



EUROPEAN REPO COUNCIL

**The interconnectivity of central
and commercial bank money
in the clearing and settlement
of the European repo market**

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All statements, opinions and conclusions contained within this report are those of its author.

Foreword by Godfried De Vidts – Chairman of the European Repo Council

All statements, opinions and conclusions contained within this foreword are those of its author

The members of ICMA's European Repo Council facilitate the distribution of secured liquidity in the wholesale markets. This interbank market activity has proven to be crucial during recent market events, not only to allow the implementation of monetary policy by the central bank community but equally to provide for the distribution of liquidity between professional market participants in the modern financial system, whether they are commercial or investment banks, insurance companies, pensions funds, asset managers, hedge funds or corporate treasurers.

The development of the new regulatory framework, as advocated by the G20, which in particular mandates the acceptance of wider centralised clearing, requires the increased use of collateral to mitigate counterparty risk in derivatives – whether listed or OTC; and across equities, commodities and fixed income. Both Dodd Frank in the USA and Europe's EMIR legislative proposal call for the collateralisation of bilateral and centrally cleared transactions. This will increase demand at repo desks throughout the world. Channelling all these requirements, alongside delivering the liquidity buffers as required under the new capital regime of Basel III/CRD IV, will need an adequate, open post-trade architecture to ensure that collateral can be available in the right place at the right time.

The ongoing work, initiated by the Giovannini working group and the European Commission sponsored working groups, CESAME and EGMI, has highlighted the sub-optimal settlement framework in Europe. The creation of a single currency exposed numerous barriers to efficient settlement originating in national market practices. One by one those barriers are being dismantled through actions taken by industry bodies and regulators. The Eurosystem development of TARGET2-Securities and CCBM2 will contribute to a better flow of collateral within and even outside the eurozone.

During the deliberations of the ERC Committee and the ERC Operations Group participants have expressed frustration with the continuing difficulties of moving collateral through the EU network of CSDs and ICSDs. Guidance given by market participants was instrumental in the creation of easier to handle funding of different types of collateral including centralised clearing initiatives for the creation of baskets of collateral. These initiatives have so far failed to become sufficiently widely adopted to allow all market participants, irrespective of their location, to participate fully. As a result, silos of liquidity persist and have frustrated many trading desks to the extent that, particularly in the crisis, liquidity in some systems was not available to all. The distribution of liquidity remains sub-optimal and is not improving despite technological improvements in the post trade area. Paradoxically the calls for more centralised clearing have increased the availability of centralised clearing but unfortunately this has also increased the re-domestication of some collateralised markets.

After many years of discussions the group decided to increase the pressure and call on ECSDA¹ and EACH² respectively the CSD and CCP communities, to work with the ERC to improve the situation. My thanks go to all those institutions that stepped up to the challenge and contributed to the work that is presented in this publication. As a follow up to the ERC White Paper on short selling and settlement failures, published on 10 July 2010, this repo cash settlement study commissioned from Richard Comotto by ICMA's ERC looks into the details of some of the previously undocumented issues around clearing. To our surprise many market participants are unaware of

¹ The European Central Securities Depositories Association.

² The European Association of CCP Clearing Houses.

the role of central bank versus commercial bank money. Although both terms are increasingly used in official discussions, in particular in light of the EMIR proposal from the European Commission, no analysis of what actually happens in practice was available. I pay tribute to Richard for his efforts in this research, painfully drawing lines so that all can clearly understand the interconnection between both types of settlement money. Crucial in our analysis was the study by the late Tommaso Padoa-Schioppa published in 2003, under the auspices of the CPSS, “The role of central bank money in payment systems”³. The study compliments this valuable paper by detailing today’s situation, making it clear to all that one type of money cannot exist without the other.

The publication of this new paper will facilitate future developments, amongst which high on the list of priorities of the ERC are:

- development of interoperability for triparty between both ICSDs - Euroclear and Clearstream;
- unfettered access by all types of trading venues, be it electronic or voice, to all CCPs irrespective of the location of the collateral; and
- improved European-wide access to liquidity, fully respecting the level playing field for all users.

Europe must and can do better. The current European government bond crisis further illustrates that nobody is immune to liquidity issues. The post-trade framework for moving collateral in optimal circumstances to where it is best and most economically usable is crucial. Future legislative developments as envisaged by the European Commission in co-ordination with the Eurosystem and ESMA will be helped by the analysis in this study. Without the help of our academic partner Richard Comotto, Euroclear and Clearstream as members of the ECSDA, the support of the applicable CCP members of EACH, the ECB’s valuable advice, the wisdom of the ERC Operations group chaired by Tony Platt as well as the guidance of all ERC Committee members this study would have been impossible. Many thanks go to all.

³ <http://www.bis.org/publ/cpss55.htm>

The interconnectivity of central and commercial bank money in the clearing and settlement of the European repo market

1 Executive summary

Payments in the wholesale financial markets can be made in central or commercial bank money. The co-existence of these two settlement assets basically reflects a trade-off between the objectives of containing systemic risk and enhancing the efficiency and (in particular) the effectiveness of payments.

Systemic stability, efficiency and effectiveness depend crucially on the ability to make payments safely and smoothly. The malfunctioning of a payment system would be likely to pose systemic risk. A chronically underperforming payment system would make individual financial transactions riskier and impose frictional costs on the financial markets and the underlying economy.

A safe and smooth payment system is critically reliant on:

- the operational soundness of the settlement institution; and
- the credit and liquidity of the settlement institution and its settlement asset.

It is in order to mitigate these operational, credit and liquidity risks that central banks --- for whom systemic stability, efficiency and effectiveness are core objectives --- act as settlement institutions and offer central bank money as the settlement asset in their own currencies. Central banks are able to provide a higher level of assurance than can commercial banks of continuity in the provision of payment services and liquidity. Nor are they exposed to commercial risks.

However, notwithstanding the inherent advantages of central bank money, all developed economies now use central bank and commercial bank money in tandem, in other words, central and commercial bank money are interconnected. Central banks only encourage or require the use of central bank money in systemically-important payment systems (SIPS), which are at the apex of payment activity in each economy, where exposures are generally highest and most concentrated, and where participants have the least control over their exposures. Thus, in most central bank payment systems, only some banks are direct participants and settle in central bank money, whereas the others use the cash settlement agency services of a direct participant to make and receive payments from other banks, producing a tiered architecture in payment activity.

Commercial banks may use the cash settlement agency services of other commercial banks, which means paying in commercial bank money, as a matter of choice. There can be compelling benefits in terms of cost, access to the credit needed to facilitate settlement, and the quality of service. However, many commercial banks and most non-bank financial institutions often have limited or no access to central banks, so are obliged to settle in commercial bank money, even in their domestic currency. Access to central banks becomes even more restrictive for payments in foreign currency or cross-border. Central banks are generally constrained from offering such payment services. Investors and intermediaries, both domestic and international, who cannot or prefer not to access central bank money are therefore integrated into the financial market by commercial bank money.

Multi-currency, cross-border securities settlement --- essential to the European repo market and the underlying market in fixed-income securities, particularly eurobonds (ie offshore bonds) --- is provided, not only by means of the delegation of payments to cash settlement agency banks, but also through the delegation of securities delivery to securities settlement agency banks (“custodian banks”) and the services of specialized institutions in the form of Financial Market Infrastructures (FMIs), such as the International Central Securities Depositories (ICSDs). Like cash settlement agency banks, ICSDs operate in commercial bank money. In addition, a significant share of multilateral clearing in the multi-currency, cross-border securities market in Europe, which is conducted by central clearing counterparties (CCP, another type of FMI), is in commercial bank money.

Without the access to the multi-currency and cross-border settlement services in commercial bank money provided by agents and FMIs, international financial institutions would be forced to establish a commercial bank in every currency zone and open an account at the central securities depository (CSD) of almost every market in which they wished to participate. This is simply impracticable. Nor could eurobonds be settled. The integrated global financial system, in which borrowers can access the cheapest capital and investors can achieve the maximum diversification of their risk, is built on flows of commercial bank money, albeit anchored against the risk of systemic instability by access to central bank money.

While enhancing the efficiency and effectiveness of payments, the tiering of payment activity between central and commercial bank money does concentrate systemic risk on the direct participants (although the degree of tiering varies between systems, depending on the rules for direct participation). The optimum balance between central and commercial bank money depends on a comparative assessment of:

- the degree of systemic risk posed by tiered payment architectures; and
- the gains in the systemic efficiency and effectiveness of payments --- and consequent facilitation of securities clearing and settlement --- contributed by settlement agents and FMIs.

In assessing systemic risk, it needs to be recognized that central banks are not entirely immune from operational risk. On the other hand, prudential supervision enhances the operational robustness and resilience of settlement agents and FMIs, as well as reducing their credit and liquidity risk exposures, by ensuring that credit is extended only within a strict risk management framework, which requires, among other things, adequate collateralisation. In addition, as regards liquidity risk, all commercial banks are eligible to receive emergency assistance from the central bank, acting in its role as the lender of last resort, in the event of illiquidity in a crisis, whether or not they are direct participants in the payment system. And FMIs such as ICSDs and CCPs, by virtue of specialisation, do not expose themselves to commercial activities unrelated to clearing and settlement, are very well collateralised and have exceptional risk management histories.

It would therefore be wrong to categorise commercial clearing and settlement institutions as uniformly risky and commercial bank money as an inherently second-class settlement asset. Both the BIS Committee on Payments and Settlement Systems (CPSS) and International Organisation of Securities Commissions (IOSCO) accept that safety is not the sole prerogative of central bank money and that other issuers of settlement assets could be sufficiently well protected to adequately mitigate risk within payment systems.

In assessing the gains in efficiency and effectiveness contributed by settlement agents and FMIs, it is clear that the integration of the global financial system, across currencies and between countries, depends crucially on payment and settlement linkages that are fuelled by commercial bank money. Moreover, the role played by commercial bank money in integrating the system may assume even greater importance, as the supply of high-quality collateral fails to keep pace with growing business and regulatory demands for enhanced collateralisation, thereby increasing the need to be able to mobilise collateral efficiently and effectively between currencies and across markets.

Recent discussions about strengthening European financial market infrastructure have looked again at the issue of settlement assets. The draft CPSS/IOSCO *Principles for Financial Market Infrastructures* recommends that “an FMI should conduct its money settlements in central bank money where practical and available”. The European Commission consultation paper on a common regulatory framework for CSD and the harmonisation of key aspects of securities settlement solicited views regarding a preference for settlement in central bank money. Some respondents argued that CSD should in principle not be allowed to settle in commercial bank money. Although focused on FMIs, these proposals would have potentially far-reaching consequences for the degree of tiering of payment activity and therefore for settlement efficiency and effectiveness, and the distribution of systemic risk.

Proposals to reweight the balance between central and commercial bank money need to be considered very carefully, in order to avoid inadvertent, adverse consequences for the operation of the repo and other markets in

collateral. A wider question also arises. Given that commercial bank money, if managed prudently, provides a safe settlement asset, while also providing an efficient and effective means of integrating into the payment process those financial institutions which cannot or prefer not to access central bank money, would the mandatory use of central bank money achieve an overall reduction in systemic risk that is significant enough to justify the replacement of the existing efficient market mechanisms and the transfer of greater risk directly to central banks?

Instead, greater consideration needs to be given to improvements, where appropriate, in the safety of commercial bank money. The mitigation of operational, credit and liquidity risks on settlement agents and FMIs can be achieved by the implementation of strong risk management policies and practices, encouraged and underpinned by effective prudential supervision within the framework of CPSS/IOSCO *Principles for Financial Market Infrastructures*. Appropriate means of risk mitigation include the adequate collateralization of exposures and other strict controls on the operational, credit and liquidity risk taken by settlement agents. Account also needs to be taken of the impact of improvements in financial market infrastructure. For example, T2 allows cash settlement agency banks to open central bank accounts in the names of their customers, and T2S will allow securities settlement agency banks to do the same, allowing reductions in the concentration of the exposures of direct participants to their customers in the payment and securities settlement systems, and vice versa, while preserving the benefits for customers of settlement agency services.

2 Introduction

Recent proposals for a common regulatory framework for CSD and for the harmonisation of key aspects of securities settlement in Europe (European Commission consultation paper of January 2011), as well as the draft CPSS/IOSCO *Principles for Financial Market Infrastructures* (March 2011), appear to be increasing the emphasis on the use of central bank money in payment systems serving securities clearing and settlement.

The European Repo Council (ERC) of the International Capital Market Association (ICMA) believes that it is crucial to the stability, efficiency and effectiveness of the European repo and underlying securities market that there continues to be an appropriate balance between the use of central and commercial bank money.

This report was commissioned by the ERC to inform the discussion of proposals to reform the European financial market infrastructure. It is also relevant to ongoing discussions on the interoperability of tri-party repo services. The report reviews the nature of central and commercial bank money, and rehearses the issues surrounding the use of each type of settlement asset (for which reason, it closely restates the arguments in the authoritative 2003 CPSS paper on *The Role of Central Bank Money in Payments Systems*). The report also analyses and seeks to illustrate the interconnectivity of central and commercial bank money flows, specifically, in the clearing and settlement of repos in Europe (see the Annex).

3 What is central bank money, what is commercial bank money?

Payments in developed economies can be made using many different forms of money, but in the wholesale financial markets, money exclusively takes the form of bank deposits, and payments take the form of transfers of deposits (the *settlement asset*) held at a common bank (the *settlement institution*) that are organized according to a given set of procedures and rules (the *payment system*).

Payment systems include the payment mechanisms used by securities settlement systems (SSSs), whether the payment mechanism is embedded within the SSS or external to it. “Embedded” mechanisms are used by the CSD for government securities operated by some central banks and by the two ICSDs. External mechanisms are linked to SSSs across communications interfaces (“interfaced” settlement models) or by some form of guarantee. Other models, which are neither completely embedded nor completely external also exist, notably the “integrated” settlement model developed by the French CSD and central bank.

Deposit money in developed economies is issued principally by central banks and commercial banks. Central bank money consists of deposits held at the central bank (plus bank notes) and commercial bank money consists of deposits held at commercial banks. Commercial bank money represents the bulk of the stock of deposit money.

The deposits held at a settlement institution are often supplemented by intraday credit given by the settlement institution to banks participating in its payment system in order to facilitate payments. The volume of such credit often represents the overwhelming bulk of settlement assets during the day.

The taking of deposits and making of payments is of course a core business of commercial banks, but central banks take deposits, among other reasons, to underpin public confidence in money, by ensuring that there is at least one payment system for their currency that uses deposit money guaranteed (implicitly or explicitly) by the public authorities. In practice, in most payment systems, the settlement institution is the central bank and the settlement asset is central bank money. However, there are important exceptions, not least the two ICSDs.

The majority of participants in central bank payment systems are commercial banks. However, most central banks also provide accounts to supervised commercial non-bank financial institutions such as securities firms and CCPs, typically in cases where such institutions are directly involved in payment or securities settlement.

4 How is central bank money special?

The core objectives of central banks include the maintenance of the stability of the financial system, and the promotion of its efficiency and effectiveness. Systemic stability, efficiency and effectiveness depend crucially on the ability to make payments safely and smoothly. The malfunctioning of a payment system would be likely to pose systemic risk, particularly if the system is one that handles large values or is, in some other respect, a SIPS. A chronically underperforming payment system would make individual financial transactions riskier and impose frictional costs on the financial markets and the underlying economy.

If there was a failure in a settlement institution or a failure of a settlement asset:

- participants in the payment system would suffer the loss of funds held on account at the settlement institution (**credit risk**); and
- the interruption of service would damage the liquidity of each direct participant (**funding liquidity risk**).

The credit risk on the settlement institution may be difficult for direct participants to avoid or control. They may, for example, have very little control over the value of payments received and held on account with the settlement institution.

Problems affecting direct participants are also likely to have knock-on effects on their customers and could trigger a general loss of confidence, damaging liquidity throughout the market (**market liquidity risk**), causing serious and widespread disruption within the financial system and the economy as a whole. The vulnerability of direct participants will be greatest in the case of SIPS where large values of payments flow through a small number of direct participants. The consequent exposure of each may be very large in relation to its balance sheet and capital. Indeed, the payments processed by some direct participants can, in some cases, be on a par with those of large-value payment systems.

Problems in a payment system could originate in the settlement institution or with the settlement asset or both:

- The settlement institution could fail because of:
 - internal operational difficulties (**operational risk**);
 - failure due to losses on business activities unrelated to settlement (**credit risk** or market risk-driven **counterparty risk**);

- failure due to losses inflicted by the collapse of one or more direct participants in the payment system to which the settlement institution has extended credit which is not adequately collateralized (**credit or funding liquidity risk**).
- A loss of confidence in the settlement asset could trigger the effective failure of the payment system. Given that the settlement asset is typically constituted by the liabilities of the settlement institution, this could stem from:
 - the failure of the issuer of the settlement asset (**credit risk**);
 - a loss of confidence in the issuer (perhaps due to fears of contagion from the failure of a counterparty or customer) resulting in a run on that institution (individual **funding liquidity risk**, which could propagate itself into collective **market liquidity risk**).

A safe and smooth payment system is therefore reliant on:

- the operational soundness (efficiency, continuity and resilience of service) of the settlement institution
- the credit and liquidity of the settlement institution;
- the credit and liquidity of the issuer of the settlement asset (which is usually also the settlement institution).

Central banks act as settlement institutions and offer central bank money as the settlement asset in their own currencies, particularly where there are high concentrations of risk in payments, by providing a higher level of assurance than can be provided by commercial banks of continuity in the provision of payment services and liquidity. It is argued that central bank money can be regarded as completely safe in the jurisdiction of the central bank. In contrast to commercial settlement institutions and assets, central banks and central bank money have a number of advantages:

- central banks have an interest in ensuring that central bank money represents a viable alternative to commercial bank money and that potential holders are not discouraged, by the associated costs, from participating in central bank payment systems, so they have a natural interest in promoting robust and efficient designs and in responding to users' needs, as far as it is realistic to do;
- central bank payment systems are operationally more robust, in as much as central banks tend to be risk-averse institutions (although central banks are not entirely immune to operational disruption);
- central banks do not pursue risky commercial activities which might have adverse consequences for their role as settlement institutions;
- the failure of a central bank is inconceivable, as central banks have explicit or implicit state support and can therefore absorb the failure of a direct participant in a central bank payment system;
- if a participant in a central bank payment system failed, the central bank can shield other participants, and payment activity in general, from any consequent loss of liquidity through the exceptional liquidity facilities it can provide as lender of last resort.

In addition to risk mitigation, central bank payment systems may also offer other benefits, some of which can justify use of the central bank as settlement institution for non-SIPS:

- **Competitive neutrality.** The central bank is not a competitor to participants in a payment system.
- **Efficiency.** Central banks can perform the role of settlement institution in several payment systems, each settling a different sort of transaction, which may enable participants to economise on overall liquidity and cost.

However, some benefits claimed for central bank payment systems are contradicted by central banks:

- **Access to the lender of last resort.** There is a perception that access to a central bank account provides semi-automatic access to emergency liquidity from the central bank, in other words, moves the institution within the central bank's safety net, notwithstanding efforts by central banks to avoid this moral hazard.
- **Cost of funds.** There is a perception that central bank money is cheap, notwithstanding the central bank policy of preventing any opportunity for "round trip" arbitrage.

5 The extent of use of central bank money

In theory, payments across an economy can take place exclusively in central bank money or exclusively in commercial bank money. *Mono-banking*, where there is only central bank money, and *free banking*, where there is only commercial bank money, have existed in the past. But neither has proved sufficiently stable or efficient to survive.

All developed economies now use central and commercial bank money in tandem, in other words, central and commercial bank money are interconnected. Central banks only encourage or require the use of central bank money in SIPS, at the apex of payment activity in the economy, where exposures are generally highest and most concentrated, and where participants have the least control over their exposure, with possible implications for risk and efficiency in the payment system and thus the wider financial system. Many types of financial institution do not have a systemic risk profile that justifies access to central bank money, notwithstanding their contribution to market liquidity and efficiency.

Moreover, in most central bank payment systems, only some eligible banks are direct participants and therefore settle in central bank money (*top-tier banks*), whereas the others (*lower-tier banks*) use the cash settlement agency services of a top-tier bank to make and receive payments from other banks. In the case of foreign currency and cross-border payments, where the payer and/or the payee is non-resident, the non-resident's bank, if it prefers not to or cannot access the relevant central bank payment system directly on a remote basis, will also use the services of a cash settlement agency bank ("correspondent bank"), which may in turn access the relevant system directly or use the settlement services of a local bank. Thus, payments take place within and between many different layers, and each chain of payments arriving at the central bank payment system at the apex of this tiered payment architecture combines different types of money. A payment from one bank to another may involve settlement in commercial bank money only (eg between two lower-tier banks using the same top-tier agent), or in central bank money only (eg between two top-tier banks), or in a combination of central and commercial bank money (eg between two lower-tier banks which do not use the same top-tier agent).

In this way, commercial banks help to facilitate broad involvement in payment activity. Without the access to the multi-currency and cross-border payment services provided by cash settlement agency banks in commercial bank money, international financial institutions would be forced to establish a commercial bank in every currency zone and, for securities settlement, open an account at the CSD of almost every market in which they wished to participate. This is simply impracticable.

The interoperable use of central and commercial bank money is seen by central banks as an essential feature of the current monetary system. Indeed, the CPSS paper on *The Role of Central Bank Money in Payments Systems (2003)* stated that "the composite of central and commercial bank money, convertible at par, is essential to the safety and efficiency of the financial system".

6 What are the benefits of commercial bank money?

The use of commercial bank money in payment systems is driven by:

- **Foreign currency payments.** The exclusive use of central bank money in payments systems is not practicable in the case of foreign currency payments, for example, where there is insufficient overlap between the opening hours of central banks in different time zones, or where remote access to the central bank is not allowed. Central banks are domestic monetary authorities, and the supply of central bank money and central bank services is consequently normally confined within the area of jurisdiction of the central bank. As a result, no individual central bank can cater for the needs of global players in full. The provision of multicurrency facilities by central banks would raise significant policy issues, not least as regards the risk in providing multicurrency credit. And in providing multicurrency facilities, central banks would be acting as global cash settlement agents and therefore competing with commercial agents. This would be a fundamental

shift in policy on the desired balance of competition between the public and private sector. The need for central banks to provide multicurrency facilities is anyway unclear, given the availability of commercial foreign currency payment services. It is standard practice in international banking to make payments in foreign currency through a cash settlement agency bank resident in the country of issue. In securities settlement, the ICSDs provide delivery-versus-payment (DVP) settlement in international markets in multiple currencies in commercial bank money and to allow the settlement of eurobonds. In CLS Bank, which is the settlement institution for Continuous Linked Settlement (CLS), while funding and defunding payments in each participating currency are made to and from accounts at central banks, ie in central bank money, gross settlement across CLS Bank during the day is made in commercial bank money.

- **Cross-border payments.** The exclusive use of central bank money in payment systems is also not usually practicable for foreign institutions operating cross-border. Remote access to CSD by foreign institutions is generally denied, although there are important exceptions (Sweden, Switzerland and the UK). The primary argument is the risk for the central bank. Dealing with non-resident banks subject to other countries' laws and regulations can be more risky, since the effect of overseas laws are more difficult to predict and may be inconsistent with domestic law. It may also be more natural to maintain a relationship with resident institutions, with which the central bank is likely to interact in other contexts. Where the account holder has access to credit, the central bank may feel less able to rely on the effectiveness of overseas supervisory regimes to help protect its position. A second argument lies in the balance between incentives and regulatory costs to the resident banking industry. Resident banks safely extend the use of the currency within the central bank's jurisdiction by providing retail payment services to the general public. They are subject to supervision by the local authorities. These resident banks in turn have the business opportunity to provide cash settlement agency banking services to non-resident banks. Remote access, by relaxing the link between "location" and "access to the central bank", could change this balance of incentives and costs.
- **Competition.** A multiplicity of competing issuers of money preserves the advantages of competition between market forces in providing innovative and efficient means of payment (as well as, more broadly, sustaining a healthy market in financial services that is essential to an efficient and effective economy). A competitive market in money issuance also encourages central banks to offer competitive services. Accordingly, central banks try, in general, not to disintermediate commercial banks by providing banking services to the public. An overlap does exist in the provision of interbank payment services, where commercial banks are usually free to choose between a central bank and a commercial bank to process their payments, but central banks try to avoid unfair competition, for example, in pricing policies. For the same reason, while central banks encourage or require the use of central bank money in SIPS, they limit access for other purposes.
- **Diversification.** A multiplicity of payment systems, properly integrated and supervised, provides robustness and resilience to the financial system.
- **Direct cost.** Many commercial banks use the cash settlement agency banking services of another commercial bank, rather participating directly in a central bank payment system, because of the relative costs. Cash settlement agency banks typically offer economies of scale. One consequence of recent improvements in payment systems such as the widespread implementation of real-time gross settlement (RTGS) and DVP has been to raise the cost of direct participation in some respects, primarily because of the increased cost of more active liquidity management.
- **Functionality of service.** Commercial banks often provide value-added payment services not available from the central bank, and not simply because central banks decline to compete. For example, commercial banks can offer the ability to use a single account in multiple ways, such as settling transactions in different markets and different currencies. Commercial banks may also be better able to provide expertise in the operation of a range of payment and settlement systems, and greater flexibility such as longer operating hours.
- **Other business considerations.** In addition to cost and the functionality that a cash settlement agency bank may offer, other banks may decide to use an agent because their business strategies are focused on higher-priority activities in which they perceive a comparative advantage, which means they prefer to minimize their in-house back office operations, at least for a particular currency.
- **Access to credit.** The decision on whether to participate directly in a payment system depends to a considerable extent on whether the settlement institution provides access to a routine credit facility. If banks'

intraday balances available for payments are too small relative to the value of payments to be made by a given time, there is a risk of gridlock, preventing payments from being executed, generating penalties and damaging business relationships. Avoiding such problems can impose costs on payers, by requiring closer control over payment flows. Access to credit, and the terms on which it is provided, is therefore important to banks and may cause them to opt to use the cash settlement agency banking services of another commercial bank rather than become a direct participant. There are a number of competing arguments:

- Central banks generally require intraday credit to be repaid by close of business and may impose high charges where accounts are overdrawn, while commercial banks may be more willing to extend overnight credit.
- The amount of liquidity needed to fund payment flows, and thus potentially the amount of credit, will be another factor in a decision on direct participation in payment systems. Direct participation typically requires significant amounts of liquidity. While design features have been introduced into some systems in order to economise on liquidity, cash settlement agency banks may be able to manage their customers' payment flows so as to reduce the amount of liquidity and credit each customer needs to obtain.
- Central banks restrict the availability of intraday credit facilities by refusing to open accounts for all types of institution and by sometimes refusing access to intraday credit to some of their account holders. Where central banks offer accounts with no credit availability, there tends to be little demand for direct participation in the central bank payment system. Central banks often do not provide accounts to CCP (although they often do not need credit anyway) and non-bank financial institutions. In the eurozone, intraday credit to securities firms is generally limited and no intraday credit is available to banks by remote access (reflecting the fact that the Eurosystem, while ready to open accounts for non-banks, does not want to disintermediate banks in the provision of credit). Central banks limit the provision of credit for a number of reasons:
 - Only clear public policy grounds justify putting public funds at risk. Credit is generally provided only to a limited set of account holders, where necessary to ensure the orderly flow of payments.
 - Where central banks provide credit, they are exposed to credit risk and consequently require collateral, set limits and/or charge fees. This alone may limit the population of account holders, particularly where the central bank only treats a limited range of collateral as eligible.
 - The ability of central banks to assess the credit of institutions is limited to resident banks.
 - Monetary policy considerations may also discourage central banks from giving intraday credit to institutions that are not monetary policy counterparties. Some central banks consider that failure to repay intraday credit by close of business is a realistic credit risk and would potentially have adverse consequences for the operation of monetary policy, so they limit the number of institutions that are given credit.
 - Central banks can be sensitive to the moral hazard that holders of settlement accounts may be misperceived to be within their "safety net" and hence likely to be eligible for emergency credit, particularly where access to an account is accompanied by access to routine credit.
 - Intraday credit facilities could be used to meet unforeseen outflows of funds, albeit only for a very short period. Where that happened, the central bank would be acting as, in effect, lender of first resort, which it may well prefer not to do.
 - Broader policy objectives can affect policy choices. For example, the Eurosystem operates on the principle of decentralisation, and therefore avoids policies which might encourage the centralisation of operations within particular central banks. One consequence is that euro area central banks are prohibited from granting intraday or overnight credit to institutions resident elsewhere in the euro area, on the grounds that allowing this might encourage activity to migrate to certain central banks.

For the various reasons listed above, the CPSS *Core principles for systemically important payment systems (2001)* and the CPSS/IOSCO *Recommendations for securities settlement systems (2001)* recognise that the use of central bank money by large-value systems is not always practicable. And draft CPSS/IOSCO Principle 9 recognises the possibility that use of central bank money may not always be practical and available. Thus, it advises that, "if

central bank money is not used, an FMI should minimise and strictly control the credit and liquidity risk arising from the use of commercial bank money”.

Furthermore, both the CPSS and IOSCO recognise that safety is not the sole prerogative of central bank money and that other issuers of settlement assets could be sufficiently well protected to adequately mitigate risk within payment systems. Thus, while CPSS Core Principle VI states that the settlement asset in systemically important payment systems should preferably be a claim on the central bank, it accepts that other assets can be used, provided that they carry little or no credit and liquidity risk. And CPSS/IOSCO Recommendation 10 envisages that central bank money might not be used as the settlement asset and accepts the possible use of commercial bank money, where steps are taken to protect members of a CSD from potential losses and liquidity pressures arising from the failure of the settlement institution whose assets are used. The same principle is repeated in the CPSS/IOSCO report on *Recommendations for central counterparties* (2004).

Confidence in the safety of commercial banks and commercial bank money has several pillars:

- Prudential supervision should help to underpin the operational robustness and resilience of commercial banks, and reduce their credit risk by ensuring, among other things, that credit is extended only within a strict risk management framework, which requires, among other things, adequate collateralisation.
- Risk on direct participants in a payment system can be mitigated by practices such as the use of more than one cash settlement agency bank. Improvements to financial market infrastructure can also help. For example, T2S will enable customer banks to reduce their risk on direct participants, and vice versa, by allowing direct participants to open central bank accounts in the name of a bank customer and to operate those accounts (providing cash settlement agency banking services) but with the central bank accounts of the two institutions segregated from each other.
- FMI delivering clearing services (CCPs) or securities settlement services (CSDs and ICSDs) do not engage in unrelated commercial business, implement demonstrably strict policies and procedures to limit the operational, credit and liquidity risks on commercial bank money (particularly robust collateralisation) and have generally excellent risk management histories.
- The liquidity of commercial bank money would not be solely dependent on the liquidity of commercial banks in the event of a market crisis, as (solvent) commercial banks are eligible to receive emergency assistance extended by the central bank acting in its role as the lender of last resort. Access to this assistance is not directly dependent on being a direct participant in the central bank payment system or having access to intraday credit from the central bank. Indeed, central banks clearly state that access to intraday credit within payment systems is not a guarantee of emergency assistance in a crisis.

It would therefore be wrong to categorise commercial banks and commercial bank money as uniformly risky. The quality of commercial bank money reflects the robustness of risk management and control by the issuer as much as the type of institution.

7 The co-existence of central and commercial bank money

Because of the practical utility of commercial bank money, payments often involve commercial and central bank money complementing each other in complex chains of payments. In this way, commercial banks help to extend the use of the currency, while central banks provide some form of safety net and privileged access to credit to facilitate operational efficiency. And in the normal course of events, confidence in commercial bank money is sustained by convertibility into central bank money.

The precise balance between the use of central and commercial bank money --- direct participation in central bank payment systems versus access as a second-tier bank, using a direct participant as a cash settlement agent --- is constantly subject to change, as both the payments and settlement infrastructure and financial markets adapt to the interrelated forces of technological change, liberalization, deregulation/reregulation, globalization and market consolidation. The overall impact of all the changes on the balance of costs and benefits of direct participation

versus use of banks in payment systems is extremely difficult to quantify. Individual institutions are likely to be affected in different ways.

On the one hand, it would appear that flows of central bank money have grown enormously. For example, the introduction of newer, safer systems to handle the substantially increased payment system values, and in particular the widespread adoption of RTGS, where each payment is settled in real time throughout the day, has led to central banks and central bank money taking on a much wider and more active role. Because the settlement of each payment involves a direct transfer of the settlement asset, RTGS payment systems require substantially more of the asset to ensure smooth payment flows. To enable this, most central banks provide intraday credit to banks participating in these systems in quantities which in some cases dwarf the banks' overnight balances or their overnight borrowing from the central bank.

On the other hand, the number of direct participants in most payment systems overall has remained broadly static or has contracted and many developments appear, on balance, to have led to more widespread use of commercial bank money, by encouraging the use of cash settlement agency banking services, even though a few new banks and even non-banks have been added to the lists of direct participants in central bank payment systems.

A major driver of change has been new and improved technology. At first glance, this appears to be driving wider direct participation by facilitating and reducing the cost of access to payment systems, for example by allowing institutions to take advantage of cheap, off-the-shelf access and processing packages and by encouraging the use of standardised, widely used communications protocols. It has also made it possible for payment systems and their participants to process large volumes of payments, not only quickly and at low cost, but also in a concerted manner with other payment-related activities such as providing credit, providing collateral and settling securities and foreign exchange transactions. However, while new technology reduces unit costs, it also reduces operating margins and therefore requires greater scale to preserve aggregate profitability, which means higher levels of investment. New technology also facilitates and creates demand for more sophisticated payment services that may be beyond the resources of smaller banks. The large institutions which are typically direct participants and cash settlement agency banks have the ability to invest in technology and to benefit from economies of scale and scope, as well as to provide their customers with broader services and with a wider a pool of expertise.

Increases in the volume of business also have an ambiguous effect on the balance of advantage between direct participation and use of cash settlement agency banks. For example, some developments (such as the growth in cross-border business) have probably resulted in more payments being channelled through cash settlement agency banks. Other things being equal, this should allow those banks to achieve cost reductions through economies of scale and scope, some of which would probably be passed on to their customers, encouraging them to remain non-participants.

As a result of globalisation, financial institutions active in the securities, foreign exchange, derivatives and other financial markets have, over a period of time, become more active in making and receiving payments in multiple currencies. Such payments are processed largely through cash settlement agency banks who have, as a result, acquired growing importance. This trend reflects obstacles to non-resident institutions securing direct access to remote payment systems, the cost and expertise required to access multiple foreign payment systems, and the ability of cash settlement agents to offer economies of scale and scope, and a range of services that are attractive to firms operating in multiple markets and that central banks are currently unable or unwilling to provide (in particular, multicurrency payment services and associated expertise in the operation of multiple payment systems, which can greatly reduce settlement costs for global financial and non-financial institutions). Even in the case of CLS, where multicurrency and cross-border challenges have been directly addressed with the assistance of central bank co-operation, there has been greater concentration of cash settlement agency activity into those banks that are direct participants in, or act as nostro agents for, CLS Bank, although it has been suggested that such payment-versus-payment systems have diminished the importance of cash settlement agency banking in certain areas.

The trend of consolidation among financial market infrastructure providers, and more particularly among the major financial market intermediaries --- which has been spurred by the other forces of change --- seems to have encouraged the development of larger cash settlement agency banks with a greater range and scope of activities. Among other things, direct participants have greater scope to internalise customer payments, rather than settle through the payment system. As a result, a greater proportion of payments may be made between holders of commercial bank money, perhaps without central bank money being involved at any stage in the chain of payments.

The complex interconnectivity of central and commercial bank money, specifically in the clearing and settlement of repos in Europe, is mapped in the Annex for the various alternative configurations of CCP, CSD/ICSD and payment system. It is clear that the integrity of the global financial system, across currencies and between countries, depends crucially on payment and settlement linkages that are fuelled by commercial bank money.

8 Conclusions

The Annex to this report illustrates the intimate and mutually reinforcing interconnectivity of central and commercial bank money, specifically, in the clearing and settlement of cash and collateral traded in the European repo market.

Trying to unravel and re-plumb flows of central and commercial bank money in order to promote wider use of central bank money as a settlement asset would be difficult. Multi-currency and cross-border payment and settlement --- the operational links that bind the global financial system --- require commercial bank money, as do other cash settlement agency banking services. Central bank money is not usually a practicable substitute.

Multi-currency and cross-border payment and settlement are particularly vital for the European repo and underlying securities markets, given that they are multi-currency and cross-border in character, and given ambitions for the European capital market to play a greater global role. Furthermore, the operational integrity of the global financial system is becoming a more pressing issue, as the supply of high-quality collateral fails to keep pace with growing business and regulatory demands for enhanced collateralisation, which means that there is an increasing need to be able to mobilise collateral efficiently and effectively between currencies and across markets. Proposals to reweight the balance between central and commercial bank money therefore need to be considered very carefully in order to avoid inadvertent and adverse consequences for the operation of the repo and other markets in collateral. And, although the regulatory proposals currently being discussed apply directly only to FMIs, there would be potentially far-reaching consequences for cash settlement agency banking services and therefore for settlement efficiency and the distribution of systemic risk.

A wider question also arises as to the scope of the potential reduction in systemic risk that could be achieved by the increased use of central bank money. Both CPSS and IOSCO recognise that safety is not the sole preserve of central bank money and that other issuers of settlement assets could be sufficiently well protected to adequately mitigate risk within payment systems. Given that commercial bank money, if managed prudently, provides a safe settlement asset, while also providing an efficient and effective means of integrating into the global payment process those financial institutions which cannot or prefer not to access central bank money, would the mandatory use of central bank money achieve an overall reduction in systemic risk that is significant enough to justify the replacement of an already efficient market mechanism and the transfer of greater risk directly to central banks?

Instead, greater consideration needs to be given to improvements, where appropriate, in the safety of commercial bank money. Draft CPSS/IOSCO Principle 9 recognises the possibility that use of central bank money may not always be practical or available by advising that, “if central bank money is not used, an FMI should minimise and strictly control the credit and liquidity risk arising from the use of commercial bank money”. The mitigation of operational, credit and liquidity risks on cash settlement agency banks and FMIs can be achieved by the implementation of strong risk management policies and practices, encouraged and underpinned by effective

prudential supervision within the framework of the CPSS/IOSCO *Principles for Financial Market Infrastructures*. Appropriate means of risk mitigation include the adequate collateralization of exposures and other strict controls on the operational, credit and liquidity risks taken by cash settlement agency banks and FMIs. Account also needs to be taken of the impact of ongoing improvements in the European financial market infrastructure. For example, T2 allows cash settlement agency banks to open central bank accounts in the names of their customers, and T2S will allow securities settlement agency banks to do the same, allowing reductions in the concentration of the exposures of direct participants to their customers in the payment and securities settlement systems, and vice versa, while preserving the benefits for customers of settlement agency services.

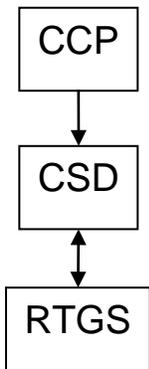
ANNEX

Illustrating the flows of central and commercial bank money in repo clearing and settlement in Europe

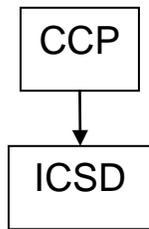
In order to aid the understanding of the complex interaction of central and commercial bank money in the clearing and settlement of repos in Europe, the flows of money and securities in CCP-cleared repo business have been mapped. The following four sections show the possible functional (not necessarily structural) configurations of CCP, securities settlement systems and payment systems:

- CCP linked to a domestic CSD and central bank payment system (RTGS)
- CCP linked to an ICSD
- CCP linked to both ICSD
- CCP linked to a domestic CSD and RTGS, and to an ICSD.

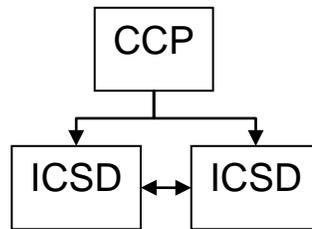
1. CSD internal



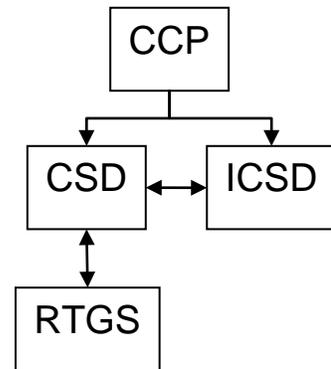
2. ICSD internal



3. ICSD-ICSD



4. CSD-ICSD



Model 1 CCP linked to a CSD

Variant 1.1 interfaced payment mechanism

In this variant of Model 1, the payment system is external to the CSD. The exchange of securities and cash on a DVP basis --- and in some cases, real-time finality in central bank money --- is achieved by co-ordination between the CSD and the RTGS across a communications interface. This configuration is therefore referred to as an “interfaced” payment mechanism.

In the interfaced mechanism, cash accounts shown within the CSD are memorandum accounts (for accounting purposes only) and merely reflect cash movements that actually take place between the central bank accounts across RTGS.

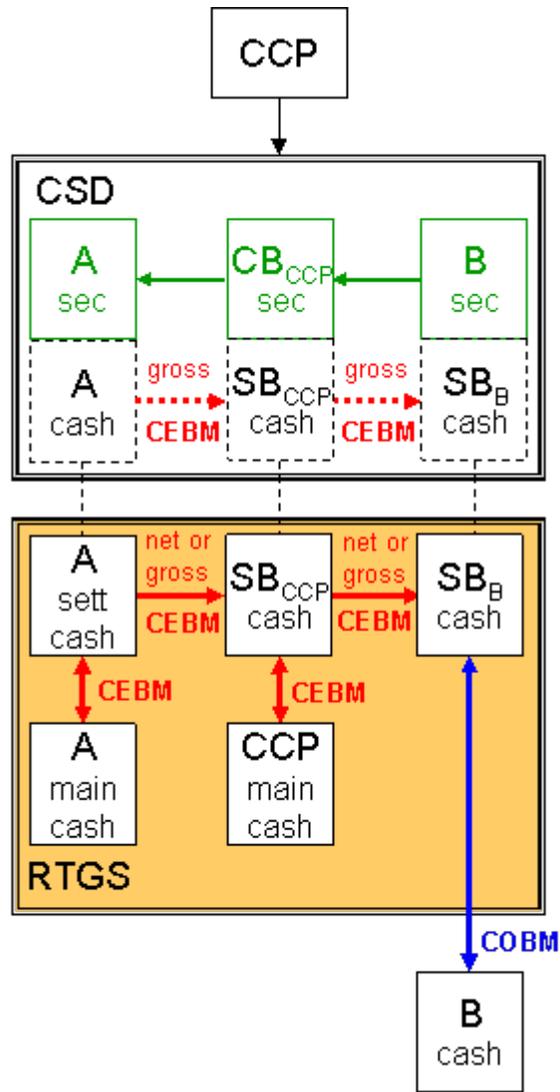
Payments recorded in the CSD are ‘gross’, in that they closely reflect individual market transactions, whereas payments made across the RTGS may be the net residual of many transactions.

There are also payments across the RTGS between direct customers’ main accounts and dedicated securities settlement cash accounts at the central bank, in order to ensure that operational balances at the central bank stay within desired target ranges.

The diagram shows each of the three parties settling in different ways:

- Bank A is a direct customer of the CSD and has a central bank account, and is managing its own securities settlement and payments.
- The CCP is using the services of a custodian bank (CB) to manage its securities settlement and, although it has a central bank account, is using a cash settlement agent bank (SB) to manage its payments. The cash settlement agent bank and the custodian bank could be the same institution.
- Bank B does not have an account at the central bank and is using a cash settlement agent bank (SB) to manage its payments but is managing its own securities settlement. This arrangement is typical of a large investment bank.

All payments across RTGS are between central bank accounts and therefore in **central bank money** (CEBM), but the exclusive use by Bank B of the services of a cash settlement agent, who is a commercial bank, means B necessarily settles in **commercial bank money** (COBM). Moreover, as commercial banks will seek to keep operational balances at the central bank within desired target ranges, Bank A will withdraw excess balances on its central bank account and convert these funds into commercial bank money, while impending payments across the RTGS for purchases of securities (for its own account and on behalf of its customers) will be funded with cash gathered in commercial bank money. These possible **commercial bank money** flows have not been shown in the diagram.



The interfaced mechanism is operated in Denmark, Greece, Italy (in Express I), Portugal and Spain.

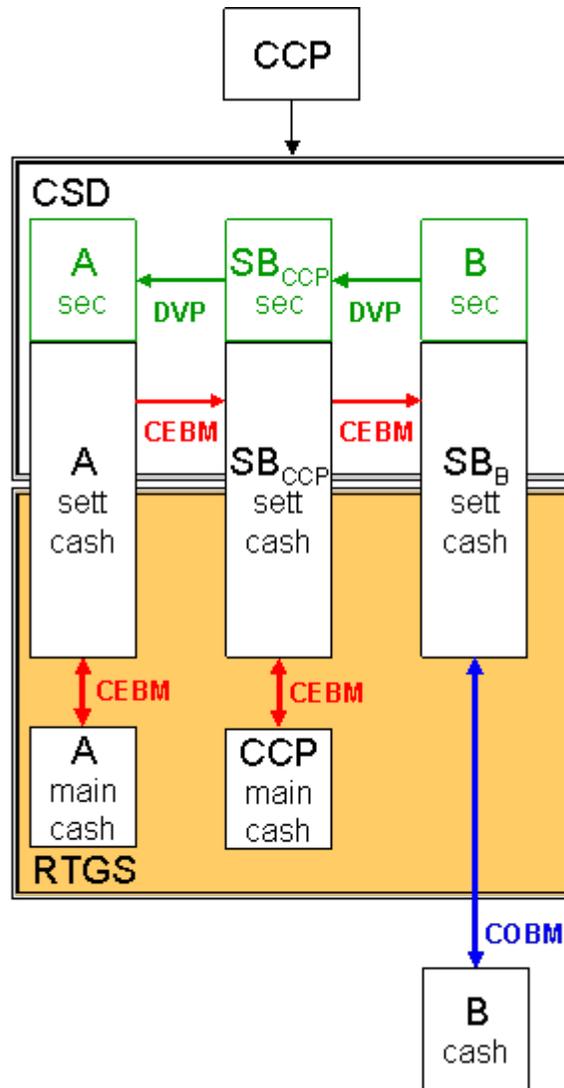
Variant 1.2 integrated payment mechanism

This variant of Model 1 shows settlement across a CSD, where the CSD directly manages cash payments as well as securities settlement. The cash accounts shown within the CSD are therefore not memorandum accounts. In this “integrated” payment mechanism --- as opposed to the “interfaced” payment mechanism in variant 1.1 --- the central bank grants a mandate to the CSD to operate dedicated securities settlement cash accounts in central bank money (CEBM). The cash legs of securities trades are settled on these cash accounts. This architecture enables the CSD to check, not only the availability of the securities in the seller’s securities account, but also the availability of cash in the buyer’s settlement cash account, and to transfer simultaneously securities and funds between the parties in a way that ensures DVP and real-time finality in central bank money. At least one central bank (Banque de France) has also mandated the CSD to operate intraday credit operations in the form of repos on its behalf for those direct customers whose settlement cash account balances are not sufficient to settle trades. Since this intraday credit is automatically allocated to the settlement cash accounts operated by the CSD, no permanent link is necessary with the RTGS. Consequently, these automated intraday repos can take place even outside the RTGS operating hours.

In addition to payments against delivery of securities, there will be payments across the RTGS between direct customers’ main cash accounts and their dedicated securities settlement cash accounts to fund and/or defund securities settlement. Cash left in direct customers’ settlement cash accounts at the end of the day will be swept by the CSD into their main cash accounts at the central bank.

As above, the diagram shows each of the three parties settling in different ways:

- Bank A is a direct customer of the CSD and has a central bank account, and is managing its own securities settlement and payments.
- The CCP is a direct customer of the CSD and has a central bank account, but is using the services of another direct customer (SB) to manage its payments and securities settlement.
- Bank B does not have an account at the central bank and is using a cash settlement agent bank to manage its payments but is managing its own securities settlement.



The analysis is identical to that for the interfaced mechanism. All payments across RTGS are between central bank accounts and therefore in **central bank money** (CEBM), but the exclusive use by Bank B of the services of a cash settlement agent, who is a commercial bank, means that B necessarily settles in **commercial bank money** (COBM). Moreover, as commercial banks will seek to keep operational balances at the central bank within desired target ranges, Bank A and the CCP will withdraw excess balances on their central bank accounts and convert these funds into commercial bank money, while impending payments across the RTGS for purchases of securities (for own account and/or on behalf of customers) will be funded with cash gathered in commercial bank money. These possible **commercial bank money** flows have not been shown in the diagram.

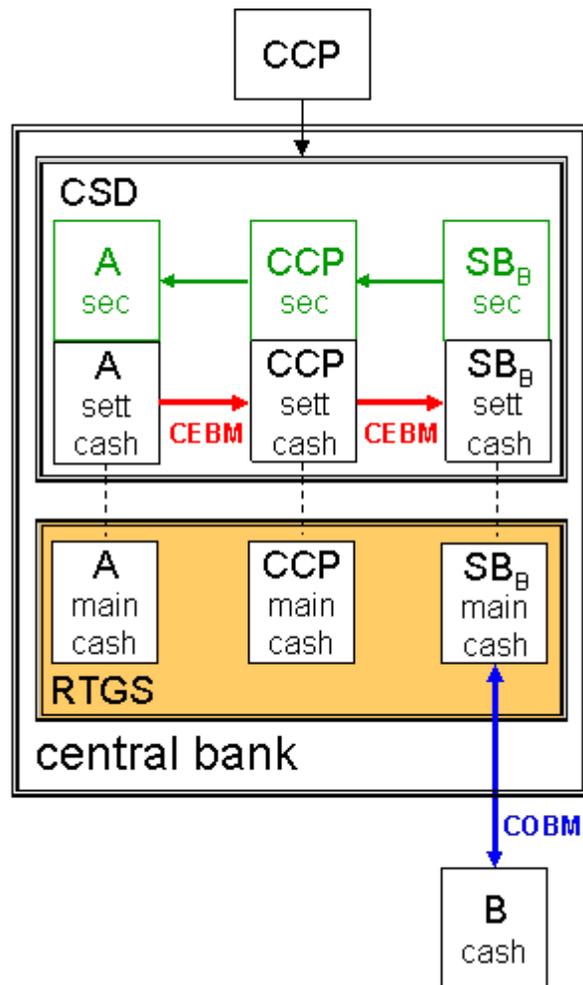
The integrated mechanism is operated by Euroclear Belgium, Netherlands and France.

Variant 1.3 embedded payment mechanism

In this variant of Model 1, the central bank operates both the RTGS and CSD. Cash accounts are embedded in the CSD, which co-ordinates with the RTGS to achieve DVP. The cash accounts shown within the CSD are therefore not memorandum accounts.

The parties are settling in different ways:

- Bank A and the CCP are direct customers of the CSD and have central bank accounts, and are managing their own securities settlement and payments.
- Bank B does not have an account at the central bank and is using the services of a direct customer (SB) as an agent to manage its payments and securities settlement.



Final payments across RTGS are between central bank accounts and therefore in **central bank money** (CEBM), but the exclusive use by Bank B of the services of a cash settlement agent, which is a commercial bank, means that B necessarily settles in **commercial bank money** (COBM). Moreover, as commercial banks will seek to keep operational balances at the central bank within desired target ranges, Bank A and the CCP will withdraw excess balances on their central bank accounts and convert these funds into commercial bank money, while impending payments across the RTGS for purchases of securities (for own account and/or on behalf of customers) will be funded with cash gathered in commercial bank money. These possible **commercial bank money** flows have not been shown in the diagram.

This is the payment mechanism operated by the National Bank of Belgium.

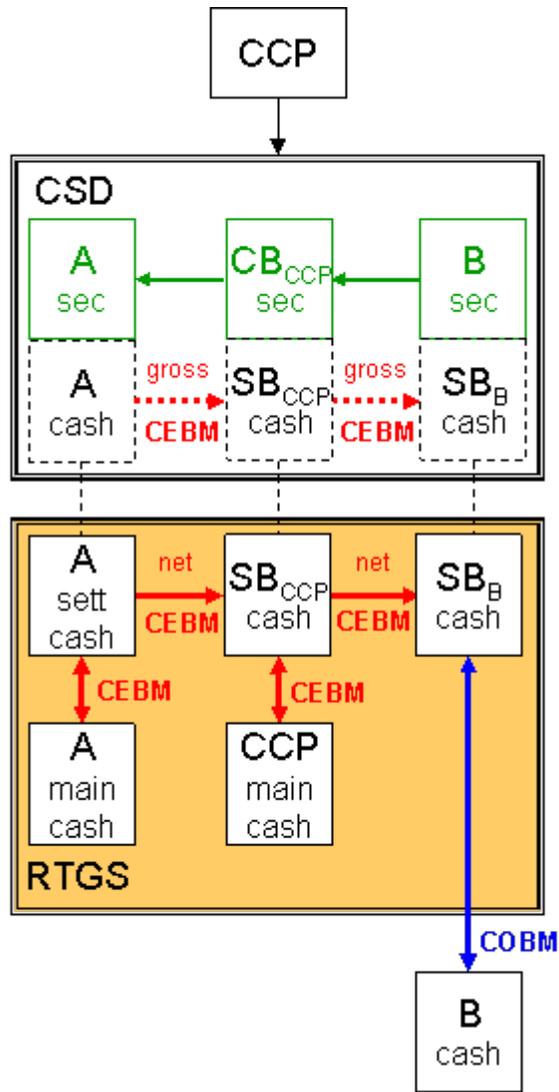
Variant 1.4 reservation pre-funding payment mechanism

In this variant of Model 1, the cash accounts shown within the CSD are memorandum accounts (for accounting purposes only). These accounts are credited and debited during the day as securities are delivered between the parties. However, the actual movement of cash takes place net at the end of the day across the RTGS. The availability of sufficient cash to complete settlement and therefore finality is ensured by special facilities called *liquidity bridges*, which pre-fund settlement by reserving cash in the accounts of the parties at the central bank (normally at the start of the business day).

Each of the three parties settles in different ways:

- Bank A is a direct customer of the CSD and has a central bank account, and is managing its own securities settlement and payments.
- The CCP is a direct customer of the CSD and has a central bank account but is using the services of another direct customer (SB) to manage its payments and securities settlement.
- Bank B does not have an account at the central bank and is using the services of a direct customer (SB) as an agent to manage its payments and securities settlement.

Final payments across RTGS are between central bank accounts and therefore in **central bank money** (CEBM), but the exclusive use by Bank B of the services of a cash settlement agent, which is a commercial bank, means that B necessarily settles in **commercial bank money** (COBM). Moreover, as commercial banks will seek to keep operational balances at the central bank within desired target ranges, Bank A and the CCP will withdraw excess balances on their central bank accounts and convert these funds into commercial bank money, while impending payments across the RTGS for purchases of securities (for own account and/or on behalf of customers) will be funded with cash gathered in commercial bank money. These possible **commercial bank money** flows have not been shown in the diagram.



This is one of the payment mechanisms that operate in Italy (in the Express II overnight net cycle).

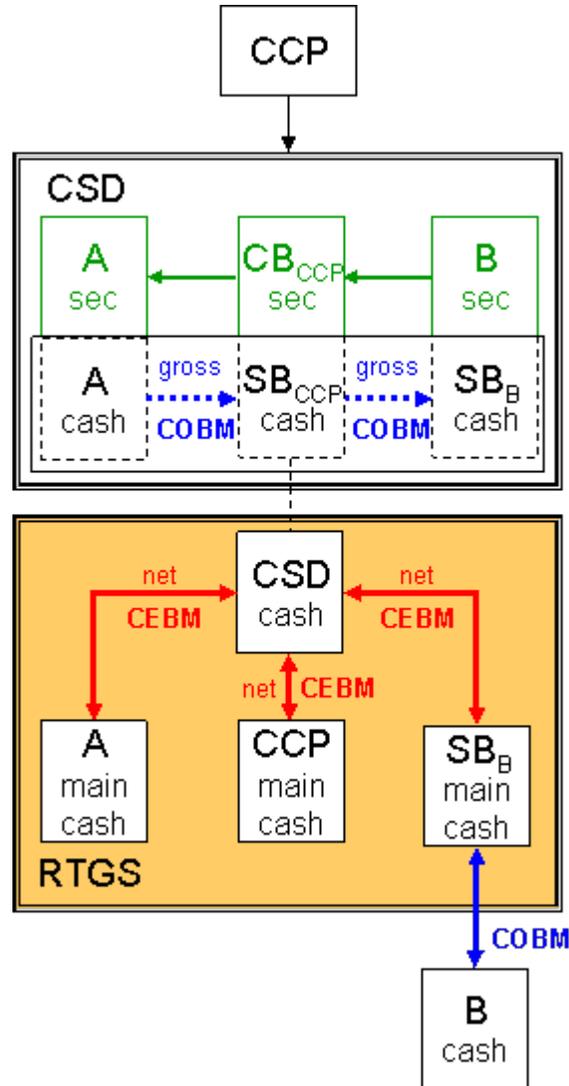
Variant 1.5 autonomous pre-funding payment mechanism

In this variant of Model 1, the CSD holds an account at the central bank which it divides, on its own books, into sub-accounts for the parties. The sub-accounts shown are memorandum accounts (for accounting purposes only). They are credited and debited during the day as securities are delivered between the parties. The availability of sufficient cash to complete settlement and therefore finality is ensured by the parties pre-funding settlement in the CSD by paying the required funds into the CSD account at the central bank from their own central bank accounts. The initial provision of funds is supplemented by an on-demand liquidity bridge. At the end of the day, the CSD pays balances back to participants across the RTGS.

Each of the three parties settles in different ways:

- Bank A is a direct customer of the CSD and has a central bank account, and is managing its own securities settlement and payments.
- The CCP is a direct customer of the CSD and has a central bank account but is using the services of another direct customer (SB) to manage its payments and securities settlement.
- Bank B does not have an account at the central bank and is using the services of a direct customer (SB) as a cash settlement agent to manage its payments and securities settlement.

Although the cash sub-accounts operated by the CSD are memorandum accounts and are translated into payments across the RTGS through pre-funding, real-time liquidity bridges and an end-of-day sweep, the fact that the sub-accounts are within the books of the CSD and the link to the parties across the RTGS is via a central bank account held by the CSD suggests that the payments across its books are **commercial bank money**. Nevertheless, final payments are across RTGS between central bank accounts and are therefore in **central bank money** (CEBM), although the exclusive use by Bank B of the services of a cash settlement agent, which is a commercial bank, means that B necessarily settles in **commercial bank money** (COBM). Moreover, as commercial banks will seek to keep operational balances at the central bank within desired target ranges, Bank A and the CCP will withdraw excess balances on their central bank accounts and convert these funds into commercial bank money, while impending payments across the RTGS for purchases of securities (for own account and/or on behalf of customers) will be funded with cash gathered in commercial bank money. These possible **commercial bank money** flows have not been shown in the diagram.



This is the payment mechanism that operates in Finland. There are some broad similarities between this mechanism and CLS.

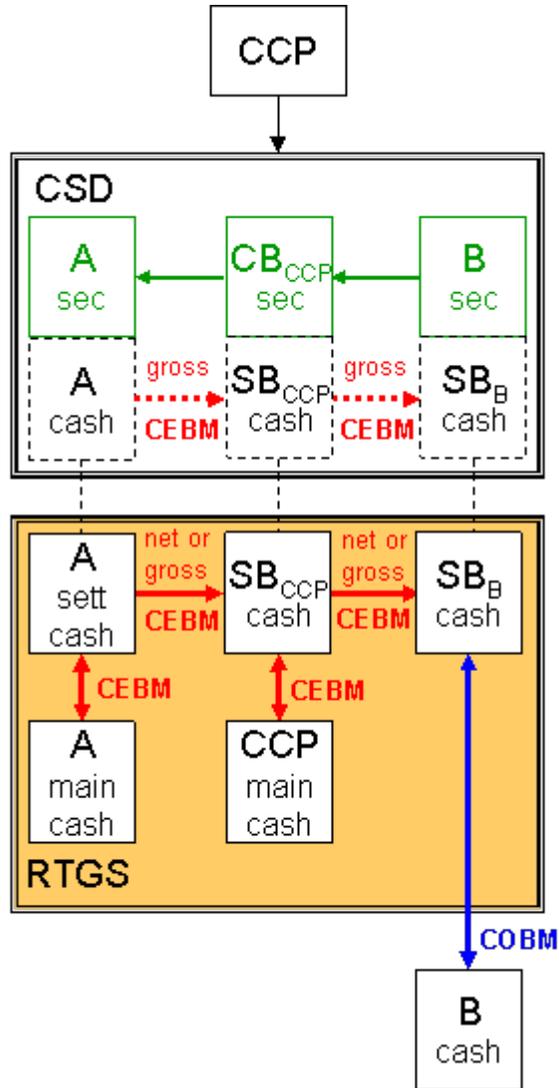
Variant 1.6 blocked pre-funding payment mechanism

In this variant of Model 1, the cash accounts shown within the CSD are memorandum accounts (for accounting purposes only). These accounts are credited and debited during the day as securities are delivered between the parties. However, the actual movement of cash takes place net at the end of the day across the RTGS, although finality is achieved in the CSD. The availability of sufficient cash to complete settlement and therefore finality is ensured by means of a legal arrangement with the central bank under which payments across parties' cash accounts in the CSD create an irrevocable guarantee on the part of the central bank to make corresponding payments in the accounts of the parties at the central bank by *earmarking* or *blocking* funds in their accounts. Ahead of each settlement cycle, the CSD is updated on blocked funds in each party's account at the central bank.

Each of the three parties settles in different ways:

- Bank A is a direct customer of the CSD and has a central bank account, and is managing its own securities settlement and payments.
- The CCP is a direct customer of the CSD and has a central bank account but is using the services of another direct customer (SB) to manage its payments and securities settlement.
- Bank B does not have an account at the central bank and is using the services of a direct customer (SB) as a cash settlement agent to manage its payments and securities settlement.

Final payments are across RTGS are between central bank accounts and therefore in **central bank money** (CEBM), but the exclusive use by Bank B of the services of a cash settlement agent, which is a commercial bank, means that B necessarily settles in **commercial bank money** (COBM). Moreover, as commercial banks will seek to keep operational balances at the central bank within desired target ranges, Bank A and the CCP will withdraw excess balances on their central bank accounts and convert these funds into commercial bank money, while impending payments across the RTGS for purchases of securities (for own account and/or on behalf of customers) will be funded with cash gathered in commercial bank money. These possible **commercial bank money** flows have not been shown in the diagram.



This is the payment mechanism that operates in the UK and Germany.

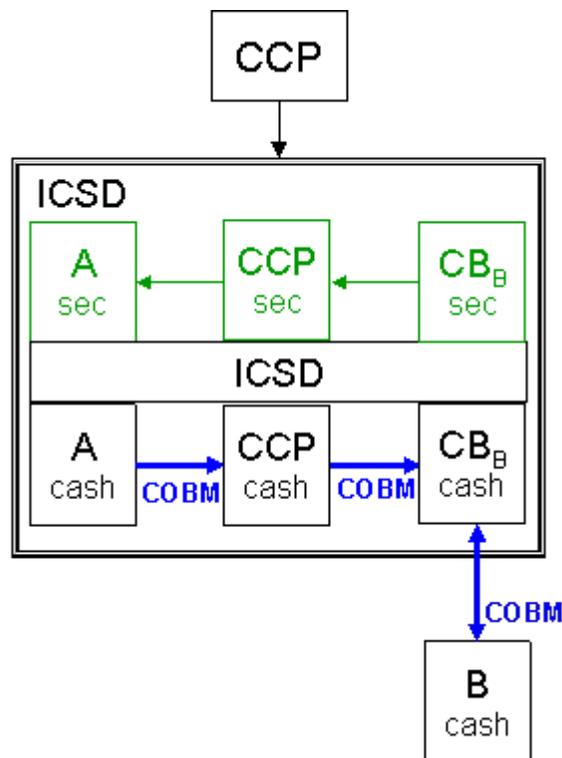
Model 2 CCP linked to an ICSD

This model shows settlement across a single ICSD (ie where the seller and buyer are both customers of the same ICSD). Because ICSDs are banks, the payment system is embedded within the depository.

In the diagrams representing variants of this model, cash and securities accounts have been shown separately for each direct customer, although the ICSD treats them as a single integrated account. The band labelled “ICSD”, running between customers’ securities and cash accounts, is intended to represent its role in providing collateralised intraday credit to direct customers.

The diagram shows each of the three parties settling in different ways:

- Bank A and the CCP are direct customers of the ICSD and are managing their own securities settlement and payments.
- Bank B is not a direct customer of the ICSD but instead to use a bank which is a direct customer (CB) to manage its payments and securities settlement. This is the least common arrangement.



Given that the ICSD is a commercial bank, all payments across the ICSD are in **commercial bank money** (COBM). However, the parties may fund and/or defund their cash accounts at the ICSD from/to accounts at the central bank (provided the ICSD also has an account at the central bank). These possible **central bank money** flows have not been shown in the diagram.

Model 3 CCP linked to two ICSD

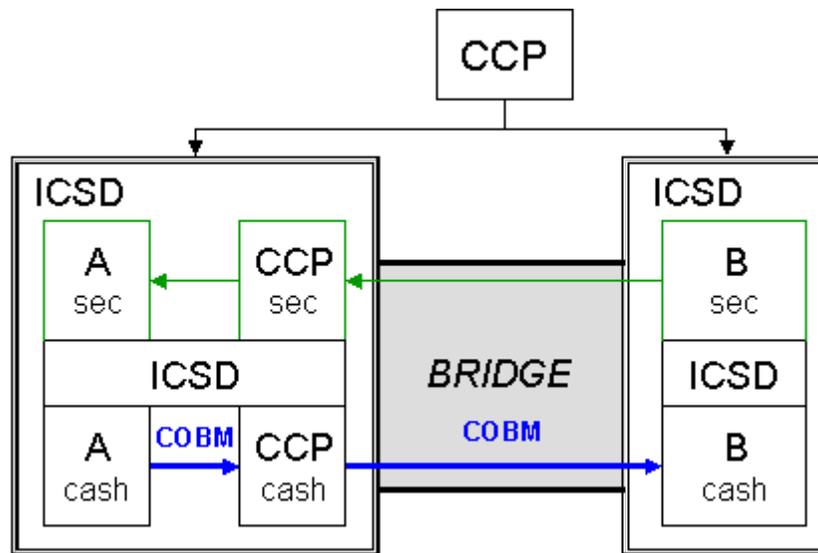
This model shows settlement between banks using different ICSDs across a structural link called “the Bridge”. It is assumed in the diagrams below that the buyer and seller are direct customers of one or other ICSD. However, if any of the parties were not direct customers, they could use an institution which is a direct customer as a cash and securities settlement agent, but this variant is not shown here.

Although the CCP is assumed to be a direct customer of both ICSDs, the diagrams only show the CCP in one of the ICSD. This reflects the practice followed by at least one CCP of making delivery of securities only in the same depository as the buyer, while being willing to take delivery from another depository (where there is a DVP link between the two depositories). The practice is thought to have arisen because the efficiency of cross-border settlement is lower than that of domestic settlement, and CCP wish to avoid the funding cost of holding securities that cannot be delivered on schedule.

In the diagrams representing this model, cash and securities accounts have been shown separately for each direct customer, although the ICSD treat them as a single integrated account. The band labelled “ICSD”, running between customers’ securities and cash accounts, is intended to represent its role in providing collateralised intraday credit to direct customers.

Variation 3.1

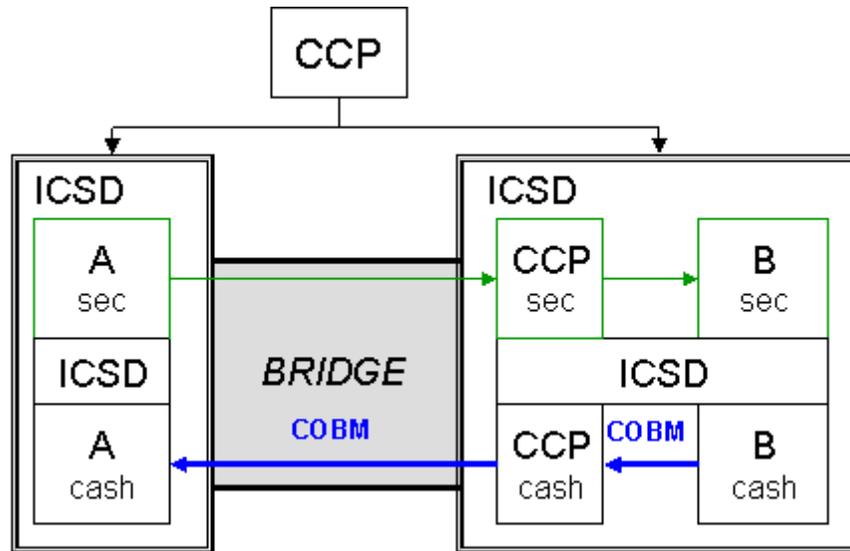
This variation of Model 3 shows Bank B delivering securities to the CCP against simultaneous payment (DVP) across the Bridge, and the CCP on-delivering to Bank A across the other ICSD, also against simultaneous payment.



Given that the ICSDs are commercial banks, payments against deliveries between Bank A and the CCP across one ICSD, and between the CCP and Bank B across the Bridge, are all in **commercial bank money (COBM)**. However, the parties may fund and/or defund their cash accounts at the ICSD from/to accounts at the central bank (provided that the ICSD also have accounts at the central bank). These possible **central bank money** flows have not been shown in the diagram.

Variation 3.2

This variation of Model 3 shows Bank A delivering securities to the CCP against simultaneous payment (DVP) across the Bridge, and the CCP on-delivering to Bank B across the other ICSD, also against simultaneous payment.



Given that the ICSD are commercial banks, payments against deliveries between Bank A and the CCP across the Bridge, and between the CCP and Bank B across one ICSD, are all in **commercial bank money (COBM)**. However, the parties may fund and/or defund their cash accounts at the ICSD from/to accounts at the central bank (provided that the ICSD also have accounts at the central bank). These possible **central bank money** flows have not been shown in the diagram.

Model 4 CCP linked to a CSD and ICSD

Model 4 shows settlement across a CSD and an ICSD, with the ICSD effectively acting as a cash and securities settlement agent for one of the parties in the CSD, in that the ICSD internalises further payments and securities delivery by passing them across its own books. It is assumed in the diagrams below that the buyer and seller are direct customers of one or other ICSD. However, any of the parties could use an agent bank to manage their payments and securities settlement in the ICSD, although this variant is not shown.

Variant 4.1

In this variant of Model 4, it is assumed that all the parties are direct customers of both the CSD and ICSD (although in sub-variant 4.1.3, Bank A does not have to be a direct customer of the CSD, and in sub-variant 4.1.4, Bank B does not have to be a direct customer of the ICSD).

Although the CCP is assumed to be a direct customer of both the CSD and the ICSD, the diagrams only show the CCP in one of the depositories. There are two reasons for this:

- First, as noted already, it is the practice of at least one CCP clearing cross-border transactions to make delivery of securities only in the same depository as the buyer, while being willing to take delivery from another depository (where there is a DVP link between the two depositories). For example, in sub-variant 4.1.1, the CCP will deliver to Bank A only within the ICSD, which means that A does not appear in the diagram to be a direct customer of the CSD.
- Second, even though the banks may be direct customers of the CSD and ICSD, they may prefer to keep certain securities in one or other depository, but not both. For example, in sub-variant 4.1.1, Bank B may prefer to keep its securities in the CSD, even though it is also a direct customer of the ICSD.

Cash accounts shown within the CSD are memorandum accounts (for accounting purposes only) and merely reflect cash movements that actually take place between accounts at the central bank across the RTGS (this is therefore a type of “interfaced” payment model). Payments across the RTGS can be net, in that they are the result of offsetting payments relating to many transactions.

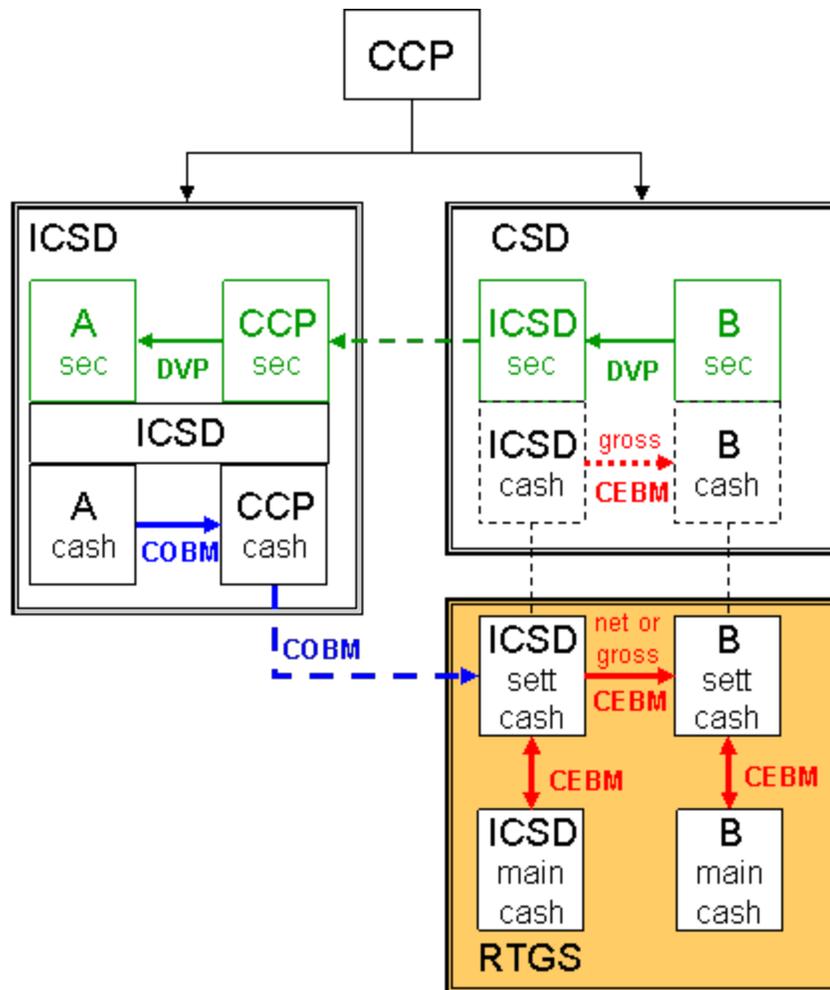
There are also payments across the RTGS between direct customers’ main accounts and dedicated securities settlement cash accounts at the central bank in order to ensure that operational balances at the central bank stay within desired target ranges.

Variant 4.1.1

In this sub-variant of Model 4, in which, Bank B sells to Bank A across a CCP-cleared trading venue. It is assumed that:

- all parties may be direct customers of both the CSD and ICSD; or
- Bank A may be a direct customer of the ICSD but not the CSD, and Bank B may be a direct customer of the CSD but not the ICSD.

The ICSD pays Bank B on behalf of the CCP across the RTGS against simultaneous delivery of securities (DVP) by B to the ICSD omnibus securities account at the CSD. Upon receipt of the securities within the CSD, the ICSD reflects the settlement of the transaction in its own books. It debits the cash account of the CCP held at the ICSD (ie an internal payment of funds between accounts on the books of the ICSD --- shown as a broken line) and simultaneously (DVP) credits the securities account of the CCP at the ICSD (ie an internal transfer of securities across the books of the ICSD --- also shown as a broken line). The ICSD is effectively acting as a clearing and settlement agent for the CCP.



All payments across RTGS (including the payment by the ICSD to B) are between central bank accounts and therefore in **central bank money** (CEBM). However, given that the ICSD is a commercial bank, the payment between Bank A and the CCP across the ICSD is in **commercial bank money** (COBM), as is the transfer of

funds from the CCP across the ICSD (the cash account of the CCP is debited and the cash account of Bank B is credited within the ICSD to fund the payment across RTGS from the ICSD on behalf of the CCP to Bank B).

Moreover, as the parties will seek to keep operational balances at the central bank within desired target ranges, excess balances on central bank accounts will be withdrawn and converted into commercial bank money, while impending payments across the RTGS for purchases of securities (for their own account and on behalf of their customers) will be funded with cash gathered across their books in commercial bank money. These potential **commercial bank money** flows have not been shown in the diagram.

In addition, the parties may fund and/or defund their cash accounts at the ICSD from/to accounts at the central bank (provided the ICSD also has an account at the central bank). These possible **central bank money** flows have not been shown in the diagram.

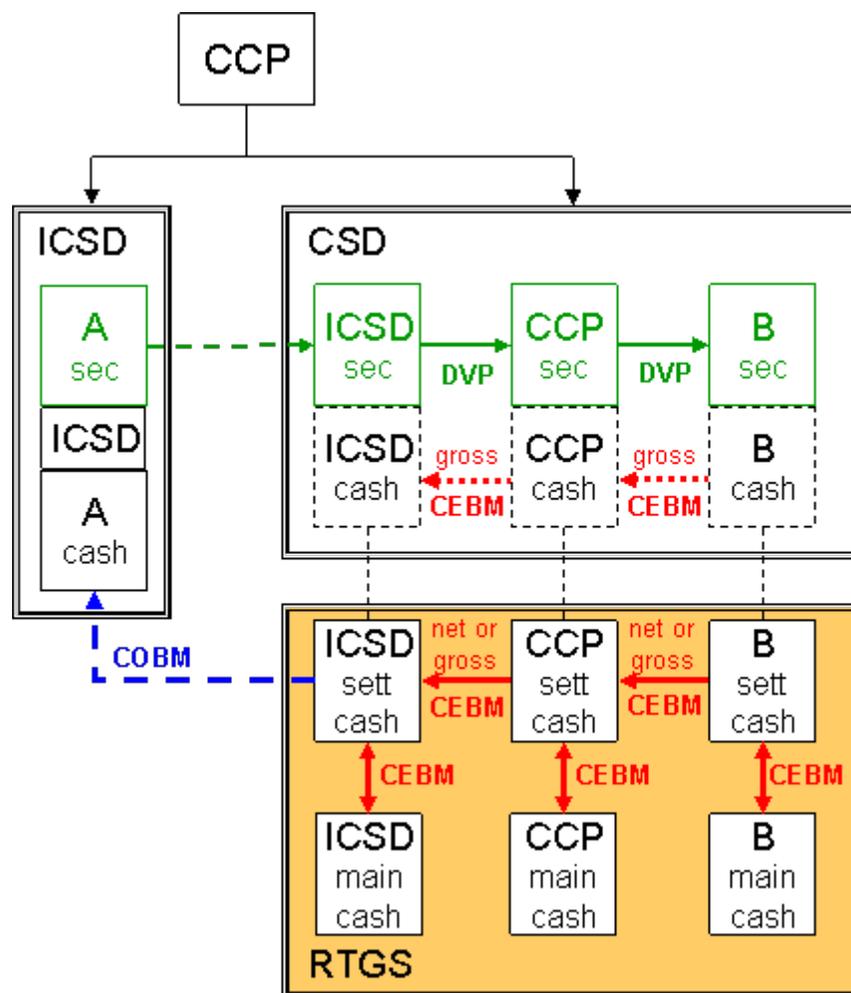
This sub-variant is found only in German fixed-income clearing and settlement.

Variation 4.1.2

In this sub-variant of Model 4, in which, Bank A sells to Bank B across a CCP-cleared trading venue. As above:

- Banks A and B may be direct customers of both the CSD and ICSD; or
- Bank A may be a direct customer of the ICSD but not the CSD, and B may be a direct customer of the CSD but not the ICSD.

The securities account of A at the ICSD is debited and the ICSD omnibus securities account is credited (ie an internal transfer of securities across the books of the ICSD --- shown as a broken line). Then, the securities are delivered from the ICSD omnibus securities account to the securities account of the CCP across the CSD against simultaneous payment (DVP) by the CCP to the ICSD across the RTGS. Subsequently, the cash account of A at the ICSD is credited (ie an internal payment of funds across the books of the ICSD --- also shown as a broken line). The ICSD is effectively acting as a clearing and settlement agent for the CCP.



All payments across the RTGS are between accounts at the central bank and are therefore in **central bank money** (CEBM). However, within the ICSD, money is credited to the account of Bank A and so represents a payment of **commercial bank money** (COBM).

Moreover, as the parties will seek to keep operational balances at the central bank within desired target ranges, excess balances on central bank accounts will be withdrawn and converted into commercial bank money, while impending payments across the RTGS for purchases of securities (for their own account and on behalf of their customers) will be funded with cash gathered across their books in commercial bank money. These potential **commercial bank money** flows have not been shown in the diagram.

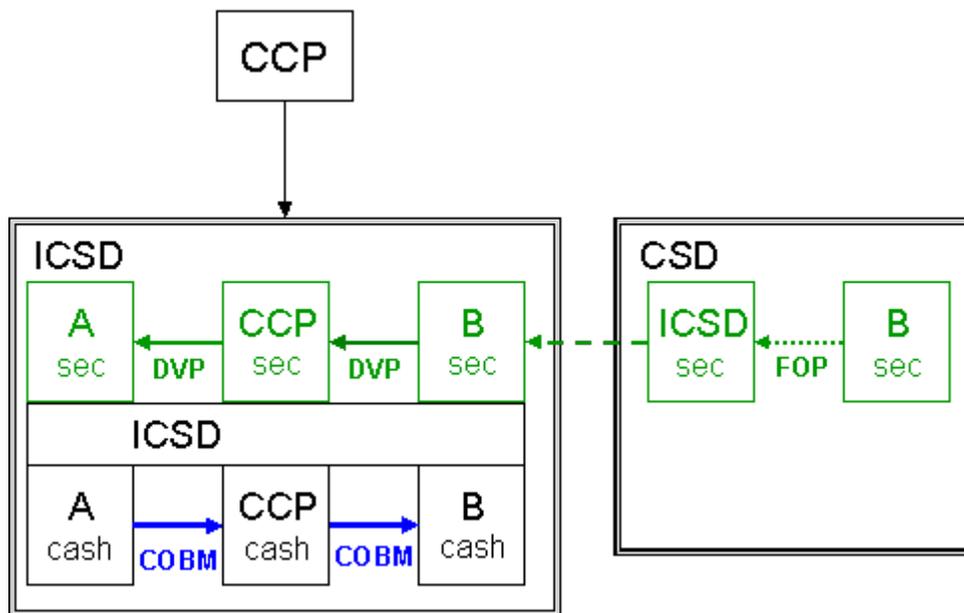
In addition, the parties may fund and/or defund their cash accounts at the ICSD from/to accounts at the central bank (provided the ICSD also has an account at the central bank). These possible **central bank money** flows have not been shown in the diagram.

This sub-variant is found only in German fixed-income clearing and settlement.

Variante 4.1.3

This sub-variant of Model 4 assumes that the CCP holds an account only at an ICSD but not at the CSD. An example of this sub-variant would be LCH.Clearnet Ltd clearing Spanish government securities.

Bank B sells to Bank A across a CCP-cleared trading venue. If Bank A and/or Bank B hold accounts in both the CSD and an ICSD, they may need to “realign” securities between the two depositories before being able to deliver to the CCP, which means transferring securities free-of-payment (FOP), with the ICSD effectively acting as a clearing and settlement agent in the CSD for Bank B. The realignment is indicated by the broken line. In this sub-variant, Bank B is realigning securities from its CSD account to its ICSD account in order to deliver to the CCP across the ICSD. The omnibus securities account of the ICSD in CSD is credited by B and then the securities account of B within the ICSD is credited by the ICSD. The realignment is indicated by the broken line. Bank B can then deliver to the CCP across the CSD against simultaneous payment (DVP).



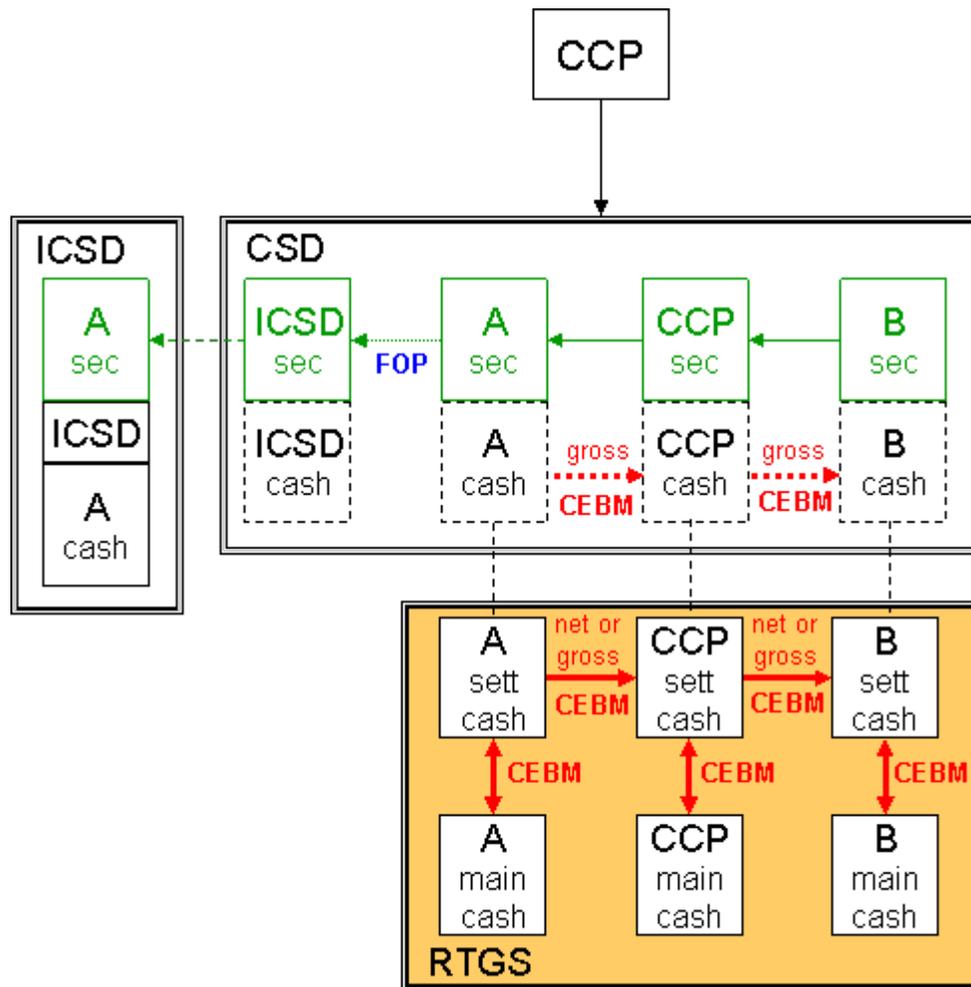
Given that the ICSD is a commercial bank, payments between Bank A and the CCP, and between the CCP and Bank B, which are all across the ICSD, are all in **commercial bank money** (COBM).

In addition, the parties may fund and/or defund their cash accounts at the ICSD from/to accounts at the central bank (provided the ICSD also has an account at the central bank). These possible **central bank money** flows have not been shown in the diagram.

Variation 4.1.4

This sub-variant of Model 4 assumes that the CCP holds an account only at a CSD but not at the ICSD. An example of this sub-variant would be LCH.Clearnet SA clearing French government securities (in the specific case of France, the diagram would show a CSD with an integrated payment mechanism, as in variant 1.2).

Bank B sells to Bank A across a CCP-cleared trading venue. Bank B delivers securities to the CCP across the CSD in exchange for simultaneous payment between central bank accounts across RTGS (DVP). The CCP then delivers the securities in the same fashion to Bank A. It is assumed that Bank A wishes to hold the securities in the ICSD, so it will need to “realign” them between the two depositories, which means transferring securities free-of-payment (FOP), with the ICSD effectively acting as a clearing and settlement agent in the CSD for Bank A. The omnibus securities account of the ICSD in CSD is credited by A and then the securities account of A within the ICSD is credited by the ICSD. The realignment is indicated by the broken line.



All payments across RTGS are between accounts at the central bank and are therefore in **central bank money** (CEBM).

Moreover, as Banks A and B will seek to keep operational balances at the central bank within desired target ranges, excess balances on central bank accounts will be withdrawn and converted into commercial bank money, while impending payments across the RTGS for purchases of securities (for own account and on behalf of customers) will be funded with cash gathered across their books in commercial bank money. These possible **commercial bank money** flows have not been shown in the diagram.

Variation 4.2

This variation of Model 4 represents the Euro GC Pooling product of Eurex Repo. Xemac is the collateral management system of Clearstream Bank Frankfurt (CBF, a CSD).

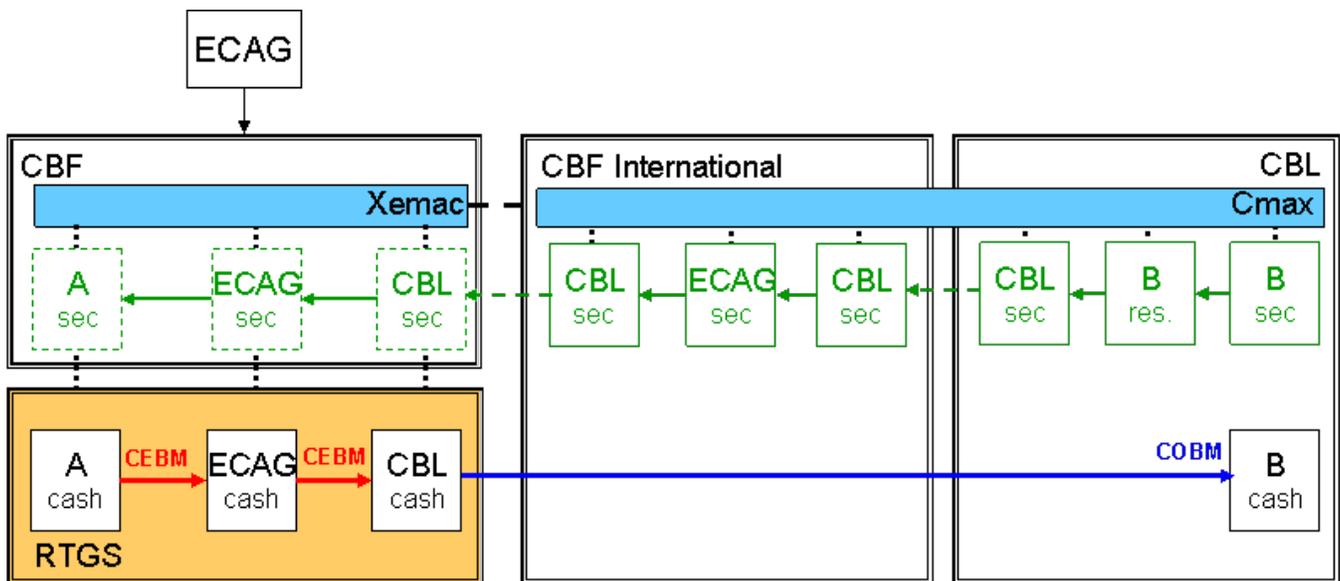
Cmax is the collateral management system operated by Clearstream Bank Luxembourg (CBL, an ICSD) and CBF International. Xemac controls collateral transfers across CBL via Cmax. The securities accounts shown within CBF are shadow accounts that reflect actual transfers of securities (by Xemac via Cmax) across CBL. The CCP is Eurex Clearing (ECAG).

This variation assumes that Bank A but not Bank B is a direct customer of CBF, while Bank B is a direct customer of CBL. Settlement takes place between CBF and CBL, with CBL acting as a settlement agent by means of its membership of CBF, through a legal entity called CBF International, and the use of an omnibus account at CBF to settle securities on behalf of its customers.

Bank B sells to Bank A across EGCP. The transfer of securities from the securities account of Bank B (B sec) to a special account (B res) across CBL is a transfer in advance of settlement in order to reserve those securities and ensure their availability, as settlement is not executed on a DVP basis but in a conditional sequence.

Once sufficient securities have been reserved, cash is paid across the RTGS by ECAG to CBL on behalf of Bank B and the reserved securities are then released to ECAG across CBL and then re-aligned to the account of ECAG in CBF via the omnibus account of CBL at CBF. An identical but opposite transaction takes place between Bank ECAG and Bank A.

If B was the buyer, it would have to pre-fund a CBL central bank account from its own central bank account across RTGS.



All payments across the RTGS are between accounts at the central bank and are therefore in **central bank money** (CEBM). However, within CBL, money is paid into the account of Bank B and, if B subsequently employs these funds for settlement across CBL, it will become **commercial bank money** (COBM).

Moreover, as Banks A and B will seek to keep operational balances at the central bank within desired target ranges, excess balances on central bank accounts will be withdrawn and converted into commercial bank money, while impending payments across the RTGS for purchases of securities (for own account and on behalf of customers) will be funded with cash gathered in commercial bank money. These possible **commercial bank money** flows have not been shown in the diagram.

About the Author

This report was produced by Richard Comotto, who is Senior Visiting Fellow at the ICMA Centre at the University of Reading in England, where he is responsible for the money markets module of the Centre's postgraduate finance programme. He compiles the ICMA's semi-annual European repo market survey and is Course Director for a number educational programmes for the repo and securities lending markets, including the ICMA Professional Repo Market Course conducted in Europe and Asia in co-operation with the ACI and SIFMA, the ICMA's GMRA Workshop and the forthcoming ICMA-ISLA GMRA-GMSLA Workshop.

The author acts as an independent consultant providing research and training on the international money, securities and derivatives markets to professional market associations, government agencies, regulatory authorities, banks, brokers and financial information services.

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The author served for ten years at the Bank of England, within its Foreign Exchange Division and on secondment to the International Monetary Fund in Washington DC.

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