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# The post-crisis world of collateral and international liquidity

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## The post-crisis world of collateral and international liquidity A central banker's perspective

International liquidity and collateral management poses a challenge to banks as it needs to adapt to ever-changing circumstances. These circumstances are now in a state of flux because of the financial crisis. Financial market behaviour has changed, the importance of high-quality collateral has increased, new liquidity standards have been designed and central counterparties will assume a greater role in the clearing of over-the-counter derivatives. There is no doubt that these trends will have a profound impact on banks' liquidity and collateral management. This paper examines whether and how infrastructural change or central banks' arrangements can help banks to accommodate these trends. If during a crisis banks have the possibility to promptly transfer securities or cash from one country to another, they may be able to solve an imminent local liquidity problem by using the excess cash or securities that they have elsewhere. Such solutions seem more urgently required now than in the past, because current trends signal a higher need for collateral (so that banks want to use their high-quality assets more efficiently). Moreover, new fast communication technologies require banks to solve local liquidity issues before rumours spread. This paper brings forward some possible solutions and forms a central banker's view on them.

## Acknowledgements

Work on this project started in early 2010. In the course of the year several discussion seminars were organized: internal seminars within De Nederlandsche Bank (DNB) as well as discussion sessions with commercial banks (e.g. a DNB liquidity seminar for Dutch banks in March, a liquidity seminar for European banks in July, which was organized by DNB and the Royal Bank of Scotland, and an interactive SIBOS presentation by DNB in October). Inspiration for this paper thus came from discussions with colleagues and representatives of commercial banks. I would like to thank everybody who contributed to the debate, including the colleagues who participated in the ‘Focusgebied Betalingsverkeer’ and ‘Future state of collateral’ discussions. I also thank the colleagues who gave me feedback on earlier versions of this paper. Given the high number of people that contributed in one way or another, I apologize for not thanking everybody in person here. I do want to mention my colleague Jaap Mauritz, who played a vital role in activating the debate with the banking community, and Ludy Limburg (RBS) for his active input from the financial institutions’ side. Finally, as the text of this paper’s Chapter 4 – as well as some paragraphs of the other chapters – has already been published in the *Journal of Payments Strategy and Systems* (see Capel 2011), I would like to thank the *Journal* for its permission to reprint this text in this Occasional Study.



# Table of contents

	<b>Acknowledgements</b>	5
	<b>Glossary</b>	9
<b>1</b>	<b>Introduction</b>	<b>11</b>
<b>2</b>	<b>Banks' international liquidity/collateral management in context</b>	<b>13</b>
2.1	Liquidity – definition and the role of authorities	13
2.2	Banks' (international) liquidity management	14
2.3	What is high-quality collateral?	16
<b>3</b>	<b>Financial market infrastructures and liquidity management</b>	<b>19</b>
3.1	International liquidity management in the context of mainly national FMIs	19
3.2	The role of FMIs in international liquidity management	20
<b>4</b>	<b>Current trends in international liquidity and collateral</b>	<b>23</b>
4.1	Fundamental changes in the money market	23
4.2	The sovereign crisis	25
4.3	The liquidity standards of the BCBS	26
4.4	A greater role for central counterparties (CCPs)	29
4.5	Impact of trends on banks' collateral and liquidity management	30
<b>5</b>	<b>Arrangements for cross-border transfers</b>	<b>33</b>
5.1	Introduction	33
5.2	Addressing a cash mismatch – possible arrangements	33
5.3	Addressing a securities mismatch – possible arrangements	35
5.4	Cross-border arrangements within the Eurosystem	39
5.5	Cross-currency area arrangements of the Eurosystem	42
5.6	Banks' suggestions for better post-crisis cross-border solutions	45
5.7	Synopsis of current cross-border arrangements	47
<b>6</b>	<b>A central banker's perspective on international liquidity/collateral</b>	<b>49</b>
6.1	Reflections on cross-currency area central bank arrangements	49
6.2	Reflections on central banks' post-crisis collateral frameworks	55

**7 Summary and recommendations 61**

7.1 Summary 61

7.2 Recommendations 63

**References 67**

## Glossary

<b>BCBS</b>	Basel Committee on Banking Supervision
<b>BIS</b>	Bank for International Settlements
<b>CCBM</b>	Correspondent central banking Model
<b>CCBM<sub>2</sub></b>	Collateral Central Bank Management (CCBM of the Eurosystem)
<b>CCP</b>	Central Counter Party
<b>CGFS</b>	Committee on the Global Financial System
<b>CDS</b>	Credit Default Swap
<b>CLS</b>	Continuous Linked Settlement
<b>CMS</b>	Collateral Management System
<b>CPSS</b>	Committee on Payment and Settlement Systems
<b>CSD</b>	Central Securities Depository
<b>DNB</b>	De Nederlandsche Bank (central bank of the Netherlands)
<b>ECB</b>	European Central Bank
<b>FMI</b>	Financial Market Infrastructure
<b>GCP</b>	Global Cash Pool
<b>ICSD</b>	International Central Securities Depository
<b>IMF</b>	International Monetary Fund
<b>LCR</b>	Liquidity Coverage Ratio
<b>LVPS</b>	Large Value Payment System
<b>NCB</b>	National Central Bank
<b>NSFR</b>	Net Stable Funding Ratio
<b>OIS</b>	Overnight Indexed Swap rate
<b>OTC</b>	Over-the-counter (derivatives)
<b>PvP</b>	Payment-versus-payment
<b>RTGS</b>	Real Time Gross Settlement (type of large value payment system)
<b>SCP</b>	Scandinavian Cash Pool
<b>SIBOS</b>	Swift International Banking Operations Seminar
<b>SSS</b>	Securities Settlement System
<b>TARGET<sub>2</sub></b>	Trans-European Automated Real-time Gross settlement Express Transfer (RTGS of Eurosystem)
<b>T<sub>2</sub>S</b>	TARGET <sub>2</sub> Securities (Eurosystem securities settlement system)





# I Introduction

The financial crisis has put international liquidity management high on the agenda of financial institutions and public authorities. The crisis has shown how complex financial products and how interdependent financial institutions and infrastructures have become. If stress arises somewhere in the financial system, this complexity and interdependency provide a fertile breeding ground for negative rumours about individual financial institutions. Once such rumours exist, they can spread much faster than in the past because market participants or dissatisfied clients can use modern communication technologies to share their worries or dissatisfaction with the rest of the world. As it often proves difficult for banks to refute rumours completely, a bank's clients may decide they would rather be safe than sorry and withdraw their deposits. Thus a relatively minor liquidity issue may develop into a major problem. Hence, given that banks are intrinsically vulnerable to bank runs because of the maturity transformation they offer, it is of paramount importance that they react promptly to every liquidity issue and are able to ride out a period of liquidity stress.

However, international liquidity and collateral management is posing a challenge to banks as it needs to adapt to ever-changing circumstances. Because of the financial crisis, these circumstances are currently undergoing rapid change. The crisis has fundamentally changed the way banks do business with each other and the way financial markets function. The crisis has also prompted supervisors and other authorities to establish liquidity standards and to promote central counterparty clearing for standard over-the-counter derivatives. As a result of these trends, banks need more collateral or liquid buffers than in the past and have to reconsider their liquidity management.

This paper is relevant for banks that are active in more than one currency area and that thus need to manage their liquidity in an international or cross-border setting.<sup>1</sup> The **focus of this paper** is on the role financial market infrastructures and central bank arrangements can play in facilitating such a bank's international collateral and liquidity management. If banks have the possibility to transfer securities or cash

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<sup>1</sup> These banks could be called 'multinational banks', 'international banks' or 'internationally active banks'. These terms are used interchangeably throughout the text.

from one country to another, they may be able to solve an imminent local liquidity problem by using the excess cash or securities they have available in another country. It can be argued that such cross-border arrangements for cash or securities transfer are more necessary now than in the past. First, there is a more urgent need these days to solve local liquidity issues before others become aware and talk about them on the Internet or in other media. Second, as current trends signal a higher need for collateral, liquidity mismatches are likely to occur more frequently and banks may need to use their pool of high-quality liquid assets more efficiently.

The **structure of this paper** is as follows. Chapter 2 provides a general context to international liquidity management. It briefly explains the concept of liquidity and sketches the difficulties faced by authorities when aiming to influence banks' liquidity and the issues faced by (international) banks in managing their liquidity. Chapter 3 comments on the role of financial market infrastructures in banks' international liquidity management, while Chapter 4 discusses which trends are likely to affect banks' liquidity management. Chapter 5 focuses on the possibilities banks have to transfer collateral (cash or securities) from one country to another. It starts by giving a full overview of the theoretical possibilities and then describes which options are currently available for (i) transfers within the euro area and (ii) transfers between the euro area and other currency areas. Finally, this chapter also presents some suggestions made by commercial banks for improving post-crisis cross-border arrangements. A central banker's perspective on trends in collateral/liquidity, collateral frameworks and cross-currency area solutions is given in Chapter 6. Finally, Chapter 7 summarizes the main observations made in this paper and concludes with some recommendations to the central bank community.

## 2 Banks' international liquidity/collateral management in context

### 2.1 Liquidity – definition and the role of authorities

**Liquidity can be defined** as the amount of cash a firm has available or is able to raise quickly in order to meet its short-term obligations. It is a multifaceted concept. First, we can differentiate between regular liquidity on the one hand and emergency liquidity on the other. Second, we can distinguish between market liquidity (ability to quickly buy or sell an asset without causing significant price changes), funding liquidity (ability to raise funds when needed to meet obligations) and intraday liquidity (ability to pay when payments are due). While this distinction is clear from a theoretical point of view, it should be noted that the different concepts of liquidity tend to be interrelated, especially when stress occurs. For instance, a problem with intraday or market liquidity can rapidly develop into a funding liquidity problem or vice versa.

Since liquidity is a multifaceted concept, there are **several authorities involved in the liquidity of banks**. Market liquidity is related to the maturity and depth of financial markets and will therefore be influenced by policy actions in the area of deregulation, integration and harmonization etc. Funding liquidity will be determined by, for example, the requirements of financial supervisors as well as by banks' access to central bank liquidity (legal requirements, eligible collateral). Intraday liquidity depends on the design of payment systems, but also on the intraday credit conditions imposed by central banks. Hence, even within one country different policy makers all influence in one way or another how liquid banks are in practice.

On a global scale liquidity is an even more complicated policy issue because of the **international institutional vacuum**. Without a world central bank and a global financial supervisor, there are several national authorities that influence the liquidity of a multinational bank. This makes it difficult to reach international agreements on important issues such as emergency liquidity assistance (ELA) to multinational banks and the bank's possibilities to transfer its liquidity across borders. For example, the home and the host country of a multinational bank usually have different views on how the burden of ELA should be shared. Moreover, the recent financial crisis has made it a more common practice among supervisors

to set local liquidity requirements and national supervisors may be tempted to ring-fence locally available liquidity buffers in times of stress. This ring-fencing is understandable from a purely national point of view, but it may aggravate or cause liquidity problems elsewhere. Because of the international institutional vacuum, multinational banks have to manage their liquidity in the face of different national rules and procedures.

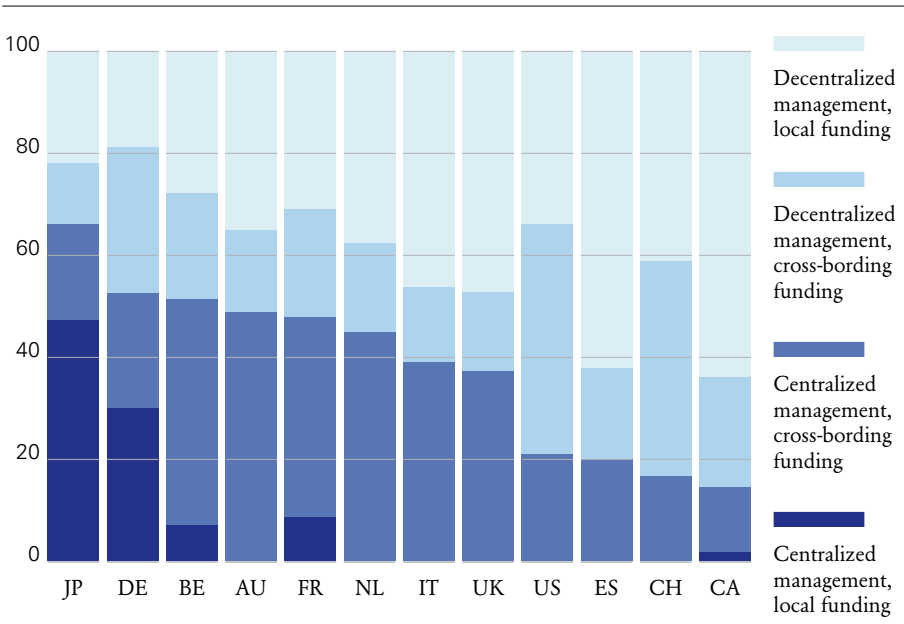
## 2.2 Banks' (international) liquidity management

**Liquidity management is a serious challenge for every bank.** First, liquidity problems can have various origins (operational, firm-specific events or market-wide stress). A bank must be ready to cope with each of these. Second, liquidity needs are difficult to quantify. This applies in particular to intraday liquidity needs as these are determined by the payment behaviour of the bank's debtors, which is difficult to forecast. Third, in periods of stress, when it is crucial for banks to avoid any suspicion of a possible liquidity shortage, everything tends to be different than in normal times. In times of stress liquidity sources can suddenly dry up (e.g. because deposits are withdrawn or payments delayed), while liquidity needs can be much stronger than normal (e.g. if others suddenly start to draw on committed but hitherto unused credit lines).

For **internationally active banks** the challenge of **liquidity management** is even greater. As mentioned above, these banks have to cope with different national rules and procedures. Moreover, multinational banks need to decide which entities are to manage the liquidity (the central parent company or local/regional subsidiaries) and how exchange rate risk should be dealt with. Finally, internationally active banks – and especially those that opt for centralized financing models (see below) – not only need to ensure that the overall amount of cash and securities is sufficient, but they also have to be prepared for possible mismatches in their liquidity. Banks that are active outside their home currency area need liquidity in their home currency but also in one or more foreign currencies. Moreover, such banks are likely to need high-quality collateral at home but also in one or more foreign countries.

The **financing models of international banks** – centralized or decentralized management, local or cross-border funding – differ widely between countries (Figure 1) but also between banks within a country (CGFS 2010b). International banks can manage their liquidity centrally (i.e. subsidiaries receive their funds from the parent in the home country) or in a decentralized way (subsidiaries raise their own funds). In both cases, the entity that is responsible for liquidity management can attract local funding (e.g. by deposits from local consumers) or cross-border funding (i.e. the funds are raised in another country). Banks that opt for decentralized liquidity management and local financing are less dependent on cross-border transfers. As the latest financial crisis was mainly a crisis on wholesale markets, one would expect

Figure 1 Funding of foreign claims



Source: CGFS (2010).

such banks to have been hit less hard by the crisis than banks with other financing models.

Indeed there is evidence suggesting that **financing problems during the crisis** were less severe for banks with decentralized finance models, as the latter tended to be less dependent on wholesale markets for funding. However, the crisis has also revealed that centralized liquidity management can have substantial merits too: banks with centralized management were able to use scarce liquidity in the most efficient way and could sometimes use intragroup finance as a lifeline when the cross-border markets collapsed (CGFS 2010b). From discussions with international banks it can be concluded that the crisis has not prompted a major revision of their financing models (CGFS 2010b). Yet there seems to be some trend towards more centralized management of liquidity (so that banks can optimize scarce liquidity and collateral). There is also evidence that banks attempt to increase the share of retail funding (also in foreign countries) and to reduce their dependence on wholesale funding. Finally, there now is greater in-company awareness on the costs of liquidity, as more banks use transfer prices to reflect the costs of liquidity in their business decisions.

Internationally active banks, especially those that manage their liquidity centrally and use cross-border funds, frequently face liquidity mismatches even if they are

liquid in overall terms. Two types of liquidity mismatch can occur: (i) a bank has plenty of cash in one currency but too little in another (a **cash mismatch**) and (ii) a bank has enough securities to use as collateral but they are located in the ‘wrong’ country (a **securities mismatch**). Cash and securities mismatches are liquidity problems that can be solved through financial market infrastructures or central bank arrangements that support the cross-border transfer of cash or securities. Liquidity mismatches and their possible solutions are the focus of this paper.

### 2.3 What is high-quality collateral?

Banks hold assets (securities and cash) to serve as collateral in case of possible liquidity needs. However, not all assets are accepted by other market participants as collateral. There are quality requirements. This paper distinguishes between ‘high-quality collateral’ and other collateral. According to the Basel Committee on Banking Supervision, there are **several characteristics that high-quality liquid assets share** (see BCBS 2010c, pp. 5-6 for a more detailed discussion). There are – first – some fundamental characteristics of these assets themselves: (i) their credit and market risks are low, (ii) their values can be computed with ease and certainty, (iii) the assets should have a low correlation with risky assets and (iv) they must be listed on a developed and recognized exchange market. In addition, there are several market-related characteristics determining whether an asset is high-quality or not: (i) the market for the asset should be active and sizable, (ii) price quotes must be readily available, (iii) the group of buyers and sellers must not be concentrated and (iv) the asset should be attractive to investors in times of distress (i.e. when there is a flight to quality). Finally, only ‘unencumbered’ assets – i.e. assets that are not already in use to secure, collateralize or credit-enhance another transaction – can be considered high-quality collateral.

In theory there thus appears to be some consensus on the criteria that distinguish ‘high-quality collateral’ from other collateral. In practice, however, it is not possible to draw a clear line between the two, as there is a continuum of different collateral options and – moreover – the market perceptions of these options change continuously. Then the counterparty matters as well: what is accepted as collateral from a trustworthy counterparty may not be accepted from another counterparty. The haircut that the market applies to different assets gives an indication of an asset’s quality. Hence, high-quality collateral can be said to consist of assets that the market genuinely accepts as collateral at a reasonable haircut. But which specific assets are high-quality is more difficult to define and the category is likely to change over time and to differ between counterparties. This is illustrated in Table 1, where it is shown that **haircuts depend on (i) the asset class, (ii) the counterparty and (iii) the general level of trust, which varies over time.**

Against this background, views on what ‘high-quality assets’ are may differ, with different organizations accepting different assets as collateral. Central banks – and especially those with a broad collateral list, such as the Eurosystem – tend to accept a longer list of assets as collateral than the market. The Basel Committee on Banking Supervision, on the other hand, has a more restrictive view on what ‘high-quality liquid assets’ are precisely (see Section 4.3).

**Table 1 Typical haircut on terms securities financing transactions in percent**

	June 2007			June 2009		
	Prime <sup>1</sup>	Non prime <sup>2</sup>	Unrated <sup>3</sup>	Prime <sup>1</sup>	Non prime <sup>2</sup>	Unrated <sup>3</sup>
<b>G7 government bonds</b>						
Short-term	0	0	0.5	0.5	1	2
Medium-term	0	0	0.5	1	2	3
<b>US agencies</b>						
Short-term	1	2	3	1	2	3
Medium-term	1	2	3	2	5	7
Pfandbrief	0	0	1	1	2	8
<b>Prime MBS</b>						
AAA-rated	4	6	10	10	20	30-100
AA-and A-rated	8	12	25	100	100	100
<b>Asset-backed securities</b>						
Structured products (AAA)	10	20	20	25	50	100
<b>Structured products (AAA)</b>						
Structured products (AAA)	10	15	20	100	100	100
<b>Investment grade bonds</b>						
AAA-and AA-rated	1	2	5	8	12	15
A- and BBB-rated	4	7	10	10	15	20
High-yield bonds	8	12	20	15	20	40
<b>Equity</b>						
G7 countries	10	12	20	15	20	25
Emerging economies	15	20	35	20	25	40

1 Prime counterparty.

2 Non-prime counterparty.

3 Hedge funds and other unrated counterparties.

Source: Study Group survey, CGFS (2010a).





## 3 Financial market infrastructures and liquidity management

### 3.1 International liquidity management in the context of mainly national FMIs

Financial market infrastructures (FMIs) are ‘official’ financial systems such as exchanges, payment systems, securities settlement systems and clearing houses/central counterparties, in which financial institutions are members, users, or participants. Banks do not need direct access to an FMI to get their transactions paid, cleared or settled. Many institutions are indirect members of or participants in an FMI, using the ‘private’ infrastructures or systems operated by global banks.

Most FMIs operate within the confines of a single country or single currency area. There are just a few exceptions. TARGET2 and TARGET2Securities (see further Section 5.4) are cross-border systems but are confined to the euro area. Continuous Linked Settlement or CLS is a worldwide system for foreign exchange settlement encompassing 17 currencies, but it is specifically designed for two-sided foreign exchange transactions, as opposed to other foreign currency payments and receipts. Moreover, international central securities depositories (ICSDs), such as Euroclear and Clearstream within the European Union, are very active in the settlement of internationally traded securities from various domestic markets and across currency areas. If a country or currency area has efficient FMIs, emerging liquidity mismatches within that geographical entity can be solved quickly.

Today's reality is thus that there are many **different payment and settlement systems operating in different currency areas**. Hence, international banks have to cope with liquidity mismatches within this setting. There are currently just a handful of global banks that are directly connected to the world's major payment and settlement systems and that can provide for their own payments and securities transactions in the world's major economies (CPSS 2008). Such global banks can make their own systems accessible to others by offering them correspondent and/or custodian services.

For most internationally active banks it is not cost efficient to participate directly in large value payment systems (LVPS) outside their home country. These banks rely on **correspondent banks** abroad to make payments in foreign currency or to obtain loans when short of foreign currency cash. Cross-border securities transactions,

which consist of a payment leg and a securities leg, typically involve different foreign institutions and systems and are therefore especially complex.<sup>2</sup> Hence, most international banks find it more efficient to rely on **custodians** for handling their foreign securities transactions than to become a direct trading, clearing or settlement member in another country. International payments and securities transactions therefore involve different institutions, both at home and abroad.

Using their network of correspondents and custodians, banks can usually **correct liquidity mismatches easily in normal circumstances**. Currencies can be swapped and securities traded on the market. Moreover, in normal circumstances a multinational bank – if solvent and liquid in overall terms – will usually be able to borrow from a private party in the currency it needs.

However, as the recent financial crisis has shown, **cash and securities mismatches** can quickly turn into a nightmare in crisis situations. If the whole market is nervous or if a particular bank is alleged to have problems, rumours about local liquidity problems – even if minor – can be spread by and blown up in the media, resulting in funds being withdrawn. Hence, in crisis situations, it is more important than ever for a bank to act promptly to correct liquidity mismatches. However, during a crisis prompt action may be impossible because the bank's normal network is no longer reliable (if the correspondent or custodian is facing problems) or accessible (if the bank itself is facing problems). For instance, foreign exchange swaps can suddenly become difficult to arrange as banks lose trust in each other and shy away from settlement risk. In addition, securities markets may become illiquid, credit lines from correspondents may be cut back and clients may start to withdraw their deposits. Therefore, banks often find it tough to deal with a liquidity mismatch in a crisis situation. The danger in this is that the problem is aggravated and becomes an overall liquidity problem or even a solvency problem.

### 3.2 The role of FMIs in international liquidity management

Well-functioning financial market infrastructures (FMIs) and central bank arrangements are essential for the international liquidity management of international banks. FMIs are essential for a bank's normal day-to-day transactions, as they basically provide the **necessary plumbing** permitting liquidity or collateral to flow from one place to another. Even if banks make use of correspondents or custodians, the latter often needs to use an FMI to get the transaction settled.<sup>3</sup>

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<sup>2</sup> In the case of the purchase of foreign securities by a domestic bank, for instance, the trading, clearing and settling of the securities would take place abroad so that several foreign institutions (e.g. a foreign exchange, clearing house/CCP and CSD) would be involved.

<sup>3</sup> Sometimes transactions can be settled in the internal systems of the correspondent or custodian if both the payer and the payee or – in case of a securities transaction – the buyer and seller of this security are clients of this bank. If this is not the case, the correspondent or custodian will use the payment system or securities settlement system to get the transaction settled.

Hence, well-working FMIs are a precondition for banks' ability to manage liquidity from an international perspective.<sup>4</sup> But during a crisis the valuable economic role of FMIs becomes more visible for two reasons. First, **crisis-proof or emergency plumbing** can be essential for banks to overcome liquidity mismatches in times of stress. If private networks do not function normally, a bank's attempt to solve an imminent local liquidity problem can be frustrated, thereby aggravating it. Hence, if authorities support cross-border FMIs or cross-border links between FMIs or – alternatively – if central banks make arrangements that enable prompt cross-border transfers of cash and/or securities, this can significantly alleviate banks' liquidity problems in case of stress. Chapter 5 discusses the possible solutions in more detail, while Chapter 6 gives a view on their desirability from a central banker's perspective.

Second, some FMIs act as **'neutral intermediaries'** (by taking over the risks of the counterparties they are dealing with) and thereby provide value added. This value added is highest if counterparties distrust each other, which typically occurs in crisis times. **CLS** is such a neutral intermediary. It is a system for settling foreign exchange transactions on a payment-versus-payment basis (so that Herstatt or settlement risk is eliminated). By contrast, in bilateral foreign exchange swap arrangements the two payment legs are uncoordinated, so that the counterparties are exposed to settlement risk.

Also a **central counterparty (CCP)** acts as a neutral intermediary for each buyer and seller. If banks use CCPs, a 'jumble' of outstanding bilateral positions between institutions is replaced by one clear position of each on the CCP (see Figure 2). If the CCP is safe, it can enhance risk transparency and reduce counterparty risk for the participating banks. Moreover, a CCP may give a further boost to the standardization of contracts and the automation of trading, which can also lower risks for banks. Given the pivotal systemic role of CLS and CCPs, actions are taken to minimize the risk that such FMIs become co-called 'single points of failure'. These include 'living will' requirements for systemically important FMIs as well as an internationally agreed set of standards. These standards include risk management requirements and provisions ensuring that there are sufficient sources of protection in case of a counterparty failure. Central banks also exercise oversight on CLS and CCPs to limit the probability that these entities fail to meet their obligations.

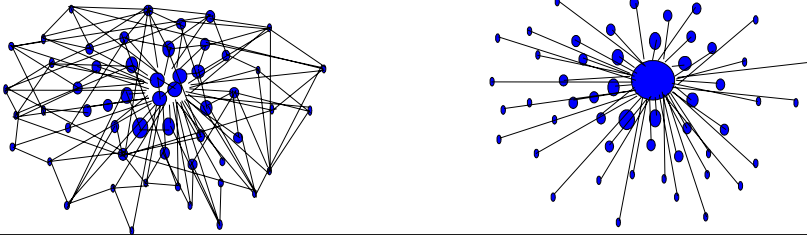
During the recent financial crisis **FMIs performed very well**. This illustrates the stabilizing role that FMIs can play in times of stress. Although many FMIs processed much larger volumes than normally due to the market turbulence,

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4. Of course, it is also important to have well-functioning FMIs within a particular country or currency area. The design of FMIs needs careful consideration. Hence, the Committee on Payments and Settlement Systems (CPSS) of the Bank for International Settlements (BIS) has issued standards for FMIs. Some FMIs have liquidity saving features, which can be extra attractive in times of liquidity shortages. A discussion of these issues is beyond the scope of this paper – for further information see the website of the BIS, where various reports can be found.

**Figure 2 Example of bilateral trade (left) versus trade via a CCP (right)**

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there were no significant operational problems. System problems resulting from defaulting members were also limited. As could be expected, FMIs that were ‘neutral intermediaries’ (CLS, CCPs) acted as shock absorbers during the last crisis. Most authorities agree that the crisis would have been worse without CLS. Many European and other non-US parties used CLS to correct their dollar shortages through currency swaps. Without CLS there would probably have been far fewer of such swaps, as banks – given the serious loss of confidence between them – would have been unwilling to run settlement risk, thereby aggravating the international liquidity problem. CCPs also did well during the financial crisis. Some CCPs had to cope with the default of Lehman Brothers, which they managed well by using the margins.<sup>5</sup> Some CCPs saw an increase in the number and value of transactions processed.

In short: well-functioning FMIs and central bank arrangements are essential for the cross-border liquidity management of international banks because they form (part of) the necessary plumbing for cross-border transactions. In crisis situations their role is more prominent, because they can offer alternative cross-border solutions when banks’ private international networks are in distress and assure that transactions will be settled by acting as ‘neutral intermediaries’ between two commercial counterparties.

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<sup>5</sup> A CCP can have the following sources to protect itself against a counterparty failure: the margins (cash or securities that the CCP requires clients to provide as collateral for their outstanding positions – the so-called first line of defence), the clearing fund (the general reserves provided to the CCP by its members – the second line of defence) and a variety of other financial resources. The margins set by the CCP enable it to act as a shock absorber, but they can have pro-cyclical effects as well.

## 4 Current trends in international liquidity and collateral

As was argued above, liquidity management is always a challenge for international banks. But the challenge for the coming years is even greater than normal as there are many new trends that are likely to have a profound impact on banks' international liquidity management. These trends are discussed in this chapter.

### 4.1 Fundamental changes in the money market

The financial crisis has radically affected the way of doing business on the money market. Before 2008 banks were willing to lend each other substantial amounts of money with little more than the track record of their counterparty as collateral. Once the crisis was under way, this blissful world of mutual trust started to show the first cracks. But what shattered it was the default of Lehman Brothers in September 2008. In one instant it became painfully clear that even banks of long standing could go bankrupt in just a short while (that is, even the big old 'trustworthy' institutions were not necessarily bailed out by their authorities). Moreover, it appeared that the consequences of such a large-scale default for other market participants could be tremendous. Hence, from that moment on, **banks became more risk averse**, especially when in doubt about their counterparties' health due to – for instance – opaque balance sheets. As a result, almost no one was prepared to lend out money anymore without receiving collateral and the unsecured money market virtually dried up. In order to alleviate the liquidity problems of banks and to help ease the tensions on the international money market, the Eurosystem quickly stepped in and took a number of conventional and unconventional measures to supply liquidity to banks.

Although the money market normalized somewhat between late 2008 and now, conditions are still not the same as before the crisis. In the last year the **generous liquidity provision** by the Eurosystem has gradually been scaled down. The expiry (and non-renewal) of the one-year Long-Term Refinancing Operations of the Eurosystem in 2010 reduced the amount of over-liquidity in the system. Since then volumes on the overnight **interbank market** have increased, implying that more banks can borrow overnight funds from other banks when necessary. However, until this very moment, there are still banks dependent on central bank intermediation and the deposit facility continues to be used intensively. Moreover, premiums for

**Figure 3a: Three month Euribor OIS spreads**



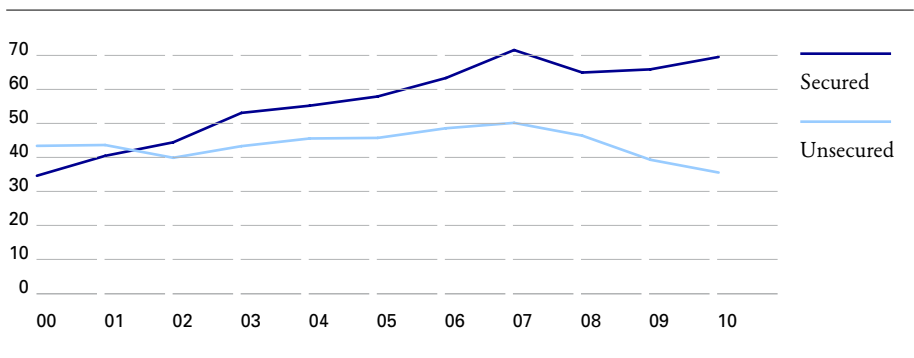
Source: European Banking Federation.

counterparty risk, as measured by the spread between the 3-month Euribor and the overnight indexed swap rate (OIS), seem to remain structurally higher than before the crisis (Figure 3a). On the positive side, premiums have come down significantly since late 2008.

While unsecured interbank activity remains subdued, the **secured interbank market or repo market** has grown, taking up part of the transactions that previously were done unsecured (Figure 3b). Unfortunately, however, the secured market is **also affected by the high level of risk aversion** and does not compensate fully for

**Figure 3b: Share of secured and unsecured lending in average daily turnover (share of swaps and other instruments not shown)**

Total aggregated average daily turnover volume in 2002 = 100



Source: European Central Bank, Euro Money Market Survey 2010.

Note: The total turnover includes unsecured lending and borrowing, secured lending and borrowing derivatives and short-term securities.

the unsecured market's decline. In particular, (i) only the higher-quality assets are accepted as collateral on the secured market, (ii) the market tends to concentrate in the short end (further intensifying a development that had already begun before the crisis) and (iii) secured market interest rates appear quite volatile. The sovereign crisis in the euro area (see below) narrowed the range of collateral accepted on the secured market even further, diminishing the private interbank market's attractiveness and sparking a new surge in deposits to the Eurosystem at the time.

An important question is how the money market will develop from now on. Many banks indicate that they do not expect unsecured lending to return to the levels prevailing before the crisis. This would imply a bigger potential role for the secured market, which will become visible once central bank intermediation is scaled down further.

What do these developments imply for banks' liquidity and collateral management? All in all, they indicate that the **demand for high-quality collateral on the private money market has increased**, that it will remain high if – as banks expect – unsecured lending does not pick up significantly, and that it may possibly increase further when the time is there to further reduce central bank intermediation.

#### 4.2 The sovereign crisis

In early 2010 financial markets became increasingly nervous about the rising government deficits and debt levels in some euro area countries (Greece, Ireland, Portugal and Spain). This escalated into a serious confidence crisis in the spring of 2010 and a new wave of financial market turbulence in the fall. As a result, financial market participants started **to price in the possibility of default of these EMU-sovereigns**, leading to higher bond yield spreads and higher risk premiums on credit default swaps of these countries as compared to, for instance, the Netherlands (Figures 4a and 4b). In response to the crisis, authorities took decisive and significant policy measures, both in May 2010 and more recently.

The **impact of the sovereign crisis** on banks' collateral and liquidity management is uncertain. It is also unclear how long this impact will last, as much will depend on the progress that the affected countries make with budgetary consolidation. The current euro area government bond market is characterized by **segmentation**. Although the exact situation varies from one country to another, for the countries mentioned above in general liquidity remains low (and spreads high), because the investors base (i.e. the amount of potential buyers) has shrunk and wants to sell (i.e. it is largely a one-sided market). By contrast, the government bond markets for the core euro area countries (e.g. Germany, France and the Netherlands) – are liquid and show low spreads. This **segmentation is also visible on the repo market**: government bonds from the first group of euro area countries require a higher interest rate premium.



Hence, from the perspective of banks' liquidity management, the immediate consequence of the sovereign crisis has been that it has **narrowed the range of assets that market participants accept as high-quality collateral**.

#### 4.3 The liquidity standards of the BCBS

In its Basel III framework, the Basel Committee on Banking Supervision introduces two new regulatory standards for liquidity risk (BCBS 2010c). The first is the **Liquidity Coverage Ratio (LCR)**, which states that institutions should have sufficient high-quality liquid resources to survive an acute stress scenario lasting 30 days. The purpose of this LCR is to promote the short-term resilience of the liquidity risk profile of institutions. In their feedback to an earlier proposal of the BCBS (see BCBS 2009), many financial institutions said they saw the logic of the LCR but found the ratio too severe. In 2010, therefore, the BCBS has carefully examined the feedback to its consultative paper and the outcome of a quantitative impact study of its proposals (BCBS 2010a). The result has been that the definition of high-quality liquid assets has been broadened and that the stress scenario has been made less severe.

As defined by the BCBS (2010c), there are **two categories of high-quality liquid assets**: level 1 and level 2 assets. The former are valued at market prices (and can be used without limit for the liquidity standards), whereas level 2 assets are subject to a haircut of at least 15% (and the total amount of level 2 assets cannot exceed 40% of the total stock of high-quality liquid assets). Level 1 assets are:

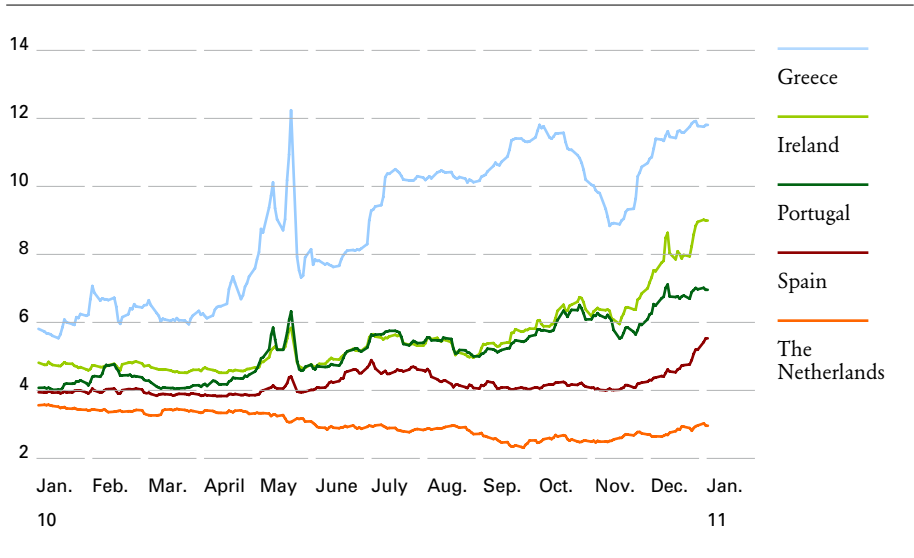
- (i) Cash;
- (ii) Central bank reserves, to the extent that these reserves can be drawn down in times of stress;
- (iii) Marketable securities representing claims on or claims guaranteed by sovereigns, central banks, non-central government public sector entities, the Bank for International Settlements, the International Monetary Fund, the European Commission, or multilateral development banks, if and only if they satisfy a set of conditions, of which a 0% risk weight is one (see BCBS 2010c, p.8);<sup>6</sup>
- (iv) Non-0% risk-weighted sovereigns, sovereign or central bank debt securities issued in domestic currencies by the sovereign or central bank in the country in which the liquidity risk is being taken or in the bank's home country; and
- (v) Non-0% risk-weighted sovereigns, domestic sovereign or central bank debt securities issued in foreign currencies, to the extent that holding of such debt matches the currency needs of the bank's operations in that jurisdiction.

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6 A 0% risk weight means that there are no capital requirements for the asset because the credit risk on this asset is deemed to be negligible.

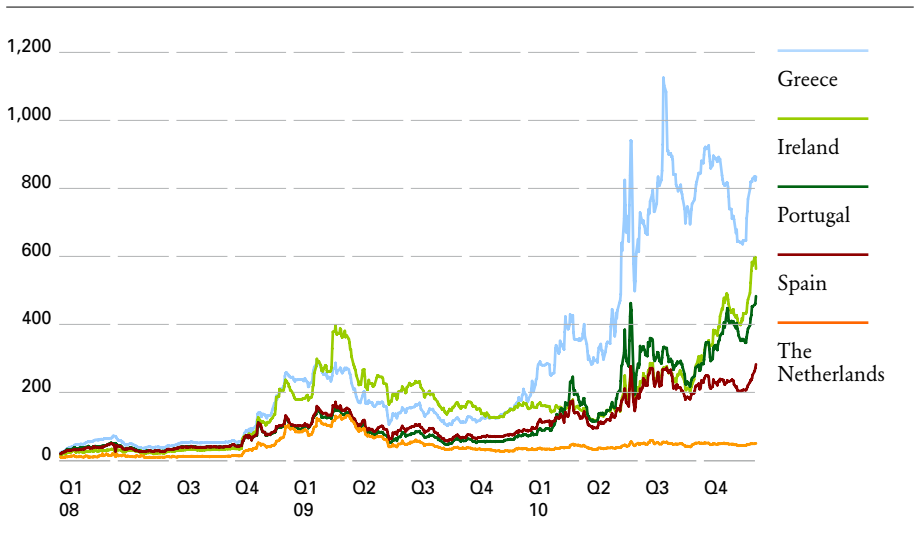
**Figure 4a** 10-year government bond yields

Percent



**Figure 4b** CDS spreads for EMU governments

In basis points



Source: Thomson Datastream.

Assets belonging to level 2 are:

- (i) Marketable securities representing claims on or claims guaranteed by sovereigns, central banks, non-central government public sector entities or multilateral development banks that meet certain criteria (BCBS 2010c, p. 9)
- (ii) Corporate and covered bonds, again subject to specific criteria (ibid, p. 9).<sup>7</sup>

The second standard is the **Net Stable Funding Ratio (NSFR)**. It establishes a minimum acceptable amount of stable funding based on the liquidity characteristics of an institution's assets and activities over a one-year horizon. It basically indicates that if liquidity is used up in activities with maturities that exceed the one-year horizon, then those activities should also be funded with means that are expected to be available for at least one year. The aim of the NSFR is to promote resilience over longer-term time horizons by stimulating banks to fund their activities with more stable sources of funding. Banks' main concern with the NSFR is that it will raise their cost of long-term lending, which could affect their business models and make non-regulated entities such as hedge funds more competitive in offering loans with longer maturities.

While some specific details of the LCR and NSFR are still being discussed, it is certain that banks will be required to hold **more liquid buffers** than they do now and to reduce the maturity mismatch on their balance sheet. The reason is that the standards were designed to 'hit' because only then will banks be induced to lower their liquidity risk. The latter is necessary to reduce the probability – as well as the potential impact – of future financial crises. Some banks indeed will have to adapt their **business models**. For example, banks that fund their long-term corporate lending with short interbank lending or other short deposits, will need to find different sources of funding to reduce the maturity mismatch. On the other hand, traditional retail banks that fund retail lending with retail deposits, will not have much to fear from the NSFR. The ratios will also raise banks' funding costs as they will need to replace short and relatively cheap funding with more costly long-term funding.

The implementation of the LCR and the NSFR will not only affect banks' liquidity management directly, but also indirectly through the ratios' impact on financial markets and the wider economy. On the **financial markets** one can expect **further segmentation** for two reasons. First, there will be an increase in demand for the assets that qualify as LCR buffers (and less demand for other assets). Second, banks will become less eager to borrow (and more eager to lend) for a period less than 30 days (as the loan will then have to be paid back within the LCR period, which is a disadvantage for the borrower and an advantage for the lender). The result will be

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<sup>7</sup> A covered bond is a bond backed by mortgages or cash flows from other debt. If the bond issuer goes bankrupt, the holder of the bond can lay a claim on the underlying assets.

the introduction of a so-called maturity threshold at the 30-day point. Similarly, there will be **maturity threshold** at the one-year point, as borrowing for more than a year helps to meet the NSFR (while lending for more than one year will be disadvantageous from an NSFR perspective). This segmentation will cause price effects: **yield spreads for less liquid assets are likely to widen and money market yield curves are expected to become steeper.**

Moreover, there is a **likely effect on secured or repo markets.** Short-term repo market transactions against assets that count as 100% in the LCR buffer, should be completely LCR-neutral for both the cash taker and the cash provider. Assets that are eligible in the LCR buffer at a haircut – and especially assets that are not eligible for LCR buffers – will become less attractive as collateral for loans from the lender’s perspective. This may further reduce the range of assets that are accepted as collateral on the secured interbank market. As a result, banks that do not have sufficient LCR-eligible assets may find it harder to raise funding on the secured interbank market.

Finally, there are **long-term economic benefits** from the adoption of liquidity standards (as well as from the increase in minimum capital requirements) as this will raise the safety and soundness of the global banking system (BCBS 2010b). Both the probability of a financial crisis and the output losses associated with such a crisis will be lower. The benefits of this substantially exceed the potential output costs for a range of higher capital and liquidity requirements. However, during the transition to stronger capital and liquidity standards there is likely to be a modest negative effect on aggregate output (Macroeconomic Assessment Group 2010).

So to conclude, when the LCR and the NSFR are in place (by 2015 and 2018 respectively), this is likely to **impact banks’ liquidity management directly but also indirectly through the money and repo markets, the private sector’s acceptance of collateral and the wider economy.** The Basel Committee on Banking Supervision has announced that the observation period for the liquidity ratios (until 2015 and 2018) will be used to ensure that the design and calibration of the liquidity ratios is right and that there are no unintended consequences, at either the banking sector level or the broader system level.

#### 4.4 A greater role for central counterparties (CCPs)

Given the good crisis performance of financial market infrastructures in general – and the stabilizing role of CCPs in particular – policy-makers have suggested that financial market infrastructures such as CCPs should assume a greater role in the international financial system if bilateral arrangements entail risks. Authorities are already taking steps to make the over-the-counter (OTC) derivatives market, which was plagued by many problems before and during the crisis, more secure

and transparent by mandating **CCP-clearing for the standard OTC derivatives contracts** (and by having all OTC derivatives contracts recorded in trade repositories). To introduce positive incentives for CCP clearing, authorities consider increasing the capital requirements on bilateral positions that remain outside the CCP clearing.

One reason why CCPs are considered safe is that they tend to make higher and more frequent margin calls than counterparties in bilateral arrangements. However, CCPs do not require margins for all the different transactions of a bank but only for its net position. Depending on a bank's derivatives transactions (one-sided transactions with less netting possibilities or contrary transactions amenable to netting), the bank may need more or less collateral for OTC derivatives trade if CCP clearing is to become common practice for standard contracts. Most banks, however, expect that only the large dealer banks in OTC derivatives will be able to benefit from the netting effect of CCPs and that all the others will have to put forward **more collateral for OTC derivatives trade**.

#### 4.5 Impact of trends on banks' collateral and liquidity management

As has been shown in this chapter, banks need to be prepared for significant changes in their international liquidity and collateral management. Already they need more high-quality collateral than in the past to attract funding on the private money markets. Moreover, partially as a result of the recent sovereign crisis, counterparties have become 'pickier' about what they consider to be acceptable collateral. Finally, the liquidity standards of the BCBS and authorities' initiatives to promote CCP-clearing for standard OTC derivatives are likely to cause a further increase in banks' demand for better quality assets in the coming years. There will be a direct impact on demand as banks need LCR-eligible assets to comply with the LCR, but also an indirect effect as borrowing against LCR-eligible assets will become easier (or cheaper) than borrowing against less liquid assets. Hence, LCR assets will become more usable as collateral. This will lead to segmented repo markets. The maturity thresholds will bring additional segmentation. Banks will have to cope with these new realities

Against this background, many banks fear that there will be a **scarcity of good quality collateral** in the near future. Whether this fear is justified is uncertain and needs further research. If the higher demand for collateral is accompanied by an increase in the amount of assets that are considered acceptable collateral, such shortages will not occur. The fact that many governments now run high budget deficits (and need to refinance high debt levels in the future), guarantees the issuance of new government bonds (though not all of these are considered good collateral by the market). Moreover, data for the Eurosystem suggest that there is an increase in the amount of collateral, also in the higher quality range (see further

Section 6.2). As of yet there are also no signs of collateral shortages for the euro area banking sector as a whole. However, whether the increases in supply will be sufficient to cope with future increases in collateral demand, is still uncertain and requires a thorough quantitative analysis. Related to this is the question whether banks will have enough collateral to borrow on the secured market, especially since this market is already characterized by higher risk aversion and is likely to become more segmented as a result of the liquidity standards.

Summarizing, the following trends are important for the future collateral and liquidity management of banks:

- The demand for good quality collateral has increased on account of the crisis and is likely to remain high.
- The range of assets that are considered to be of high-quality has narrowed, also owing to the sovereign crisis.
- The liquidity standards of the BCBS and initiatives to promote CCP clearing for standard OTC derivatives are likely to further spur banks' demand for high-quality assets.
- Given the increase in demand expected, many banks fear that collateral will become scarce. However, since the amount of available collateral is increasing too (at least within the euro area), more research is needed to assess whether collateral scarcity is to be expected.
- The secured market is already showing signs of higher risk aversion and has become more segmented. Further segmentation can be expected, as the liquidity standards will induce banks to demand more 'liquid' assets at the expense of 'non-liquid' assets and will also create maturity thresholds at the 30-days and 1-year point. Whether this expected segmentation will make it difficult for banks to raise enough funding on the interbank market needs further examination.



## 5 Arrangements for cross-border transfers

### 5.1 Introduction

As was discussed above, an international bank may encounter two types of liquidity mismatches: a cash mismatch (abundant cash in one currency, too little cash in another) or a securities mismatch (the bank has enough securities but they are located in the ‘wrong’ country). A bank can easily correct such liquidity mismatches in normal situations, but possibly not in crisis situations.

If there are no doubts about a bank’s solvency and the quality of its worldwide collateral, the **home central bank and the foreign central bank have a common interest** in fast and reliable arrangements to make sure that the bank concerned is able to resolve its liquidity mismatches. The central bank of the country where the liquidity shortage occurs has an interest in avoiding the negative repercussions of the liquidity shortage on consumers, businesses or market participants within its jurisdiction. The central bank of the other country will try to avoid a loss of reputation to the multinational bank, as this could lead to contagion and affect the bank’s activities at home.

This chapter gives an overview of infrastructural arrangements for the cross-border transfer of cash and securities. It starts by presenting *the theoretical possibilities* for transferring cash (Section 5.2) and securities (Section 5.3) from one country to another. Then it discusses the arrangements that are currently *available* (or planned for the near future) for transfers within the Eurosystem (Section 5.4) and for transfers between the Eurosystem and other currency areas (Section 5.5). A synopsis is given in Section 5.6. Chapter 6 gives a short *assessment* of these different arrangements from the perspective of a central banker, while Chapter 7 presents a view on the arrangements or infrastructural change that seem *desirable* given the current trends in international collateral and liquidity.

### 5.2 Addressing a cash mismatch – possible arrangements

Cash mismatches could possibly be corrected in multi-country or multi-currency payment systems. If such systems were available, banks could use a liquidity surplus in one country or currency to correct for a shortage in another country or currency.

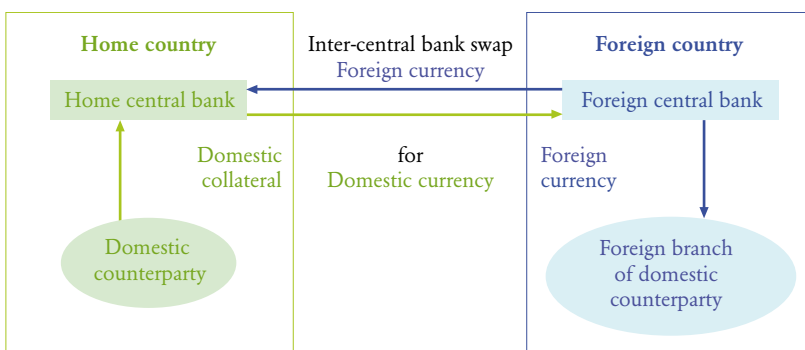


There are some payment systems with multi-country (TARGET2) or multi-currency (Continuous Linked Settlement or CLS) features. However, as will be discussed in detail below, these systems have a limited scope in practice and cannot resolve all the cash mismatches of euro area banks.

In the absence of ‘complete’ multi-country or multi-currency systems, banks usually rely on their private networks if they need a foreign currency loan or wish to swap currencies. As was discussed above, this tends to work very well in normal circumstances. However, in times of stress, the bank may find that its foreign-currency lifeline to its foreign correspondent is no longer there and that private swap markets dry up, so that it may be unable to resolve its cash mismatch swiftly.

As the domestic and foreign central banks have a common interest in containing the repercussions the cash mismatch may have for their own economy, central bank arrangements for emergency cash transfers could be considered. Consider a domestic counterparty that is in urgent need of foreign currency funds. There are two ways the two central banks can help to remedy this situation. The first is that they establish **inter-central bank swap lines** in case of international liquidity stress (Figure 5). If the domestic counterparty has sufficient domestic cash or eligible domestic securities to serve as collateral (i.e. there is a liquidity mismatch, not an overall liquidity problem), the domestic central bank could – if there is a swap agreement with the foreign central bank – obtain a foreign currency loan from the foreign central bank (i.e. a debit on its account), which it lends on to the domestic counterparty. As a collateral on its loan, the foreign central bank receives a credit on its account with the home central bank (in the home currency). When at a predefined date the domestic counterparty pays back its foreign currency loan plus the interest rate, the reverse transaction takes place: the home central bank’s account

**Figure 5 Inter-central bank swap**



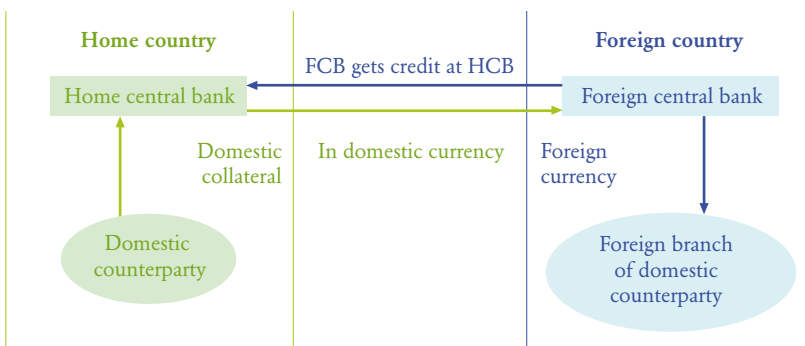
at the foreign central bank is credited again (i.e. the loan is repaid) while the foreign central bank's account at the home central bank is debited. The home central bank also pays the agreed interest rate to the foreign central bank. Such swap agreements were used during the recent crisis (see Section 5.5).

In the example above it is the home central bank that lends the foreign-currency liquidity to the domestic counterparty. In the second arrangement it is the foreign central bank that directly supplies foreign currency to a local branch of the domestic counterparty on the basis of **collateral in the form of the other country's cash** (which it receives as a credit on its account with the home central bank). As in Figure 5, Figure 6 presents the case of a domestic counterparty that has enough collateral at the home central bank but that is short of foreign currency liquidity. Taking the collateral that is needed from the domestic counterparty, the home central bank credits the account of the foreign central bank. The latter then – after possibly applying some haircut – credits the account of the counterparty's foreign branch. Liquidity arrangements of this type are already available in some specific cases (see Section 5.5).

### 5.3 Addressing a securities mismatch – possible arrangements

Like cash mismatches, securities mismatches can usually be corrected easily if securities markets function normally. Banks can then acquire the securities they need for borrowing from their central bank. During a crisis the selling of foreign assets (to obtain domestic securities eligible at the central bank) may not be possible (or only at an unfavourable price). Moreover, during a crisis the bank's need for central bank credit may be higher than normally, so that its normal domestic collateral pool may be insufficient. In such cases it would be very helpful for the

**Figure 6 Providing foreign liquidity on the basis of domestic cash**



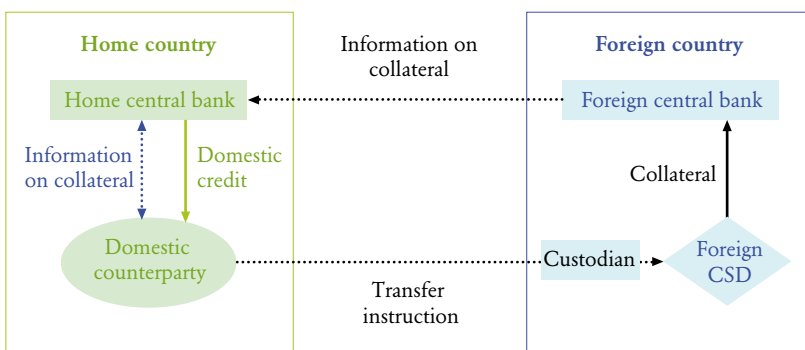
bank if it could use some of its foreign assets to obtain liquidity from its home central bank. However, the acceptance of foreign collateral poses risks to a central bank. Hence, the pros and cons of accepting foreign collateral should be carefully weighed. This will be discussed in Section 6.1.

The current section focuses on the different operational arrangements that are possible if a central bank has decided that it will accept foreign securities collateral. There are five possible models: (i) a correspondent central banking model (CCBM), (ii) a guarantee model, (iii) links between securities settlement systems, (iv) remote access to securities settlement systems and (v) a collateral management system. Each model is briefly illustrated below. For a more detailed discussion see CPSS (2006).

In each of the following figures the same case is presented, namely that of a domestic counterparty that urgently needs liquidity from its home central bank. The difficulty is that the counterparty does not have sufficient domestic securities to serve as collateral, but it does have foreign securities at the foreign central securities depository (CSD). So the basic question is how the foreign securities are to be transferred into a securities account of the home central bank.

In the **correspondent central banking model** the foreign central bank acts as a correspondent or custodian for the home central bank. The process starts with the domestic counterparty giving a transfer instruction to the foreign securities settlement system (SSS), which is usually operated by the CSD. If the counterparty is not a settlement member, it needs the services of a foreign custodian to organize the transfer. The next step takes place within the foreign SSS: the securities are

**Figure 7 Correspondent central banking model (CCBM)  
Guarantee model technically similar to CCBM**



booked from the counterparty's (or custodian's) account into the account of the foreign central bank. The latter then informs the domestic central bank that it has received the securities on its behalf, so that the home central bank is assured it has collateral to cover a domestic currency loan (see Figure 7 for a simple representation). The CCBM of the Eurosystem is based on this theoretical model but has its own specificities (see further Section 5.4 for operational arrangements in practice).

The **guarantee model** is technically very similar to the correspondent central banking model (see Chapter 6 for a further comparison) and therefore not displayed separately. The main difference is that the home central bank does not receive (information on) foreign collateral, but it receives an inter-central bank guarantee.

The correspondent central banking model and the guarantee model require active involvement of the foreign central bank in cross-border transfers. There are some clear advantages to this, as will be discussed in Section 6.1. However, the home central bank can also accept foreign securities without an active role of the foreign central bank. **Links between securities settlement systems** are one way of arranging a cross-border transfer of securities without another central bank's involvement. The counterparty would then instruct that its securities in the foreign CSD are transferred to the domestic CSD's account at the foreign CSD and the domestic CSD credits the home central bank's accounts (Figure 8).

A home central bank can also receive foreign securities from a domestic counterparty if both entities have **remote access** to a foreign SSS (Figure 9). The counterparty then sends its transfer instruction directly to the foreign SSS or CSD, which transfers the securities to the home central bank's account. The last possible operational

**Figure 8 Links between securities settlement systems**

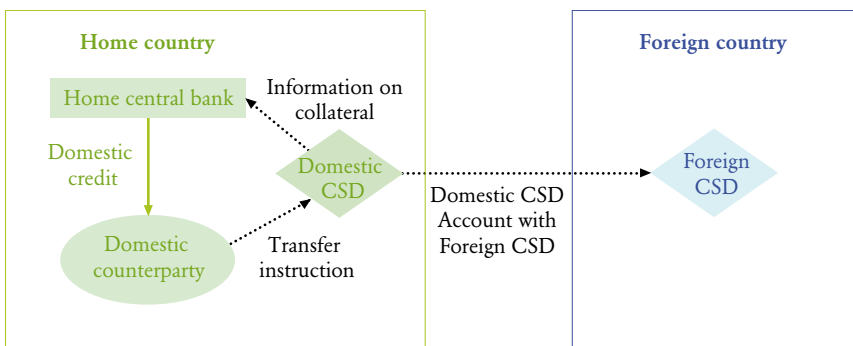
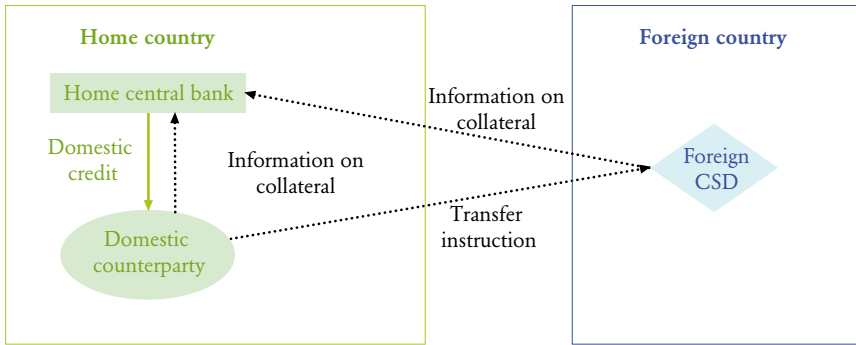


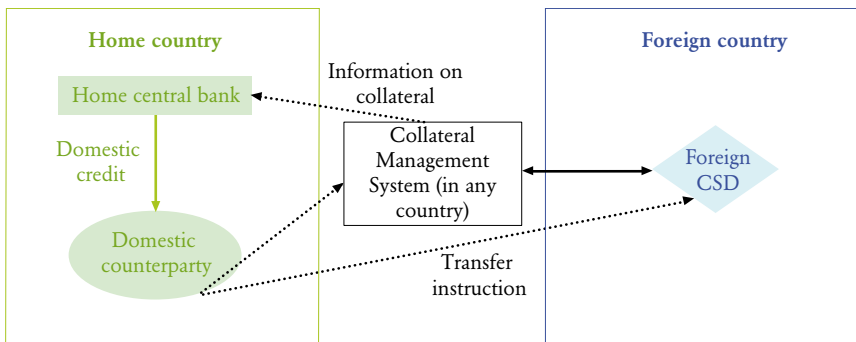
Figure 9 Remote access



arrangement is one where the home central bank and its counterparties are connected to a **Collateral Management System (CMS)**. A CMS is a system that manages collateral transfers between collateral demanders and collateral suppliers. It can have different forms: it can be a collateral pooling system operated by a central bank. If more than one central bank accesses the CMS, it becomes a global collateral pool. But a CMS can also be a triparty collateral service operated by an SSS or (I)CSD (see CPSS 2006). A CMS does not have to be located in the home country or the country where the foreign assets are located, but could be located anywhere.

Figure 10 illustrates how a CMS would work. If both the home central bank and the domestic counterparty are connected to a CMS, the counterparty instructs the foreign CSD to book the securities to the CMS. The latter transfers these to the account of the home central bank.

Figure 10 Collateral management system (CMS)



#### 5.4 Cross-border arrangements within the Eurosystem

Within the euro area it is easy to transfer cash from one euro area country to another or to use collateral in another euro area country. Quick transfers of cash within the euro area are possible through the Eurosystem's *real time gross settlement* (RTGS) system **TARGET2** as well as through EURO 1, a multilateral large-value payment system for euro payments that was set up by the Euro Banking Association.

The national central banks (NCBs) of the Eurosystem have a **Single List of eligible collateral**, permitting banks all over the euro area to use the same assets to obtain monetary credit through the Eurosystem's open market operations or intraday credit for payment purposes. Compared to the collateral lists of the Fed and the Bank of England, the Eurosystem accepts a broad range of collateral in its main open market operations and also allows a broad range of banks to participate (see ECB 2009). The Eurosystem's **Correspondent central banking Model (CCBM)** ensures that collateral pledged to one euro area NCB can also be used to obtain liquidity from another NCB (see Figure 7 for a schematic illustration of a CCBM). In the current CCBM the Eurosystem's NCBs have their own collateral management systems, implying that there are different procedures for domestic and cross-border use of collateral. CCBM2, which is currently being built, will be a single collateral management system with harmonized procedures (see below).

At the end of 2010 cross-border collateral represented 35% of the total collateral provided to the Eurosystem (ECB 2011, p. 107). CCBM is the main channel for transferring cross-border collateral in Eurosystem monetary policy and intraday credit operations (accounting for 24.1% of total collateral provided to the Eurosystem), but **links between securities settlement system (SSSs)** also play a significant role (5.0% of total collateral). Both direct links (links between two SSS) and so-called relayed links (links between two SSS, via at least one other SSS) are possible, but they must comply with user standards before they are deemed eligible by the Eurosystem. **Remote access** within the Eurosystem is not allowed, with the exception of a few clearly-defined special cases where there no longer is an SSS within the country's jurisdiction.<sup>8</sup> Finally, within the Eurosystem there are three (I)CSDs offering **triparty collateral management services**: Euroclear, Clearstream Banking

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<sup>8</sup> The central bank of Ireland has remote access to Euroclear (as the Irish securities settlement system ceased operations some time ago). Moreover, in 2008 the Governing Council authorized the National Bank of Belgium, the Banque de France and De Nederlandsche Bank to open a direct account with CSDs of the Euroclear Group outside their own jurisdiction in response to Euroclear's establishment of a common settlement platform ESES (Euroclear Settlement of Euronext-zone Securities).

Luxembourg and Clearstream Banking Frankfurt.<sup>9</sup> However, the collateral received in these triparty systems cannot be used to obtain credit from a central bank in another euro area country, which is due to the so-called repatriation requirement.<sup>10</sup> This repatriation requirement will be lifted when CCBM2 is operational (see below).

Within a few years time, the possibilities to transfer liquidity or collateral across the euro area will be greatly enhanced. **CCBM2** (where the acronym now stands for Collateral Central Bank Management) is currently being built by De Nederlandsche Bank (DNB) and the National Bank of Belgium. CCBM2 provides a common platform for managing collateral kept by financial institutions with the central banks of the Eurosystem. One major benefit of this system is that it harmonizes procedures for the domestic and cross-border use of collateral. These harmonized procedures will yield efficiency gains for commercial banks and make it simpler to use collateral located in one euro country for a credit facility in another euro country. In September 2010 the Eurosystem reached agreement on the functionality of CCBM2 and on its the terms and conditions as well as on the key milestones of the project plan and its respective deliverables. The system will become operational in 2013 and will be used by all NCBs.

Moreover, the Eurosystem is also in the process of constructing a common system for securities settlement, which is named **TARGET2Securities or T2S**. Compared to the current situation where a multitude of euro area CSDs is involved in securities settlement, T2S will create one central platform for securities settlement. This will be beneficial for internationally active banks as it will reduce settlement times for cross-border securities transactions and make this settlement more efficient. Moreover, the auto-collateralization feature of T2S will help banks to optimize their liquidity management.<sup>11</sup> T2S is expected to go live in 2014.

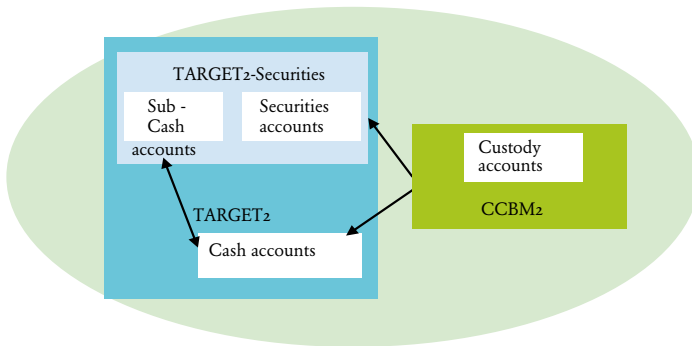
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9 According to the glossary of the ECB, a CSD is an entity that: 1) enables securities transactions to be processed and settled by book entry; 2) provides custodial services (e.g. the administration of corporate actions and redemptions); and 3) plays an active role in ensuring the integrity of securities issues. Securities can be held in a physical (but immobilized) form or in a dematerialized form (whereby they exist only as electronic records). An ICSD is a CSD which was originally set up to settle Eurobond trades and is now active also in the settlement of internationally traded securities from various domestic markets, typically across currency areas. At present, there are two ICSDs located in EU countries: Clearstream Banking in Luxembourg and Euroclear Bank in Belgium.

10 According to the current rules of the Eurosystem, national central banks can either receive their collateral through their local (I)CSD or through another national central bank. In the latter case, however, it must be collateral from the respective country (the repatriation requirement), whereas in the former case the central bank cannot only receive the collateral from its own CSD but also from other CSDs that have links with this local CSD. This means that, for example, the Bundesbank can receive via Clearstream Banking Frankfurt (CBF) collateral from all over the euro area, because CBF has CSD-links with nearly all other CSDs, either through direct links or through so-called relayed links via Clearstream Banking Luxembourg (CBL).

11 Auto-collateralization is an automated intraday credit operation in central bank money. When cash is insufficient on the buyer's side (or below a threshold defined by the buyer) it is triggered in order to facilitate the settlement of securities-related transactions in T2S.

**Figure 11** The ‘magical triangle of liquidity’ (source: ECB)



When first CCBM<sub>2</sub> and subsequently T2S have gone live and function next to TARGET<sub>2</sub>, the Eurosystem will have a single platform for settlement in central bank money plus an integrated liquidity pool and single Eurosystem collateral pool, as well as single processes for the mobilization of liquidity and collateral (Figure 11). The three systems together will greatly facilitate cross-border payments and securities transactions within the euro area and make these transactions more efficient, so that liquidity mismatches can be resolved promptly within the euro area. While this is a major achievement, many other major currency areas already have integrated systems. Nonetheless, other countries or currency areas may like to review the adequacy of their current financial market infrastructures, and in particular their liquidity efficiency, in the light of recent trends in collateral and liquidity management (see further Chapter 7).

After 2014 the Eurosystem infrastructure is likely to develop further, depending on the needs at that moment. At the moment banks are happy with the existing features of TARGET<sub>2</sub> and see no need for change. If T2S becomes a success, this could trigger further consolidation in the euro area's securities markets. This may be conducive to further infrastructural developments in the Eurosystem. Finally, further harmonization in collateral management may prove to be desirable in the longer run.

Further efficiency gains seem possible for banks' cross-border securities transactions within Europe. Here there still seems to be scope for improvement due to the **plethora of different institutions involved** (trading platforms, CSDs, CCPs etc.) and to their different operational peculiarities (e.g. cut-off times). While the nature of the securities business, with different institutions playing their own distinguishable role in the trading-clearing-settlement chain, explains part of the



fragmentation, it also indicates that euro area securities markets are not yet well integrated. The adoption of the **Markets in Financial Instruments Directive (Mifid)** in November 2007 (which allowed for alternative trading platforms alongside the official exchanges) and the Code of Conduct (which was signed in November 2006 by 60 EU exchanges, CCPs and CSDs) are EU initiatives to improve on the fairness, transparency, efficiency and integration of European securities markets. These initiatives have had significant positive effects so far. Competition has increased due to the emergence of new multilateral trading facilities and CCPs, which led to lower trading and clearing fees. However, the negative side effect has been increased fragmentation and complexity. Many market participants and many authorities, however, expect that this is only a temporary effect and foresee further consolidation in the securities market. T2S may also create a further momentum towards consolidation (see above).

### 5.5 Cross-currency area arrangements of the Eurosystem

Cross-border payments and securities transactions with a payer/payee or securities buyer/seller outside the euro area are more complicated, as most financial market infrastructures operate within a single currency area. In practice only a couple of big global banks are directly connected to the world's major payments and settlement systems, while most internationally active banks rely on correspondent banks abroad to make payments in foreign currency on their behalf or to get loans when they are short of foreign currency cash. As securities transactions are especially complex, most international banks engage custodians to handle their foreign securities transactions.

**Continuous Linked Settlement or CLS** is the only true worldwide payment system but it is there for a specific purpose, namely to eliminate settlement risk from foreign exchange transactions. In bilateral foreign exchange swap arrangements payments are uncoordinated, partly because of time zone differences, which leads to settlement or Herstatt risk. CLS offers a system to settle foreign exchange transactions on a *payment-versus-payment* (PvP) basis. It is specifically designed for such two-sided transactions (i.e. not for a one-sided transaction where one party makes a payment to another).<sup>12</sup> At the moment 17 major foreign currencies can be settled in CLS. CLS was of great value during the recent financial crisis as many

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<sup>12</sup> The exception is that the cash payments related to the OTC credit derivatives are also largely settled through CLS, which involves just one payment leg. CLS provides an automated settlement service for payments related to contracts that are confirmed electronically in the Trade Information Warehouse (TIW) of the Depository Trust & Clearing Corporation (DTCC). This activity, which is a non-PvP transaction, falls under the Eurosystem's location policy and is only permitted if activity in euro remains below a threshold (€5 billion or 0.2% of the total daily average value of payment transactions processed by euro area interbank funds transfer systems which finally settle in central bank money, whichever is the highest amount, see ECB 2007).

European banks used CLS to obtain the dollar liquidity they needed desperately without counterparties being exposed to settlement or Herstatt risk.

CLS provides **a safe settling method but it does not resolve cash mismatches**. As CLS is only a settlement trading platform, banks still need to find counterparties willing to sell the foreign currency they need. In case of market turbulence this may be difficult. Moreover, CLS is only useful for settling *predictable* liquidity mismatches because of the settlement cycle's characteristics. For example, best practice is that banks submit their payment instructions before 0:00h Central European Time (and 06:30h is the absolute deadline) to receive the currency demanded in the course of the morning. Hence, CLS is not useful for correcting liquidity mismatches that occur intraday. Finally, not all banks have access to CLS.<sup>13</sup>

In December 2007 and early 2008 many central banks made **inter-central bank swap agreements** to facilitate the international distribution of liquidity. The idea behind this agreement was that the crisis might hinder commercial banks in obtaining foreign currency liquidity as needed. The ECB entered into swap agreements with the Federal Reserve and the Swiss National Bank to facilitate the distribution of dollar and Swiss franc liquidity to euro area banks. The ECB also provided euro liquidity to some European central banks outside the euro area. The swap agreements were used intensively, especially in the months after the default of Lehman Brothers.

Finally, central banks can have **emergency liquidity arrangements on the basis of cash collateral** with central banks outside the euro area. De Nederlandsche Bank (DNB), for instance, has such agreements with the Hong Kong Monetary Authority (HKMA) and the Monetary Authority of Singapore (MAS). The arrangements entail that a Dutch bank with sufficient collateral pledged to DNB, could – subject to prior agreement of HKMA or MAS and after applying a haircut – obtain liquidity in Hong Kong or Singapore dollars from HKMA or MAS. In return, the latter would receive a credit from DNB on its euro account in TARGET2. The arrangements are reciprocal so that – subject to prior agreement of both DNB and the ECB – Hong Kong or Singapore banks could ask for emergency liquidity in euro on the basis of collateral pledged to HKMA or MAS.

As for payments, there is no complete worldwide settlement system for securities. However, there are a couple of central securities depositories (CSDs) that offer

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<sup>13</sup> The costs of settlement membership in CLS are substantial, so that it is only cost efficient for banks with high volumes of foreign exchange transactions. Smaller international banks can choose to participate in CLS as a third party member. However, this option is not entirely risk free, as these banks now become exposed to intraday credit risk on the settlement member (as the settlement member usually gets paid before the foreign exchange transaction has been settled through CLS). Moreover, banks may be reluctant to disclose details about their foreign exchange transactions to another commercial bank.

settlement activities across currency areas. The **international CSDs** (ICSDs) – Euroclear Bank and Clearstream Banking Luxembourg in the European Union – were originally set up in the 1970s to manage the clearing and settlement of Eurobonds, for which there was no supporting market infrastructure. Since then the activities of these ICSDs have broadened to include settlement of internationally traded securities and various domestic securities from different national markets, usually through direct or indirect (through local agents) links to local CSDs. The Swiss CSD (SIX SIS) and the American CSD (the Depository Trust Company), although not called ICSDs, also hold foreign securities and are able to provide cross-currency area settlement.

While cross-border collateral represented 35% of the total collateral provided to the Eurosystem (ECB 2011, p. 107), this only refers to collateral issued and located within the euro area. **The Eurosystem does not accept non-euro area securities** on a regular basis. As part of the crisis measures, however, the Eurosystem temporarily (from late 2008 until the end of 2010) accepted certain marketable assets issued in the euro area but denominated in US dollars, UK sterling or Japanese yen. Moreover, as of early 2009 the Governing Council may in certain contingencies decide to accept as eligible collateral certain marketable debt instruments issued by one or more non-euro area G-10 central governments in their domestic currency.

**Outside the euro area**, there are some central banks (i.e. those of the United States for the Standing Facility, the United Kingdom, Sweden and Switzerland) that **accept foreign collateral** routinely.<sup>14</sup> For this purpose some of these countries have implemented remote access to support the cross-border use of collateral, sometimes combined with links.<sup>15</sup> However, while the Eurosystem provides credit to banks that meet the prevailing conditions, banks' access to central bank credit operations in the US and England is more limited (see ECB 2009).

**Outside the euro area**, there is also a **practical example of a cross-border cash pool**: the Scandinavian Cash Pool (SCP), operated by Denmark, Sweden and Norway. In the SCP, liquid assets held at the central bank of one of these three countries (i.e. cash collateral) may be used to obtain intraday credit from the central bank of one of the other two. The SCP was set up when the Scandinavian currencies began to participate in CLS, and Scandinavian banks suddenly needed much more intraday liquidity. In practice, the SCP is mostly used by banks active in several Scandinavian countries to enlarge liquidity in Norway and Sweden on the basis of their Danish securities.

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<sup>14</sup> In the case of the UK, Sweden and Switzerland, the acceptance of foreign collateral may be explained by the relatively limited supply of suitable domestic collateral (see CPSS 2006).

<sup>15</sup> The Bank of England has accounts at Euroclear Bank plus Clearstream Banking Luxembourg, the Federal Reserve has accounts at Euroclear Bank plus Clearstream Banking Luxembourg and the Riksbank has accounts at Euroclear Bank (CPSS 2008).

## 5.6 Banks' suggestions for better post-crisis cross-border solutions

In the course of 2010 De Nederlandsche Bank (DNB) organized **several discussion sessions with commercial banks** to discuss the trends in international liquidity and collateral as well as current infrastructural arrangements. DNB organized a liquidity seminar for Dutch banks in March, a liquidity seminar for 20 European banks in July (organized jointly with the Royal Bank of Scotland) and DNB gave an interactive presentation at SIBOS in October. On these occasions banks expressed their views on current trends and infrastructures. Banks recognized the trends described in Chapter 4 above, adding that they did not expect a return of 'the good old days' on the money market. Some banks expressed the fear that collateral may become scarce.

With respect to cross-border infrastructural arrangements, banks remarked that:

- **Triparty collateral services** by CSDs or SSS are attractive, especially if central banks are connected;
- **Settlement times** should be reduced, also within Europe;
- **Emergency liquidity arrangements** are valuable solutions for potential cross-currency area liquidity mismatches;
- A **global single list of eligible collateral** and more harmonized operational/legal collateral procedures (the latter also within the Eurosystem) would be helpful;
- While CCBM2 will be an important step forwards for European banks, a big leap forwards would be a **global collateral pool**, to which the major central banks worldwide would be connected.

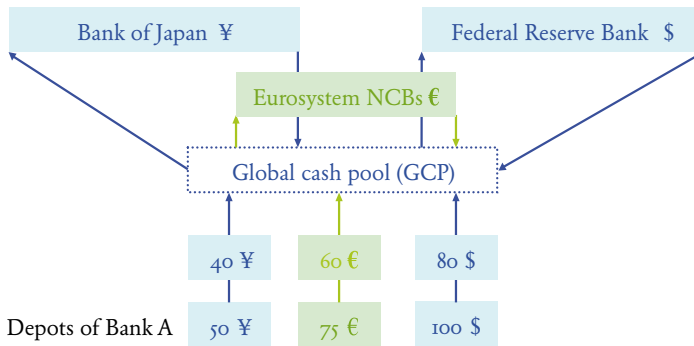
The idea of the global collateral pool was further developed during the discussion seminars. As cash can be transferred much faster than securities and is easier to handle due to legal and operational complications associated with foreign securities collateral (see Section 6.1), banks suggested to construct a **global cash pool (GCP)**. This GCP would 'travel with the sun', implying that all participating national central banks (NCBs) could draw from the GCP during their own business hours. At close of their business the collateral would again be unencumbered and become available in the GCP for NCBs in the subsequent time zone. The proposal was to construct a GCP for emergency situations only to start with, with the possibility to make it a regular facility at a later stage.<sup>16</sup> A simplified illustration is given in Figure 12.

Participating NCBs would determine the value of their own local collateral (i.e. apply appropriate haircuts) and accept the values established by other NCBs for

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<sup>16</sup> In the more distant future such a GCP could possibly serve other useful roles as well. For example, European banks that don't have access to the credit facilities of the Fed, could possibly use it to transfer collateral to their US correspondent, which in return could grant them intraday credit for US payments. Such agreements could be to the mutual benefit of the Fed and the Eurosystem

Figure 12 A global cash pool (GCP)



non-local collateral. However, to avoid collateral arbitrage it would help if NCBs had common valuation rules and comparable risk management. Moreover, every NCB would have the discretion to determine how much of the local collateral pool would be made available for use by other NCBs, so that the risk is low that entire local pools are 'eaten up' in other time zones. The construction of such a GCP could be relatively simple: it would not have to be a worldwide collateral system, but could perhaps just be an extra layer added to local systems.

Similar **recommendations were made by the Payments Risk Committee** in 2003, which had commissioned a task force – consisting of representatives from 13 multinational banks – to study the market's need for improved cross-border intraday liquidity management services. More specifically, it was recommended (see Payments Risk Committee 2003) that the central banks of G-10 countries should

1. extend in the immediate term their range of eligible foreign (cross-border) collateral for intraday RTGS liquidity to include a range of high-grade sovereign debt from each of the G-10 countries. To achieve this operationally, the Committee favoured a triparty model, where custody of G-10 sovereign debt and collateral management would be outsourced to an ICSD or a national CSD with links to an ICSD.
2. determine over time whether it is necessary to further extend their range of eligible foreign-denominated collateral for RTGS intraday liquidity to beyond that of G-10 sovereign debt.
3. in cooperation, where appropriate, choose the most effective steps to foster satisfactory private sector action in the area of enhancing global payment liquidity.

## 5.7 Synopsis of current cross-border arrangements

So far, this paper discussed the following issues related to the role of infrastructural arrangements and central bank agreements in liquidity mismatches;

- Sound infrastructural arrangements and/or central bank agreements are necessary for cross-border transactions in cash and securities and are therefore indispensable for banks' international liquidity management. During a crisis, these play a more prominent role as international banks can no longer rely on their private networks of correspondents and custodians to resolve their cash and securities mismatches. Then a 'safety net' of emergency arrangements may be necessary to prevent liquidity mismatches developing into overall liquidity or even solvency problems;
- Central banks have **two options to help resolve banks' cash mismatches**: (i) by establishing inter-central bank swap agreements or (ii) by accepting foreign cash as collateral under liquidity arrangements.
- **In practice cash mismatches** are not an issue within the Eurosystem as the euro is the common currency and cross-border payments can be made in TARGET2 or EURO1. To resolve cash mismatches between the Eurosystem and other arrangements, CLS is valuable for eliminating counterparties' settlement risks. However, CLS cannot solve market-based liquidity shortages nor does it offer an adequate solution for unexpected and urgent liquidity shortages. Hence, during the crisis central bank support was necessary. Central banks established mutual swap agreements and designed new emergency liquidity arrangements for possible future crisis situations.
- There are **five operational arrangements** for central banks wishing to **accept foreign securities** as collateral: (i) a correspondent central banking model, (ii) a guarantee model, (iii) links between securities settlement systems, (iv) remote access to securities settlement systems and (v) a collateral management system (CMS). The first two models require cooperation between central banks, whereas the third and fourth are market-led initiatives. A CMS can take different forms. It can be operated by one or more central banks, but also be a private triparty service offered by an SSS or (I)CSD.
- Within the Eurosystem **the transfer of securities collateral to another euro area country** takes place via CCBM or links between SSS. CCBM2 will further enhance collateral efficiency within the euro area. Triparty CMS is offered by Euroclear, Clearstream Banking Luxembourg and Clearstream Banking Frankfurt, but until the go-live of CCBM2 in 2013 the collateral received in these systems cannot be used to obtain credit from a central bank in another euro area country.
- A few CSDs in the world (e.g. the European Euroclear Bank and Clearstream Banking Luxembourg, the Swiss SIX SIS and the American Depository Trust Company) are able to provide **cross-currency area securities settlement**. This

helps multinational banks in securities transactions. Until today, however, there are **few possibilities to use foreign securities as collateral** with a central bank in another currency area. The Eurosystem's collateral list is characterized by its broad acceptance of assets and the broad access offered to banks, but it does not routinely accept securities issued or located outside the euro area. Euro area securities are accepted by some central banks abroad (e.g. the Fed in the Standing Facility and the Bank of England), but banks face stricter requirements for central bank access in these countries than in the euro area.

- Looking at **banks' suggestions for improved post-crisis cross-border solutions**, it can be observed that CCBM2 will make triparty collateral services more attractive (as the collateral can then be used at a central bank in another euro area country) and that T2S will contribute to more efficient securities settlement (as well as to efficient liquidity management thanks to the auto-collateralization feature). Hence, in a few years time banks' main wishes for intra-euro area liquidity arrangements will have been fulfilled. However, while initiatives for cross-currency area solutions were taken during the crisis, these arrangements are by nature temporary. Banks have indicated that they would like further initiatives to be taken in this area.

## 6 A central banker's perspective on international liquidity/collateral

As was discussed above, the financial crisis has led to a surge in demand for high-quality collateral on the market. This demand is likely to increase further when the time is there to normalize central bank intermediation and when the liquidity standards of the BCBS and CCP clearing for standard OTC derivatives have become practice. At the same time, the range of assets that market participants accept as high-quality has narrowed, because of higher risk aversion of market participants and also because of the sovereign crisis.

This chapter reflects on the possible consequences of these developments for the central bank. First, central banks may like to reconsider their current approach to cross-currency area cash and securities arrangements, given that liquidity mismatches are likely to occur more frequently in the future and that there will be a greater need to react promptly to such mismatches (see Section 6.1). Second, given the elevated demand for high-quality assets on the financial markets and the decline in collateral quality used at the central banks, the central banks may like to review their own collateral arrangements (see Section 6.2).

### 6.1 Reflections on cross-currency area central bank arrangements

#### Reviewing current cross-currency area arrangements – general considerations

As was argued above, the central banks of both home and host countries have a **clear interest in fast and reliable cross-border arrangements** to make sure that an international bank is able to resolve its liquidity mismatches. The central bank of the country where the liquidity shortage occurs has an interest in avoiding the repercussions of the liquidity shortage on its own economy. The central bank of the other country likes to prevent a loss of reputation to the multinational bank, which might lead to contagion and affect the bank's activities at home.

Already in July 2008, the Committee on the Global Financial System, in a report that studied central bank operations during the financial crisis, argued that there was a **need to explore whether the possibilities for transferring cash and securities from one currency area to another could be improved**. The report said *'Channels for distributing liquidity across borders may become impaired in times of*



*financial turmoil. To prepare for that possibility, central banks should take steps to strengthen their capacity to counter problems in the international distribution of liquidity. Possible steps include establishing or maintaining standing swap lines among themselves and accepting – or developing and maintaining the ability to accept – foreign currency denominated assets or obligations booked abroad as collateral in their operations’ (see CGFS 2008, p.2).*

Given the developments since July 2008, the **need for such cross-border central bank arrangements seems to have increased further**. Firstly, it can be expected **that liquidity mismatches will occur more frequently** in the future, as current trends signal an increase in the demand for high-quality collateral (see Chapter 4). The latter may also reinforce the current development towards more centralized management of liquidity (as this offers banks the opportunity to optimize scarce liquidity and collateral, see Section 2.2), which may further raise the probability of future liquidity mismatches. As argued above, such liquidity mismatches are no problem in normal circumstances, but they can turn into a nightmare during a crisis. Secondly, **there is a stronger need for banks to react promptly** to a liquidity mismatch because of the emergence of new and fast communication technologies and because the liquidity problems in the recent crisis are fresh in people's minds so that they are likely to react strongly to unfavourable news. Banks need to solve local liquidity problems before they can escalate through the media into a more serious liquidity (or even solvency) problem.

Finally, the financial crisis has led to **ring-fencing behaviour by some national supervisors**, so that locally available liquidity buffers cannot leave the country in case of stress. While this may be (or seem to be) in the country's direct self-interest, it may aggravate or cause liquidity problems elsewhere and precipitate a more systemic crisis. With central bank arrangements in place, there is no need for an actual cross-border transfer of liquid assets. A bank can then pledge such assets to or repo them with its home central bank, so that they can serve as collateral for a foreign currency credit from a foreign central bank. Given these three developments (more liquidity mismatches, new fast communication and ring-fencing behaviour), it can be concluded that the need for cross-border central bank arrangements has increased.

With a few exceptions (see Section 5.5), financial market infrastructures operate within the borders of a single country or a single currency area. If a country or currency area has an efficient payment or securities settlement system, emerging local liquidity mismatches can be resolved quickly. Moreover, a currency area consisting of several countries can make arrangements – for instance, a correspondent central banking model (CCBM) – to facilitate the cross-border use of collateral at the different central banks. Within the euro area, for example, the current infrastructure (TARGET2 and CCBM) already allows fast payments and collateral transfers between euro area countries. Planned Eurosystem infrastructure

(CCBM<sub>2</sub>, T<sub>2</sub>S) will further enhance collateral and securities settlement efficiency. Hence, liquidity mismatches within the euro area (and within other currency areas with good infrastructures and collateral arrangements) can usually be resolved quickly, even during a crisis. Against this background, it can be concluded that **improved central bank arrangements between different currency areas are most urgent**.

If central banks like to establish cross-border facilities, they need to decide whether these facilities should be of **regular or emergency character**. An advantage of emergency-only arrangements is that they may reduce moral hazard (see below). However, if there is a shortage of high-quality domestic collateral or if it is highly beneficial for the country's private sector to have recourse to foreign collateral, then there may be good reasons to establish permanent cross-border facilities. The costs to the central bank of establishing new arrangements are another consideration: it may be cheaper to go for emergency solutions only or – oppositely – the fixed costs of setting up arrangements may be so high that they can only be recovered if used on a routine basis.

While the merits of improved cross-border liquidity arrangements are clear, central banks should also consider that every form of liquidity assistance by central banks, both routine and emergency assistance, can affect banks' behaviour and lead to less prudent management of liquidity mismatches. Yet the risk of **moral hazard** is lower in case of emergency assistance, especially if there is 'constructive ambiguity' about the terms and conditions of such emergency assistance.

Cross-currency area solutions that include international collateral pooling are attractive for commercial banks, since these solutions enable them to use potentially scarce high-quality collateral efficiently. Central banks also like to promote efficiency in banks' collateral use, but only if it does not jeopardize financial stability. An important question is therefore: **is there a trade-off between efficiency and financial stability?** In discussions of De Nederlandsche Bank with commercial and central banks, most central bankers tended to believe that such a trade-off exists, while commercial bankers tended to think the two can go hand in hand. In any case it can be concluded that the financial stability implications of more efficient new arrangements need careful examination.

### **Accept foreign cash as collateral?**

Compared to foreign securities collateral (see below), **foreign cash collateral has three main advantages** for a central bank (see Table 2 for a summary). First, the main risk of foreign cash collateral, to a central bank, is exchange rate risk. This risk is well understood and can be dealt with by relatively straightforward risk control measures such as haircuts. Foreign securities, by contrast, come with more complex

risks. Second, cash arrangements are less complex and therefore easier to implement for a central bank than securities arrangements. To accept foreign cash, all a central bank needs is an account with a foreign central bank. If the foreign central bank acts as a correspondent, this makes the arrangement safer (no counterparty risk). Finally, cash transfers can be arranged much faster than securities transfers, possibly even on a same-day basis if there is enough overlap in the operating hours of the two payment systems concerned. Seen from the perspective of the counterparty, foreign cash arrangements are attractive because foreign cash is relatively easy to come by (while obtaining suitable foreign assets may be more difficult).

**Disadvantages of foreign cash collateral** are that it may have an impact on foreign currency liquidity and that it may change the demand for foreign currency, which could affect foreign monetary policy. Moreover, if inter-central bank swaps are used as an operational model, the central bank’s action may be misinterpreted as a foreign exchange intervention and there is a risk of crowding out the private swap market. A final disadvantage of foreign cash is that it is potentially costly for the counterparty (especially if used as collateral for longer-term lending).

**Table 2 Central bank considerations in accepting foreign cash or foreign securities**

	Foreign cash	Foreign securities
Advantages	<ul style="list-style-type: none"> <li>• The main risk is exchange rate risk which can be managed relatively easily</li> <li>• Relatively straightforward operational arrangements</li> <li>• Enables relatively fast cross-border transfers</li> <li>• Easy to obtain for counterparties</li> </ul>	<ul style="list-style-type: none"> <li>• No impact on foreign liquidity and foreign monetary policy</li> <li>• Will not be interpreted as a foreign exchange intervention or distort private swap markets</li> <li>• Is cheaper for counterparties (especially if less liquid assets can be used)</li> </ul>
Disadvantages	<ul style="list-style-type: none"> <li>• Possible effect on foreign liquidity and foreign monetary policy</li> <li>• Central bank swaps may be misinterpreted as foreign exchange intervention and could distort the private swap market</li> <li>• Relatively costly for counterparties</li> </ul>	<ul style="list-style-type: none"> <li>• Operational arrangements are complex</li> <li>• Cross-border securities transfers can be slow</li> <li>• Not only exchange rate risk for the central bank, but also legal and operational risks.</li> <li>• Counterparties’ access may be limited</li> </ul>

## Accept foreign securities as collateral?

**Foreign securities** also have several **advantages** over foreign cash as collateral (see Table 2). First, for the counterparty securities collateral is more cost efficient (especially if the central bank accepts less liquid assets as collateral). Second, there is no direct impact on foreign currency liquidity or foreign monetary policy. Finally, the central bank's action cannot be misinterpreted as a foreign exchange intervention or distort private swap markets.

The **disadvantages of foreign securities** are the following. First, from an operational perspective securities arrangements are more complex than cash arrangements. Second, the delivery of securities to a central bank in another country can take a significant amount of time.<sup>17</sup> This may in fact preclude the use of foreign securities for obtaining central bank credit on a same-day basis. Third, partially as a result of the previous two, foreign securities are riskier for a central bank than foreign cash. In addition to foreign exchange risk (as foreign securities are usually denominated in foreign currency) there are also legal and operational risks (see Capel 2009 for a more detailed discussion). Legal risks arise because special expertise and extra time is called for to ascertain whether the collateral meets the statutory quality requirements and to limit the possibility that legal problems arise should the collateral need to be sold off. Operational risks relate to the possible need to adjust systems and operational procedures to administer foreign collateral at home and, moreover, to bottlenecks that may occur in the cross-border transfer of collateral once arrangements are in place. A final disadvantage of securities as compared to cash is that some counterparties may face difficulties in acquiring suitable foreign assets.

## Which operational model for accepting foreign cash?

The operational differences between the inter-central bank swap agreements and emergency liquidity arrangements (Figures 5 and 6 above) are small. Both arrangements are relatively straightforward and can be implemented swiftly. Pre-signed agreements between central banks have the advantage of ensuring everyone is ready to act if a crisis occurs, but come at the price of potentially stronger moral hazard. A difference between the two arrangements is that in a swap agreement, it is the domestic central bank that determines how and when the foreign currency funds are distributed, whereas in the known existing liquidity arrangements, this is done by the foreign central bank. Other differences are that a liquidity arrangement is unlikely to be misinterpreted as a foreign exchange intervention and that it will not distort private swap markets.

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<sup>17</sup> Important factors determining the time lag are: the number of systems and intermediaries that are involved in the transfer, their operating hours and cut-off times, the degree of time zone differences, the central bank's settlement arrangement etcetera.

## Which operational model for accepting foreign securities?

As shown above (Figures 7-10) there are five different operational models for accepting securities from another country. The costs and risks of these models differ (see CPSS 2006 for a detailed overview). The **Correspondent Central Banking Model** and the **Guarantee Model** (Figure 7) are based on contractual relationships between central banks and are relatively simple to implement. In principle, these models do not require the building of new infrastructures (although countries may decide – such as the Eurosystem countries did – that it is better to build a new common infrastructure). Some investments have to be made in legal opinions, internal resources and IT. The involvement of the foreign central bank reduces risks for the domestic central bank. Legal risks are likely to be lowest for the guarantee model (under which the central bank does not own foreign collateral), but are probably also limited within a CCBM as a central bank can usually get legal advice from its colleague abroad when needed (e.g. on the valuation of the securities or on procedures in case the collateral needs to be sold off). Operational risks are relatively low as there is no dependence on the smooth functioning of links between securities settlement systems or on another, possibly foreign, system (securities settlement system or collateral management system).

For the other three operational models (**links, remote access and a CMS**) the active involvement of the foreign central bank is not necessary. Establishing the necessary connections will require no initial investment (links between SSS) or limited investment (remote access and interface to CMS) on the part of the central bank. However, the central bank will need to invest in acquiring know-how on foreign securities and – in the case of remote access – on processes at the foreign SSS. In the case of a CMS, the central bank pays (possibly high) service costs. However, the most important considerations are not the costs but the risks. In these three models the central bank becomes dependent on processes that may be beyond its control but that may nevertheless become critical for the smooth provision of domestic liquidity. Since links between securities settlement systems entail risks, links must conform to international and European standards, but the question remains whether the central bank is able to enforce and monitor adherence to these standards. In the case of remote access, the home central bank would need to be well informed about the functioning of the foreign SSS (to limit operational risks) and will want to ascertain the foreign SSS is subject to adequate oversight. In the case of a foreign CMS the home central bank should be aware of the operational and legal risks involved and be able to manage these, but the oversight instruments and the influence over the CMS may be limited. These are risks that should be carefully considered.

While an overall assessment can only be made if the precise characteristics of the different arrangements are compared, it seems that in most cases legal and operational risks are lower where cooperation between central banks is sought.

### **Allow collateral pooling?**

Cross-border collateral pooling – as in the global cash pool outlined above – enables commercial banks to use their existing pool of collateral more efficiently. As a result, they may be able to economize on the total amount of liquid assets held. For central banks as well, efficiency is an important advantage of a collateral pool, especially if there is an imminent scarcity of good collateral. Moreover, a collateral pool offers more clout to address a local liquidity mismatch, which reduces the probability of local liquidity problems and their possible exacerbation into widespread liquidity problems. However, a collateral pool also raises financial stability issues for a central bank. If the establishment of a pool encourages banks to economize on their total amount of liquid assets, there will be less collateral available in case of a systemic crisis. In addition, the pool itself may become a source of contagion: if in one country a large amount of collateral is withdrawn and cannot be replenished at the end of day because of local problems, there may be insufficient collateral available for use in the subsequent time zone. Hence, central banks need to pay attention to the financial stability issues of a collateral pool construction. Finally, a precondition for a central bank's participation in a cross-border collateral pool is that it uses *pooling* rather than *earmarking* as its collateralization technique.<sup>18</sup>

## **6.2 Reflections on central banks' post-crisis collateral frameworks**

### **Why should central banks reconsider their current collateral arrangements?**

There are several reasons why central banks may decide to adapt their collateral arrangements once the financial crisis is over. First, **recent trends in international liquidity and collateral may call for a revision of collateral frameworks**. On the one hand, central banks may conclude that a broad collateral list remains necessary to give banks sufficient access to central bank credit in the light of the market's increased demand for high-quality liquid collateral (especially, if collateral becomes scarce). On the other hand, the adoption of the liquidity coverage ratio (LCR) can be a reason to restrict the collateral list to high-quality collateral since the LCR may affect the monetary policy of central banks with broad collateral lists and may induce banks to pledge even more illiquid assets as collateral with the central bank (see ECB 2010, p. 31). This is so because banks can use their illiquid assets (which

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<sup>18</sup> In an *earmarking system* collateral assets are earmarked specifically for one particular operation throughout the life of that operation, whereas in a *pooling system* collateral assets are pooled together for various central bank operations.

are not eligible for the LCR), to build up their central bank reserves (which are LCR-eligible).

Second, as central banks supply more liquidity than before the crisis, **more collateral** is pledged to (or repo'd with) central banks, but this collateral tends to be **of lower quality**. Central banks have relaxed their criteria for collateral acceptance to alleviate the funding problems of banks, while private financial institutions set stricter quality requirements on the securities they accept as collateral from others. Hence, a variant of **Gresham's Law** is operating within many central banks: 'bad' collateral drives out good collateral (with 'bad' in quotation marks, because central banks will not actually accept bad collateral).

The last point can be illustrated for the euro area. According to the 2010 Annual Report of the European Central Bank (see ECB 2011, p. 97), the average **total amount of Eurosystem-eligible collateral** reached €14 trillion in 2010, which was 7% above the 2009 amount. Of this total of €14 trillion, an average of €2,010 billion was put forward by counterparties as collateral to the national central banks (NCBs) of the Eurosystem. This was a slight decrease from the €2,034 of 2009 (but a significant increase from the €1,579 billion of 2008, the 2009 increase reflecting banks' response to the financial market turbulence). Since counterparties on average had clearly lower liquidity needs in 2010 while they kept approximately the same amount of collateral at the Eurosystem, there was a significant increase in 2010 in the share of 'free' collateral (i.e. collateral not needed for monetary credit). The latter suggests that the euro area banking sector as a whole is not facing constraints due to insufficient collateral.

The **quality of collateral used in the Eurosystem has declined** in recent years. The ECB's Annual Report shows that all asset classes – marketable and non-marketable, liquid and illiquid – have contributed to the increase in *amount of eligible collateral* within the Eurosystem. However, when looking at the *collateral put forward* to the NCBs in recent years, there has been a gradual increase in the share of non-marketable and less liquid assets (see ECB 2011, p. 98). While the acceptance of non-marketable and less-liquid assets by the Eurosystem (and other central banks) has been instrumental in easing liquidity issues for commercial banks (they can use their higher-quality collateral elsewhere), it also calls for **good risk management by central banks**. For assets that are non-marketable, deliberate efforts have to be made to determine a fair value or price for these assets. Moreover, to compensate for liquidity risk, proper haircuts have to be set.

### **Broad or narrow collateral list?**

An important element of central banks' collateral arrangements is the choice between a narrow collateral list (central bank accepts only high-quality assets, as the market

does) and a broad list (the central bank accepts a wider range of collateral than the market, possibly including non-marketable and illiquid assets). As is discussed in ECB (2009), a country's or currency area's choice for a particular collateral framework is governed by a set of external and internal factors. **Relevant external factors** are the country's or currency area's legal framework, the characteristics of its financial markets and the structure of its banking system. For example, in a currency area consisting of several countries and a heterogeneous population of banks, the collateral list is bound to be broader than in a single country with a homogeneous banking population.

**Internal factors** refer to central bank policies, such as the design of monetary policy (e.g. whether liquidity is supplied via outright or temporary operations and the size of reserve requirements) and whether or not collateral requirements depend on the type of operation (see ECB 2009 for a more detailed discussion). These internal and external factors explain many of the differences between the collateral frameworks of the Eurosystem, the Fed and the Bank of England (see ECB 2009). Nonetheless, even if the 'starting points' of central banks are different, they still have room for manoeuvre in deciding how broad the collateral list should be. Moreover, should a central bank wish to narrow down its collateral list, it could adjust some of these internal factors (e.g. lower reserve requirements) to make this possible

**Advantages of a broad collateral list** are that a wide range of counterparties has access to central bank operations and that less adjustment is needed when a liquidity crisis occurs, as banks already have a wide range of assets that they can potentially use to obtain central bank credit. Indeed during the financial turmoil the Eurosystem had to make fewer extensions to its relatively broad list of eligible collateral than the Federal Reserve System and the Bank of England (see ECB 2009).

One of the **disadvantages of a broad collateral list** is that it is bound to include 'lower quality' assets, which necessitates extra vigilant monitoring and extra risk control measures from central banks. Moreover, a central bank's acceptance of illiquid assets will possibly raise monetary policy issues once the LCR is in place (see above and ECB 2010). This is so because banks can use their illiquid assets (which are not eligible for the LCR), to obtain a higher amount of central bank reserves (which are LCR-eligible). Finally, a long collateral list tends to be complex, leading to an administrative burden for both the central bank and commercial banks as well as possible level playing field issues (e.g. if the central bank's haircuts fail to do justice to the quality differences between assets, this could benefit certain banks). Finally, a broad list may limit the incentives for banks to manage their liquidity risk in a proper fashion and create distortions by favouring the use of illiquid assets. The result of lower liquidity discipline may be that – when a crisis occurs – the central bank may still have to further extend the list of eligible collateral.



A **narrow collateral list**, on the other hand, provides better incentives for proper liquidity management by banks. Other **advantages** are: easier risk management and a simpler collateral administration at the central bank. The latter lowers the administrative burden (for both commercial and central banks) and higher transparency can contribute towards a level playing field. Finally, under a narrow collateral list with only high-quality assets there will be less impact of the LCR on monetary policy.

**Disadvantages of a narrow collateral list** are that some banks may find it difficult to gain access to central bank credit (especially if collateral becomes scarce) and that central banks need to make explicit decisions on broadening the list when a crisis occurs. To avoid ad-hoc decisions in a crisis situation, which could entail operational and legal risks, central banks could make ex-ante decisions on how to broaden the list when needed. A decision to accept new assets in case of stress would usually carry higher operational risks than an ex-ante decision to relax certain concentration limits in a crisis situation. Table 3 summarizes the relative advantages and disadvantages of narrow and broad collateral lists.

**Table 2 Considerations in choosing between a narrow or broad collateral list**

	Broad collateral list	Narrow collateral list
Advantages	<ul style="list-style-type: none"> <li>• Wide range of financial institutions can get access to monetary and intraday credit</li> <li>• Less need for extension in case of a financial crisis</li> </ul>	<ul style="list-style-type: none"> <li>• Gives banks proper incentives for adequate liquidity risk management</li> <li>• Risk management less of an issue for the central bank</li> <li>• Less complexity and lower administrative burden</li> <li>• More transparent, less risk of unlevel playing field</li> <li>• Less impact of LCR on monetary policy</li> </ul>
Disadvantages	<ul style="list-style-type: none"> <li>• Impact of the LCR on monetary policy</li> <li>• Risk management issues for central bank</li> <li>• Complexity and administrative burden</li> <li>• Possible level playing field issues</li> <li>• Disincentive for sound liquidity risk management by financial institutions</li> </ul>	<ul style="list-style-type: none"> <li>• Requires extension in a crisis situation, which may lead to ad-hoc decisions and operational/legal risks for central banks</li> <li>• Some banks may face difficulties in acquiring enough central bank liquidity with their collateral pool</li> </ul>

Finally, regardless of whether the collateral list is narrow or broad, it can be **rule-based** (i.e. it indicates precisely which assets are accepted under which conditions) or **principle-based** (so that it is clear from the outset that the composition of the list can change if circumstances change). Moreover, a central bank can choose from **different collateralization techniques**: pooling versus earmarking (see footnote 18) and pledge versus repo.

### **One size (of collateral list) fits all?**

Another question is whether there should be one collateral list for all purposes or whether there should be different collateral lists, depending on what kind of central bank credit the collateral is used for. Given that – compared to intraday or overnight credit – open market operations have a longer maturity (and thus entail more credit risk for a central bank), central banks could opt for a more restrictive list of eligible collateral for the latter. Moreover, the fact that overnight credit is often needed in an emergency situation (if market sources are not available) could be another reason to allow a broader list of eligible collateral for that purpose. However, operational efficiency is an argument for using the same list of eligible collateral for all central bank credit. This is the reason the Eurosystem has opted for a ‘one size fits all’ approach.<sup>19</sup> The Federal Reserve, for one, has come to another decision: it has a more restrictive list of eligible collateral for open market operations than for discount window lending and intraday credit.

### **Risk management issues**

When a central bank gives credit to a counterparty – through open market operations or by extending intraday or overnight credit – it exposes itself to credit risk on that particular counterparty. Central banks can protect themselves against such risk by: (i) lending to **financially sound institutions** only (i.e. counterparty requirements), (ii) setting **quality requirements on the collateral** they accept or (iii) imposing a set of **control measures**, including haircuts, concentration limits and measures to avoid a high correlation between the counterparty's financial health and the collateral's value.

The **three elements of the risk management framework should be interrelated**. For instance, central banks that opt for a broad collateral list (lower quality requirements on collateral) typically need extra risk control measures. Central banks could also decide to set stricter quality requirements on the collateral from

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<sup>19</sup> Some Eurosystem NCBs also take collateral for non-Eurosystem purposes. For example, in the Netherlands clearing participants may fulfil their margins and clearing fund obligation towards a central counterparty through a guarantee of De Nederlandsche Bank (DNB). For this guarantee, DNB blocks collateral of the clearing participants in their books. In principle NCBs can set their own collateral requirements for such national activities, but DNB has opted for using the Eurosystem collateral requirements for its national activities as well.

weaker counterparties (as the market does – see Section 2.3). However, by doing so, the central bank could send negative signals to the market, which could further add to the counterparty's problems. Discretionary risk control measures could then be a better option, since those would make the central bank's actions less visible to other market participants.

Finally, the central bank needs to decide **how frequently risk control measures are adjusted**. If haircuts were adjusted continuously to reflect the actual risks, this would be ideal from the perspective of risk management and from a level playing field perspective (all collateral would then carry the same risk for the central bank). However, the continuous adjustment of haircuts is costly and could also send signals to the market at an inconvenient time.

## 7 Summary and recommendations

### 7.1 Summary

This paper has made the following observations:

- Internationally active banks, especially those that manage their liquidity centrally and that use cross-border funds, frequently face liquidity mismatches even if they are liquid in overall terms. Two types of liquidity mismatches are possible: a cash mismatch and a securities mismatch. Banks need to correct such liquidity mismatches before they develop into more serious liquidity problems or even solvency problems. Due to modern communication technologies, banks need to act faster than in the past (see Chapter 2).
- Banks need high-quality collateral for their liquidity management. While there is broad agreement on what high-quality assets are in theory, it is difficult to make this definition operational in practice (see Chapter 2).
- Most financial market infrastructures (FMIs) operate within the confines of a single country or single currency area. For most international banks it is not cost efficient to participate directly in foreign FMIs. Hence, a multinational bank's liquidity mismatches are usually resolved through the bank's network of correspondents and custodians. While in normal circumstances this procedure usually works well, in stress situations it may not (see Chapter 3).
- Well-functioning financial market infrastructures (FMIs) and central bank arrangements are essential for the international liquidity management of international banks because they form (part of) the necessary plumbing for cross-border transactions. In crisis situations their role is more enhanced. FMIs can provide alternatives when banks' private international networks are no longer reliable (if the correspondent or custodian is facing problems) or accessible (if the bank itself is facing problems). Moreover, some FMIs act as a 'neutral intermediary' between two commercial counterparties and thereby provide security that transactions will be settled (see Chapter 3).
- Because of money market developments, there already is an increased demand for high-quality assets. This demand will continue to grow because of the liquidity standards of the BCBS and mandatory CCP-clearing of standard OTC derivatives (see Chapter 4). However, because of the sovereign crisis (see Section 4.2) and greater risk aversion among market participants (see Section 2.3), it

seems that the range of assets that are considered "high-quality" collateral on the markets has narrowed. At the same time governments run larger debts because of the financial crisis, which leads to more supply of government bonds, of which many – but not all – are considered high-quality collateral. Whether collateral will actually become scarce thus needs further examination (see Chapter 4).

- While the repo or secured market is already showing signs of stress and has become more segmented in recent years, further segmentation is to be expected between 'liquid' and 'non-liquid' assets and around the maturity thresholds at the 30-days and 1-year points. Further research should make clear to what extent this segmentation will be a hurdle for banks in raising funding on the interbank market (see Chapter 4).
- Within the Eurosystem the current infrastructure (TARGET2 and CCBM) allows for fast payments and collateral transfers between euro area countries. Planned Eurosystem infrastructure (CCBM2, T2S) will further enhance collateral and securities settlement efficiency. Hence, liquidity mismatches within the euro area (and within other currency areas with good infrastructures and collateral arrangements) can usually be resolved quickly, even during a crisis (see Chapter 5).
- Cross-border arrangements between the euro area and other currency areas have proven their value added in the past crisis period. However, they are limited in scope as they are based on cash and meant for emergency situations only. The cross-currency area acceptance of foreign securities as collateral remains very limited. Against this background, it can be concluded that improved central bank arrangements between different currency areas are most urgent (see Chapter 5).
- The need for cross-currency area central bank arrangements has become more urgent due to the expected higher frequency of liquidity mismatches (which is the result of the higher demand for high-quality assets and the fact that the latter may further induce banks to centralize their liquidity management). The need has also increased because of the emergence of new and fast media and the more frequent use of ring-fencing by national supervisors (see Chapter 6).
- Given the stronger need for need for cross-currency area central bank arrangements, central banks could consider accepting foreign cash and/or foreign securities as collateral. In the former case central banks could (i) establish inter-central bank swap agreements or (ii) accept foreign cash as collateral under liquidity arrangements (see Chapter 5). To accept foreign securities there are five operational arrangements: (i) a correspondent central banking mode (CCBM), (ii) a guarantee model, (ii) links between securities settlement systems, (iv) remote access to securities settlement systems and (v) a collateral management system (see Chapter 5). The relative advantages and disadvantages of foreign cash compared to foreign securities were summarized in Table 2 (see Chapter 6). The pros and cons of these different cross-border arrangements were discussed, leading to the conclusion that cash arrangements are less complex and easier to implement than securities arrangements and that for securities arrangements

legal and operational risks are usually lower when cooperation between central banks (i.e. a CCBM or guarantee model) is sought (see Chapter 6).

- In the light of the above observations, central banks may also wish to reconsider their collateral frameworks. The recent trends discussed in Chapter 4 can be an argument for broadening the list of eligible collateral at the central bank (as commercial banks really need to use their high-quality collateral elsewhere), but also for narrowing the list (given the possible impact of the LCR on the monetary policy and on the quality of collateral pledged to central banks that accept illiquid assets). The risk management issues that many central banks faced during the latest financial crisis can also be a reason to narrow the collateral lists. Due to differences in relevant external and internal factors, the collateral list of one central bank is ‘naturally’ broader than that of another. But every central bank has some room for manoeuvre in deciding how broad the collateral list should be and could – if it so desires – adjust internal factors (e.g. lower reserve requirements) to give banks sufficient access with a narrower list. The relative advantages and disadvantages of a narrow and a broad collateral list were summarized in Table 3. Apart from the composition of collateral list, other elements of the collateral framework (such as the risk management framework and the decision whether to have one or more collateral lists for different operations) could also be reviewed.

## 7.2 Recommendations

In the light of the observations above, the following recommendations can be made to the central bank community:

### Further research

1. There is a **need for research to assess whether collateral scarcity** is to be expected. The current paper observes (i) that the demand for high-quality collateral is already stronger than before the crisis, (ii) that the range of assets that are considered to be of high-quality has narrowed (partially because of the sovereign crisis) and (iii) that further increases in the demand for high-quality collateral can be expected because of money market developments, the liquidity standards of the BCBS and initiatives to mandate CCP clearing for standard OTC derivatives. However, the amount of available collateral is increasing too (at least within the Eurosystem), so whether collateral actually becomes scarce is uncertain. If good collateral becomes scarce, there may be a need for efficient infrastructural solutions (e.g. collateral pooling).
2. A more detailed **investigation into the functioning of the secured or repo market** would be valuable too. At this moment this market is already showing signs of stress and segmentation (as only higher-quality collateral is accepted and there is a concentration in the short end of the market). In the coming years the

liquidity standards are likely to cause further segmentation between ‘liquid’ and ‘non-liquid’ assets and around the maturity thresholds at the 30-days and 1-year points. Further research should make clear to what extent this segmentation will reduce banks’ possibilities in raising funding on the interbank market and what its consequences will be for monetary policy.

### **Actions within a single country or a single currency area**

3. If a country or a currency area has well-functioning financial market infrastructures and collateral arrangements, liquidity mismatches within that entity can be resolved quickly. The importance of quick solutions has increased, because liquidity mismatches are expected to occur more frequently in the future and because banks have less time to find solutions because of modern communication channels. Moreover, if current infrastructures are inefficient, they may put an unduly high claim on banks' liquid assets in the future, when banks already need more highly liquid assets for other purposes. Hence, it is time **to review the adequacy of current financial market infrastructures** in the light of more frequent liquidity mismatches and a possible collateral scarcity in the future.
4. Within the Eurosystem, the current infrastructure (TARGET<sub>2</sub> and CCBM) allows for fast payments and collateral transfers between euro area countries. Planned Eurosystem infrastructure (CCBM<sub>2</sub>, T<sub>2</sub>S) will further enhance collateral and securities settlement efficiency. However, the trading, clearing and settlement landscape within the European Union is still scattered. As there thus seems to be significant potential for efficiency gains in cross-border securities transactions within the EU, the EU may need to make **additional efforts to promote further efficiency in European securities settlement**.
5. Central banks should **re-examine whether their collateral frameworks are still appropriate** in the light of recent trends in collateral and international liquidity. There could be arguments for narrowing the list of eligible collateral once the crisis is over, (given the challenges to risk management and the possible impact of the LCR on monetary policy and quality of collateral pledged to the central bank), but also for keeping a broad list (if banks are short of high-quality liquid assets). Other elements of the collateral framework (one collateral list or several lists for different operations, risk management framework) may be reviewed too.

### **Cross-currency area actions**

There are few cross-currency area arrangements and those available are limited in scope (cash and emergency only). The cross-currency area acceptance of foreign securities as collateral remains very limited. The need for cross-currency area central bank arrangements seems to have increased due to the expected higher frequency of liquidity mismatches, the emergence of faster communication methods and

the more frequent use of ring-fencing by national supervisors. In this context the following actions could be considered:

6. Central banks worldwide could consider actions to enhance the **consistency of their lists of eligible collateral**. A possible starting point could be an international agreement that LCR-eligible assets are eligible for central bank credit too (possibly with an extra haircut by the central bank on LCR assets located abroad).
7. Once an agreement is reached on a pool of assets that can be used by all (or the largest) central banks worldwide, further steps to build a **Correspondent Central Banking Model** for these assets could be considered.
8. Initiatives to promote the cross-border acceptance of securities as collateral for central bank operations are likely to take time. As cash arrangements are relatively straightforward and easy to implement and have proven their value added during the last crisis, central banks could **take further steps to promote the cross-border transfer of cash**. Possibilities here are the extension of inter-central bank swap agreements, alternative bilateral liquidity arrangements between the main currency areas or even the construction of a global cash pool that ‘travels with the sun’. As financial stability comes first for central banks, the impact on financial stability of such arrangements need careful examination.





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- Vol.9/No.3 (2011) The post-crisis world of collateral and international liquidity -  
A central banker's perspective  
*Jeanette Capel*

