the relevant risks it faces in pursuing its business objectives. The ERM framework is used to ensure the coherence of the group's risk management and internal control activities, for example by defining how risks are identified and mitigated or by supporting risk owners in taking decisions that accord with the company's risk appetite. Euroclear Bank makes an annual public disclosure in line with Pillar 3 of Basel II. See also Section 4.4.1.4 in the descriptive Red Book chapter on the euro area.

### *Legal risk*

The Euroclear system has been designated as a settlement system under the provisions of the law of 28 April 1999 that implements the EU Settlement Finality Directive 98/26/EC. This law protects the validity and enforceability of securities and cash transfers as well as final settlement within the Euroclear system. As from the implementation of the Royal Decree of 3 June 2007, this protection is also granted to the very limited number of non-financial companies participating in the Euroclear system.

All securities accepted in Euroclear Bank are held and transferred by book entry in accordance with Royal Decree no 62 of 10 November 1967, coordinated by the Royal Decree of 27 January 2004. Royal Decree no 62 establishes the participants' co-ownership right in the pool of fungible securities credited to their account whereby a participant has direct co-ownership rights, not over specific securities, but over all securities of the same type held in the system. Each participant has therefore the right to "revindicate" (obtain the return in kind of) the same amount and category of securities that is standing to the credit of its securities account, even in the case of the failure or insolvency of Euroclear Bank. As Euroclear Bank has no ownership interest in securities held in its system, securities never become part of the estate of Euroclear Bank, thus protecting participants under Belgian law against the risk of bankruptcy of Euroclear Bank.

Euroclear Bank is also licensed to hold on behalf of third parties dematerialised securities of Belgian public debt, dematerialised securities issued under Belgian law by Belgian companies and Belgian commercial paper in conformity with the law of 2 January 1991 on public debt instruments, the Belgian Company Code (and the Royal Decree of 12 January 2006 on the dematerialised securities of companies), the law of 22 July 1991 on commercial paper (thesauriebewijzen/certificats de trésorerie and depositocertificaten/certificats de dépôt) and the Ministerial Decree of 24 January 1991 on the licensing of the holding of dematerialised securities of Belgian public debt (Article 1, 1), (b) and 3°, (a)). Under that legislation, Euroclear Bank has the special status of an "international securities clearing organism" (Article 3bis).

Securities deposited in Euroclear Bank are typically subdeposited with a network of depositories, being banks, central banks or securities settlement systems (SSS) located in the country of issuance of the security. All securities are credited to segregated custody accounts and labelled or otherwise appropriately identified as being held for Euroclear Bank. Formal legal opinions under the local laws where assets are subdeposited confirm that the securities would not be part of the general assets of the depository or the local SSS and that those assets should not be subject to attachment by those entities' creditors.

In accordance with the system's terms and conditions, Euroclear Bank accepts liability for direct losses caused by its negligence and for direct, indirect or unforeseeable losses caused by its gross negligence or wilful misconduct. However, Euroclear Bank does not accept liability for the negligence or wilful misconduct of third parties, including depositories. Under the loss-sharing provision in the terms and conditions, the loss of securities caused by any event not due to any negligence on the part of Euroclear Bank will be shared among the participants holding a position in the particular security issue in the system. Euroclear Bank is required to take all such steps as it shall reasonably deem appropriate (including legal proceedings) to effect a recovery of any securities loss on behalf of affected participants.

Euroclear Bank has insurance for general liabilities, terrorism, cyber risks, directors and officers, and employment practices liabilities.

### *Settlement risk*

Euroclear Bank operates a DVP1 settlement system that holds both participants' cash and securities accounts on its books. Intraday finality for the batch processing and the real-time process is achieved through simultaneous book entry on the respective cash and securities accounts.

External trades settling through domestic market links established by Euroclear Bank settle effectively in the local market in accordance with local market finality rules. As a rule, Euroclear Bank will not credit a participant's account with securities before receipt by Euroclear Bank of the securities in its local account with finality.

### *Credit risk*

As a limited purpose bank, Euroclear Bank provides system participants with banking and custody services associated with the multicurrency securities settlement activities in its system. Euroclear Bank has an external AA+ rating.

Intraday credit facilities can be granted to participants to support their settlement activity; as a rule, the intraday credit usage is secured by securities or cash as collateral on an account held and pledged in Euroclear Bank. In accordance with the Belgian law of 2 August 2002 on the supervision of financial markets, Euroclear Bank can also rely on a statutory lien which only applies to proprietary assets of a participant. Pursuant to its operating procedures, Euroclear Bank waives the statutory lien for the assets of participants' clients, except where the participant has agreed in writing that the lien should continue to apply to the client's assets credited to such securities account.

Euroclear Bank may run treasury exposure resulting from investing clients' end-of-day long cash positions. Such positions are typically re-deposited in the market with high-quality counterparties. The related risks are limited by their short duration (mainly overnight), as well as by concentration risk caps. Reverse repos are also relied on whenever possible.

### *Liquidity risk*

Participants with long cash balances resulting from their settlement activity (net sellers) wire their funds out of the Euroclear system, whereas participants that need to cover their debit cash balances (net buyers) must repay their positions during the day (as most of their transactions have settled in the overnight processing). To process the pay-ins and outflows, Euroclear Bank relies on its cash correspondent network.

For contingency situations, Euroclear Bank can rely on several committed liquidity sources. Structural solutions have recently been developed to allow Euroclear Bank to appropriate and immediately "monetise" the securities pledged by its top credit users in case the latter are unable to repay their credit exposures upon request. Liquidity stress and backtests are organised regularly to confirm that liquidity is adequate.

***Market risk***

As a rule, participants to whom Euroclear Bank has granted secured credit facilities pledge assets deposited in Euroclear Bank to secure their credit usage. The collateral valuation model of Euroclear Bank defines, at least once a day, adequate haircuts for each security, taking into account market, credit, country and liquidity risks. Valuations can also be updated in real time whenever requested. Although Euroclear Bank does not seek market risk, some degree of risk may arise if the value of its investment book falls. For that reason, the investment book is conservatively managed.

***Operational risk***

The Euroclear group ERM framework and its operational risk policy are outlined in Sections 4.4.1.4 and 4.4.2.5 in the descriptive Red Book chapter on the euro area.

Under the Basel II framework, Euroclear Bank adopts the Advanced Measurement Approach (AMA) to calculate capital requirements for operational risk. The information security internal control system is covered by the ERM framework for compliance with the group's adoption of the AMA under Basel II and accords with other internationally recognised reference frameworks.

Either SWIFT or the proprietary system EUCLID can be used by Euroclear Bank participants. For each system, participants are required to perform user identification and authentication procedures.

### 3.7 Links to other systems

Euroclear Bank has established more than 40 links with local markets worldwide, as well as the Bridge with Clearstream Banking Luxembourg (Clearstream). The majority of the links between Euroclear Bank and local markets are indirect, via a local agent who holds a securities account at the local issuer CSD. These local agents have to meet a number of selection criteria (including financial and operational requirements) and are re-approved annually. Apart from the Bridge with Clearstream, Euroclear Bank has established more than 10 direct links.

The network of links allows Euroclear Bank to settle securities held in other issuer CSDs either on a cross-border basis (ie settlement between securities accounts held in Euroclear Bank and in the foreign CSD) or internally (ie settlement between two securities accounts held in the books of Euroclear Bank). Internal settlement accounts for the majority of Euroclear Bank settlement turnover.

### 3.8 Pricing

In accordance with the European Code of Conduct for Clearing and Settlement and with a view to enhancing price transparency, all Euroclear group (I)CSDs, including Euroclear Bank, disclose tariff information for all services offered, including examples of how the tariff schedules for the main services work in practice, with price examples for typical clients. This is provided for all asset classes, including fixed income, even though the code of conduct applies currently to equities only.

Settlement fees are based on the number of settled transactions in each instrument. The average fee rate is calculated by applying a sliding scale concept to the number of instructions of each type in each instrument. This average rate is then applied to the number of instructions in the corresponding type of instrument and market for each participant's securities account.

Safekeeping fees are based on the monthly average depot value of securities held in all securities accounts in Euroclear Bank. The sliding fee concept is also applied here.

### 3.9 Major ongoing and future projects

For major ongoing and future projects of the Euroclear group, see Section 4.4.1.5 in the descriptive Red Book chapter on the euro area.

### 3.10 The use of the securities infrastructure by the National Bank of Belgium

Generally speaking, the National Bank of Belgium makes use of Euroclear Bank for two main purposes: (i) the holding and management of its own securities portfolio; and (ii) the management of the collateral offered to it by counterparties for monetary policy operations or the coverage of intraday credit facilities.

## 4. American Express Company

### 4.1 Institutional framework

American Express Company (American Express) and its primary operating subsidiary, American Express Travel Related Services Company Inc (TRS), are New York-based bank holding companies. TRS owns two federally chartered banks in the United States, Centurion Bank and American Express Bank Federal Savings Bank (AEBFSB).[10] American Express is governed by a shareholder-elected board of directors, the majority of which are independent from the company.

American Express operates its own network, processes transactions, and provides business-to-business services to merchants. American Express derives its revenue primarily from card usage and secondarily from finance charges and fees.

As a bank holding company, American Express is subject to supervision and examination by the Federal Reserve. Centurion Bank is chartered as a commercial bank in the state of Utah and is regulated by the Utah Department of Financial Institutions and the Federal Deposit Insurance Corporation (FDIC). As of July 2011, the US Office of the Comptroller of the Currency regulates the AEBFSB. As a credit and charge card issuer, American Express's lending and pricing practices are regulated by various agencies in the countries in which it operates. As an issuer of stored-value instruments, American Express is subject to money transmission laws. As the operator of a card network, American Express is often subject to anti-money laundering rules and data security laws.

[10] Prior to 2008, American Express and TRS were joint stock companies.

## 4.2 Participation

Within its general purpose card network, American Express generally acts as both a card issuer and merchant acquirer. Occasionally third-party banks might act as an issuer and/or acquirer on American Express's behalf. Participants with access to the American Express network must abide by the network's rules and meet certain financial standards. In 2010, American Express had 91 million credit cards in force worldwide.

## 4.3 Types of services

The majority of American Express cards are issued by TRS and its banking subsidiaries, but American Express has also established arrangements with some third-party issuers and acquirers. For most US merchants, TRS and its banking subsidiaries, Centurion Bank and AEBFSB, act as the merchant acquirer. Outside the United States, American Express's Global Merchant Services (GMS) signs merchants to accept cards, processes card transactions, and settles payments made with American Express cards. Through its network, American Express also offers a number of value added services to merchants such as rewards, fraud prevention and information services.

American Express provides charge and credit card products as well as prepaid cards and travellers cheques. American Express credit cards were used for 4.7 billion purchase transactions worldwide in 2010, totalling USD 713 billion.

## 4.4 Operation of the system and settlement procedures

### *4.4.1 Data transmission*

American Express transactions typically follow a three-party payment system structure in which American Express acts as both issuer and acquirer as it connects cardholders and merchants.

### *4.4.2 Authorisation*

American Express authorises transactions at the point-of-sale. The authorisation typically requires one step because American Express acts as both the issuer and acquirer.

### *4.4.3 Clearing and settlement procedures*

When American Express, TRS, or one of its banking subsidiaries acts as the merchant acquirer, a transaction is settled when American Express pays the merchant for the amount charged on the card minus the merchant discount. If American Express is the acquirer but the card is issued by a third-party bank, American Express also receives financial settlement from the issuer, who receives an issuer rate. If American Express is the issuer and a third-party bank is the acquirer, American Express receives a negotiated issuer rate when settling with a merchant acquirer.

## 4.5 Risk management

American Express is exposed to consumer credit risk from its cardholders as well as institutional credit risk from merchants and third-party bank partners. When American Express acts as an issuer, it owns the relationship with its cardholders and therefore assesses their credit risk. In countries where American Express believes there is higher financial risk, American Express uses third-party banks as issuers. American Express reports that its credit losses are generally lower when using this model than when it acts as a credit issuer. In cases where a third-party bank acts as a card issuer or merchant acquirer, American Express is exposed to the risk that the third-party bank will be unable to settle its financial obligations. Therefore, American Express monitors the financial health of third-party banks. Additionally, American Express may require third-party banks to post a letter of credit, bank guarantee, or other collateral.

American Express uses various technologies to prevent and identify fraudulent transactions on its network. In 2010 American Express acquired Accertify Inc, which provides solutions to help merchants prevent online and card-not-present fraud.

### 4.6 Major ongoing and future projects

American Express embeds ExpressPay chips in certain cards, which allows for contactless payments. Contactless payments use radio frequency technology to transmit payment information to a contactless-enabled terminal.

In 2010 American Express acquired Loyalty Partner, a company which allows multiple merchants to join together to offer a single loyalty programme with a shared rewards currency.

## 5. MasterCard Worldwide

### 5.1 Institutional framework

MasterCard Worldwide (MasterCard) is a public traded company with corporate headquarters in Purchase, New York and operations headquarters in O'Fallon, Missouri. In 2006, MasterCard restructured itself from a member-owned association of banks into a public traded company governed by a board of directors, the majority of which are independent from MasterCard's clients.

MasterCard Worldwide owns, manages, and licenses international retail product brands as well as an international telecommunications network and several processing centres. Licence-holding institutions market and issue cards to their customers in accordance with MasterCard's rules and standards. MasterCard licence holders independently set and charge fees and interest, decide on credit and spending limits, and choose which benefits should be offered to cardholders. MasterCard's revenue comes primarily from fees paid by its clients based on payments volume and services provided.

MasterCard is subject to various regulations in the countries in which it operates. MasterCard's network is often subject to anti-money laundering rules and data security laws. In addition, some jurisdictions regulate pricing policies for certain MasterCard products.

### 5.2 Participation

MasterCard grants licences to participants to use its brand and access its network. Licence holders must agree to abide by MasterCard's standards for membership and acceptance of its cards. MasterCard's clients are primarily financial institutions that issue its cards and/or act as merchant acquirers for merchants that accept MasterCard cards. In 2010, MasterCard had 975 million cards in force worldwide.

### 5.3 Types of services

MasterCard provides transaction processing and value added services through its electronic payments network. Value added services include fraud detection and card processing for debit and prepaid cards through MasterCard Integrated Processing Solutions.

MasterCard payment processing services include credit, debit, and prepaid platforms. Consumer credit processing services are offered under the MasterCard brand, which has several different operating platforms. Many of these platforms have value added services built into them such as loyalty programmes and fraud prevention. MasterCard offers MasterCard/Cirrus/Maestro-branded debit card products. MasterCard debit cards have either single-message or dual-message authorisation. Although primarily issued in the United States, MasterCard debit has also been introduced in Europe, the Asia-Pacific region, and Latin America. While Maestro is the only dual-message product that operates globally, its main presence is in Europe. Cirrus is MasterCard's ATM brand. MasterCard- and Maestro-branded cards can also be used at ATM terminals. MasterCard also provides prepaid cards, which can be used for gift, employee benefits, payroll, travel, government disbursement, and other purposes. MasterCard-branded credit, debit, and prepaid cards were used for 30.3 billion purchase transactions worldwide in 2010, totalling USD 2.0 trillion.

## 5.4 Operation of the system and settlement procedures

### *5.4.1 Data transmission*

MasterCard transactions typically follow a four-party payment system structure, connecting the cardholder, merchant, issuer (cardholder's bank), and acquirer (merchant's bank). MasterCard operates the MasterCard Worldwide Network to link issuers and acquirers. The MasterCard Worldwide Network is managed through MasterCard's global operations centre.

The MasterCard Worldwide Network has both a peer-to-peer and a centralised component. Fast transactions, such as those submitted through contactless technology, are transmitted through the peer-to-peer network. More complicated transactions, such as those screened for fraud, use the centralised processing structure.

### *5.4.2 Authorisation*

MasterCard transactions can be transmitted through a single-message or dual-message system. In a single-message transaction, a single message is submitted by the acquirer containing all the information necessary for authorisation, clearing, and settlement. Non-European PIN-authorised transactions are typically sent through the single-message system. In a dual-message system transaction, the acquirer first submits a message for authorisation and later sends a second message with information for clearing and settlement. All signature and chip-and-PIN authorised transactions are dual-message.

At the point of sale, the transaction information is sent from the merchant terminal to the acquiring bank. The acquiring bank (or its processor) turns this information into an authorisation request and then connects to the MasterCard network. MasterCard routes the authorisation request to the issuing bank (or its processor) for authorisation. If the issuer's authorisation service is unavailable, MasterCard stands in to process and authorise the transaction. Once a message is received, MasterCard routes the authorisation message back to the acquirer, who in turn routes the message to the merchant terminal.

### *5.4.3 Clearing and settlement procedures*

MasterCard clears transactions through its processing systems. Transactions are cleared by centralised processing through the Global Clearing Management system with information relayed through the MasterCard Worldwide Network. For single-message debit transactions, the single-message system clears transactions between customers and other debit transaction processing networks.

MasterCard helps settle transactions by facilitating the exchange of funds between parties. Once clearing is completed, customers receive a daily reconciliation with their final settlement position net of any fees. Settlement occurs between a clearing bank designated by the customer (and approved by MasterCard) and a settlement bank chosen by MasterCard.

### 5.5 Risk management

MasterCard guarantees settlement of all payments sent through its network and is therefore exposed to credit risk. MasterCard requires its members to meet certain standards and regularly assesses their financial soundness. A participant must meet certain standards in order to receive a licence from MasterCard including financial soundness, compliance with card design and feature standards, merchant acquiring and acceptance standards, and risk management. MasterCard assesses members' financial quality and the state of the economy in which members operate. In certain cases, MasterCard may require a participant to post collateral, typically in the form of letters of credit, bank guarantees, or secured cash accounts. Additionally, MasterCard can block the authorisation and settlement of transactions and suspend or terminate membership.

MasterCard uses various technologies to prevent and identify fraudulent transactions.

### 5.6 Major ongoing and future projects

MasterCard Worldwide's newer products include the contactless payment PayPass and the MasterCard Mobile Payments Gateway. Contactless payments use radio frequency technology and the MasterCard Worldwide network to send payment information to a contactless-enabled terminal. Contactless payments devices include key fobs, phones, and wristbands. MasterCard has positioned PayPass as a substitute for cash in low-value transactions. In 2010, PayPass was used at 276,000 merchant locations across 36 countries.

MasterCard launched the MasterCard Mobile Payments Gateway in Brazil in 2009. This technology facilitates routing and prepaid processing for mobile-initiated transactions.

## 6. Visa

### 6.1 Institutional framework

Visa operates worldwide through two separately incorporated entities: Visa Inc and Visa Europe. Visa Inc was formed in 2007 when four of Visa's member-owned organisations (Visa USA, Visa International, Visa Canada, and Inovant) reorganised into a single publicly traded company. Visa Inc has headquarters in San Francisco, California, and is governed by a stockholder-elected board of directors, the majority of which are independent from the company. Visa Europe is a London-based not-for-profit organisation owned and governed by more than 4,000 European member financial institutions. Visa Europe holds an exclusive, irrevocable licence to the Visa brand, products, and technology in Europe and pays royalties to Visa Inc. Visa Europe is also a minority shareholder in Visa Inc.

Visa owns, manages, and licenses international retail product brands as well as its international telecommunications network and processing centres. Licence-holding institutions market and issue cards to their customers in accordance with Visa's rules and standards. Visa licence holders independently set and charge fees and interest, decide on credit and spending limits, and choose which benefits should be offered to their cardholders. Visa's revenue comes primarily from fees paid by its clients based on payments volume and services provided.

Visa Inc and Visa Europe are subject to various regulations in the countries in which they operate. Visa's network is often subject to anti-money laundering rules and data security laws. Visa Europe's pricing policies are regulated by the European Commission. Visa Inc's pricing policies are also subject to regulation in certain countries.

## 6.2 Participation

Visa grants licences to participants to use its brand and access its network. Licence holders must agree to follow Visa's rules and standards. Visa's clients are primarily financial institutions that issue its cards and/or act as merchant acquirers for merchants that accept Visa cards. Approximately 2.2 billion Visa-branded cards were in circulation worldwide in 2010.

## 6.3 Types of services

Visa provides transaction processing and value added services through its electronic payments network, including risk management, debit card issuer processing services, loyalty services, dispute management services, and value added information services. Visa's payment processing services include credit, debit, and prepaid platforms. Consumer credit processing services are offered under the Visa brand, which has several different operating platforms. Visa provides debit processing services through the Visa Debit and Interlink Debit platforms. Interlink is a single-message point-of-sale network that generally requires a personal identification number (PIN) for authentication. Visa Debit runs on a two-message system based on credit card network technology. Visa Electron is a platform that allows issuers to require all transactions initiated from the card to be authorised electronically. It is used primarily in countries where electronic authorisation is less prevalent or by issuers targeting high-risk consumers. Visa Electron is primarily debit-based, but it can be used for credit products. In addition, the Plus ATM network is part of the Visa brand. Visa credit and debit cards and Interlink cards can also be used at ATM terminals. More recently, Visa has offered prepaid cards for gift, travel, youth, payroll, money transfer, voucher replacement, corporate incentive, insurance reimbursement, and government benefit purposes. Visa credit, debit, and prepaid cards were used for 79.5 billion purchase transactions worldwide in 2010, totalling USD 4.7 trillion.

## 6.4 Operation of the system and settlement procedures

### *6.4.1 Data transmission*

Visa transactions typically follow a four-party payment system structure, connecting the cardholder, merchant, issuer (cardholder's bank), and acquirer (merchant's bank). Visa operates VisaNet, a computer and telecommunications network that links Visa's member financial institutions worldwide. VisaNet has a centralised architecture consisting of multiple synchronised processing centres, which allows VisaNet to view and analyse each authorisation transaction it processes and provide value added information such as fraud screening.

### *6.4.2 Authorisation*

Visa transactions can be transmitted through a single-message or dual-message system. In a single-message transaction, a single message is submitted by the acquirer containing all the information necessary for authorisation, clearing and settlement. Non-European PIN-authorised transactions are typically sent through the single-message system. In a dual-message transaction, the acquirer first submits a message for authorisation and later sends a second message with information for clearing and settlement. All signature and chip-and-PIN authorised transactions are dual-message.

At the point of sale, the transaction information is sent from the merchant terminal to the acquiring bank. The acquiring bank (or its processor) turns this information into an authorisation request and then connects to the Visa network. Visa routes the authorisation request to the issuing bank (or its processor) for authorisation. If the issuer's authorisation service is unavailable, Visa stands in for the issuer to process and authorise the transaction. Once a message is received, Visa routes the authorisation message back to the acquirer, who in turn routes the message to the merchant terminal.

### *6.4.3 Clearing and settlement procedures*

For single-message transactions, clearing occurs at the time of authorisation. Dual-message transactions are cleared when a single daily batch message containing all of an acquirer's transactions is received. The acquirer's clearing message contains account numbers and transactions amounts. This message is received by Visa, which then calculates the issuer's settlement obligation net of certain fees.

Settlement occurs each business day. Visa uses participants' transaction information to compile each member's net position. The issuer sends funds to Visa's designated settlement bank, which in turn transfers the funds to the acquirer.

## 6.5 Risk management

Visa participants are required to abide by its rules and standards. Visa regularly assesses its participants' exposures and may require the posting of collateral. Visa indemnifies participants for settlement losses due to another client's failure. Other risk control measures employed by Visa include blocking the authorisation or settlement of certain transactions, limiting the use of certain types of agents, prohibiting acquiring relationships with high-risk merchants, and suspending a client's membership and access to the Visa network. Visa has its own proprietary model for assessing settlement risk.

Visa also employs a number of technologies to prevent and identify fraudulent transactions.

## 6.6 Major ongoing and future projects

Visa has expanded into emerging payment platforms including mobile payments. Visa's contactless payment product is Visa payWave. Visa payWave-enabled devices include cards, mini-cards, key fobs, and mobile phones. Visa recently launched its first commercial mobile payWave programme in Malaysia. Visa has also unveiled the Visa Money Transfer service. Intended primarily for markets where remittances are an important part of the economy, consumers can initiate Visa Money Transfers through an ATM, a bank branch, over the internet, or a mobile payments device.

In July 2010, Visa Inc acquired CyberSource, which offers technology and services to online merchants so that they can accept electronic payments, combat fraud, and ensure security. In addition to CyberSource, Visa Inc has expanded its online presence through Rightcliq, an online shopping tool that allows users to compare products and track packages.

# 7. SWIFT

## 7.1 Introduction

The Society for Worldwide Interbank Financial Telecommunication (SWIFT) is a member-owned limited liability cooperative established under Belgian law. SWIFT provides a communications platform together with products and services that allow its users to exchange financial information securely and reliably.[11] Its members are financial institutions, including central banks.

SWIFT was founded in 1973 by 239 banks from 15 countries. Since then, the number of financial institutions and countries connected to SWIFT has steadily increased. By the end of 2010, almost 10,000 financial institutions from 209 countries were connected.

SWIFT users are categorised into members (shareholders), sub-members (ie subsidiaries controlled by members) and participants. Members can benefit from all the services offered by SWIFT, whereas participants only have access to a restricted range of services related to their business. Participants include securities brokers and dealers, investment management institutions, fund administrators, money brokers and various other institutions, mainly from within the securities sector. SWIFT also admits non-financial companies, but their use of the network is restricted to corporate-to-bank communications.

Messaging services are provided to banks, broker/dealers and investment managers, as well as to market infrastructures for payments, treasury, securities and trade. Corporate-to-bank communications are also supported.

By the end of 2010, SWIFT provided services to 2,344 members, 3,331 sub-members and 4,030 participants. In 2010, SWIFT carried more than 4 billion messages. Average daily traffic is close to 16 million messages.

Customers depend on the confidentiality and integrity of SWIFT messaging, as well as the system’s high availability, to underpin the security and resilience of their own critical business operations.

SWIFT also acts as a catalyst for collaborative work within the financial community to shape market practice, define standards and consider approaches to issues of mutual interest. It also allows its customers to automate and standardise financial transactions, thereby reducing costs, operational risk and inefficiencies.

## 7.2 Governance

SWIFT is governed by a board of up to 25 non-executive directors. The management is overseen by the board of directors, which has seven committees with delegated decision-making powers for Audit and Finance, Banking and Payments, Securities, Technology and Production, and Standards. There is also an HR Committee and a Pricing Board Task Force.

The Audit and Finance Committee (AFC) has six board directors and is a governance and oversight body for systems security, internal control and financial policy. The AFC meets four to five times per year with the management as well as the internal and external auditors to review systems security, accounting policy, reporting, auditing and control matters, as well as the balance sheet, subsidiaries and financial projections. The AFC has powers delegated from the board in these matters.

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[11] SWIFT does not hold funds, manage accounts on behalf of customers, or store financial information on an ongoing basis. Its activities involve the secure exchange of data while ensuring their confidentiality and integrity.

SWIFT has two separate mandates for external audit: a financial audit mandate and a security audit mandate. The mandates of the external auditors are decided by the AFC.

The Technology and Production Committee (TPC) decides on and monitors large IT projects and reviews operational risks (including those related to technology and information security), which comprise a major risk category at an IT services company such as SWIFT.

Risk management is coordinated within a formal enterprise risk management (ERM) framework under the leadership of the Chief Risk Officer.

SWIFT maintains a dialogue with its users through national member groups, user groups and working groups. These bodies can be involved in strategic planning and the review of standards proposals, as well as the provision of industry feedback on major SWIFT projects or migration time frames and scenarios.

## 7.3 Oversight

The international dimension to SWIFT's activities is reflected in its oversight, which is based on a special agreement between the G10 central banks. Under this arrangement, the National Bank of Belgium (NBB), the central bank of the country in which SWIFT is headquartered, acts as lead overseer of SWIFT, supported by the other G10 central banks. The NBB is responsible for the day-to-day oversight relationship with SWIFT.

A technical oversight group (TG) does the oversight fieldwork and interacts with SWIFT's management. The TG reports to a senior-level group of cooperative overseers (OG) that is also responsible for setting the oversight policy. An executive group of the OG meets with representatives from SWIFT's board and management to discuss oversight conclusions.

Oversight focuses primarily on the infrastructure's security and reliability, seeking to ensure that SWIFT has appropriate structures, processes, risk management procedures and controls to effectively manage the risks it may pose to financial stability and the financial infrastructure. In this context, SWIFT's governance, management and operations are also reviewed.

Overseers bring forward issues that arise from the oversight process and make recommendations, suggestions and proposals. SWIFT explains the measures it has taken or plans to take in response to these suggestions.

The oversight objectives vis-à-vis SWIFT were clarified with the adoption of the High Level Expectations (HLEs) for the oversight of SWIFT. The publication of the HLEs has made the oversight process more transparent and has provided SWIFT with additional guidance. The HLEs are also used to frame oversight activities and provide a tool for communication both between the technical and senior level of the oversight and between the overseers and SWIFT.

This oversight body does not grant SWIFT any certification, approval or authorisation. SWIFT continues to bear the responsibility for the security and reliability of its systems, products and services.

## 7.4 SWIFT messaging

Known as FIN, SWIFT's core application is a store-and-forward service for the exchange of standardised messages. Financial institutions use FIN for individual messaging that requires the highest levels of security and resilience. Features include delivery monitoring and prioritisation, message storage and retrieval, as well as validation to ensure that messages conform to SWIFT message standards.

In 2010, availability of FIN was 99.999%. FIN traffic can be broken down as follows:[12]

FIN traffic distribution by market:

- payments 49.4 %
- securities 43.4 %
- treasury 5.8 %
- trade finance 1.1 %
- system 0.3 %

FIN traffic distribution by region:

- Europe, Middle East, Africa 67.0 %
- Americas 20.4 %
- Asia-Pacific 12.6 %

SWIFT's core FIN application runs over SWIFTNet, SWIFT's internet protocol-based messaging platform. SWIFT offers a range of connectivity models and products to meet its users' various operational and business needs.

SWIFTNet also refers to the suite of services and products other than FIN that are offered over the SWIFTNet platform.

FileAct enables the transfer of files and is typically used to exchange batches of structured financial messages and large reports. FileAct supports tailored solutions for market infrastructure communities, closed user groups and financial institutions. FileAct is used for file transfers related to bulk payments, securities information and reporting, and for other purposes such as central bank reporting and intra-institutional reporting.

SWIFT also offers interactive services. InterAct complements FileAct and FIN in supporting tailored solutions for market infrastructures, closed user groups and financial institutions. With InterAct, institutions and communities can exchange messages in an automated and interactive way: an application sends a request message to another application and receives an immediate response message. InterAct is used in mission- and time-critical applications such as Continuous Linked Settlement (CLS), SWIFT's Accord matching application or real-time gross settlement (RTGS) systems.

## 7.5 Market infrastructures

SWIFT provides messaging and connectivity services to a large and growing number of market infrastructures.

In payments, almost 80 clearing and settlement systems rely on SWIFT for secure messaging connectivity and common message standards. SWIFT is used by market infrastructure systems for the clearing and settlement of both high-value interbank payments (such as Europe's TARGET2 RTGS) and low-value payments (such as automated clearing houses or ACHs). It is also used by the multicurrency cash settlement system CLS.

[12] Figures for 2010 from SWIFT 2010 Annual Report.

In the securities sector, SWIFT is used particularly for securities reporting by the securities market clearing and settlement infrastructures. Exchanges, matching utilities, clearing houses, CCPs and (international) central securities depositories ((I)CSDs) all use SWIFT. It is also used for the exchange of information between market players and regulators or financial authorities.