

CEPS RESEARCH REPORT

IN FINANCE AND BANKING

No. 25

**THE EU REPO MARKETS:
THE NEED FOR FULL INTEGRATION**

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AND

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NOVEMBER 2000

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Valentina Stadler was a Research Fellow at CEPS at the time of writing this report and *Karel Lannoo* is the Chief Executive Officer at CEPS and head of the financial markets programme. The authors are grateful to Richard Potok, Yves Poulet, Peter Restelli-Nielsen and Daniella Russo for comments and suggestions on earlier drafts.

The paper was originally written in the framework of a tender for the European Commission, Directorate General for Economic and Financial Affairs. The contents and conclusions of this study do not engage the European Commission in any sense.

ISBN 92-9079-308-2

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Table of Contents

EXECUTIVE SUMMARY AND POLICY RECOMMENDATIONS.....	5
I. AN INTRODUCTION TO REPO MARKETS	8
A. REPO MARKETS DEFINED.....	8
1. Motivation	8
2. Forms of transactions.....	9
3. Relation between the repo and other financial markets.....	10
B. RISKS AND ECONOMIC BENEFITS OF REPO MARKETS	11
1. Risks of repo transactions	11
2. The economic benefits of an efficient repo market.....	12
C. EUROPEAN REPO MARKETS IN PRACTICE.....	13
1. Market size.....	13
2. Accounting practices	15
3. Legal documentation/master agreements	15
4. Principles of best practice	16
II. THE IMPACT OF EMU	16
A. THE OPERATIONAL FRAMEWORK OF THE ECB	17
B. THE FUNCTIONING OF THE FRAMEWORK.....	20
1. From fixed to variable rate tenders	21
2. Towards a greater harmonisation in collateralisation techniques.....	22
III. THE CLEARING AND SETTLEMENT FUNCTION	23
A. DEFINITIONS AND CLARIFICATIONS	24
B. IMPLICATIONS OF THE EURO FOR FINANCIAL MARKET INFRASTRUCTURE.....	24
1. The advantages of consolidation	25
2. The importance of settlement independence	26
C. DIFFERENT MODELS OF CONSOLIDATION	28
1. ECSDA's Eurolinks model	28
2. Euroclear's hub and spoke model	29
3. Clearstream's European Clearing House Model	30
D. ISSUES FOR POLICY	31
IV. CROSS-BORDER REPOS AND LEGAL CERTAINTY	33
A. THE CORE ELEMENTS OF LEGAL CERTAINTY.....	33
1. Full Transfer of Title	33
2. Protection from Recharacterisation	34
3. Recognition of Insolvency Set-off or Close-out Netting	34
4. Recognition of Top-up Collateral	35
5. Protection from Retroactivity	35
6. Recognition of Substitution.....	36
7. Conflicts of Law	36
B. THE SETTLEMENT FINALITY DIRECTIVE.....	36
C. ISSUES FOR POLICY.....	39
V. PRUDENTIAL ISSUES RAISED BY THE REPO MARKETS.....	40

A. COLLATERALISATION OF INTERBANK EXPOSURES.....	40
B. PRUDENTIAL TREATMENT OF REPOS.....	41
1. The banking book regime	41
2. The internal ratings regime.....	42
BIBLIOGRAPHY	45
GLOSSARY	48
ANNEX I: SECURITIES SETTLEMENT SYSTEM IN THE EU.....	51

Executive Summary and Policy Recommendations

Repurchase agreements (in short repos) are short-maturity collateralised financial instruments. In a repo transaction, securities are exchanged for cash with an agreement to repurchase the securities at a future date. Repo markets thus perform a crucial position in between the securities and money markets.

Repos are the key instrument for monetary policy operations of the European Central Bank (ECB) and the central banks of the Eurosystem. The public repo market is used by the ECB to signal its monetary policy stance, while the private repo markets serve as a source of information on market expectations.

Before EMU, repo markets essentially existed at the national level, but to different degrees across countries. With the start of EMU, all the wholesale markets were re-denominated to euro in the EU-11, and monetary policy instruments were harmonised. The necessary preconditions are thus in place for the private euro repo market to develop, but this seems not to be sufficient yet, as many elements still hamper the full Europeanisation of this activity. This report has examined the barriers to the emergence of a euro-wide repo market and makes a series of policy recommendations. They concern the operation of monetary policy procedures of the ECB, the legal framework for repos, especially at a cross-border level, the infrastructure for clearing and settlement of repos, and issues related to prudential supervision.

(1) Repos and monetary policy procedures

- The move towards variable rate tenders reduced distortions in the repo transactions with the European Central Bank. It allows for a better assessment of the banking sector's liquidity true demand and reduce the uncertainty that had characterised the old system. It should also permit that less collateral is frozen for monetary policy operations with the ECB, and can be used in other repo operations.
- Collateral management procedures for participation in the ECB's repurchase agreements should become more harmonised. Today, the national central banks of the Eurosystem use two different systems of collateral management, a pooling and delivery-versus payment system. Continued acceptance of the existence of two different systems maintains strong barriers to further financial market integration of the euro countries. It could also seriously hamper the ECB from steering liquidity in the financial system in times of crisis. As long as such marked differences in collateral management procedures exist, integration of repo markets in the Euro area cannot fully take place.

(2) Repos, the legal framework and the legal certainty of cross-border collateral

- One of the reasons of the fragmented nature of European private repo markets are the differences in the financial trading documentation. Early endorsement by market players in the different member countries of the euro-zone of the Euro Master Agreement (EMA) will greatly support the integration

of repo markets. The EMA harmonises standards applicable in this field and provides the contractual infrastructure for repo markets.

- The problems regarding the cross-border recognition of collateral can, however, only be solved by more statutory harmonisation of legislation at EU level, and a solid implementation. The existing EU's settlement finality directive needs to be implemented in all member countries to allow for a broad interpretation of collateral, to ensure legal certainty to all holders of collateral. This is not the case in all member states as of today. In order to create a more efficient repo market, legal certainty with regards to the enforceability of collateral must be extended even beyond the scope of the EU's Settlement Finality Directive. The most important element is that collateral should mean a full transfer of title, to protect market participants from insolvency of the counterpart.

(3) Repos and clearing and settlement systems

- The fragmentation of clearing and settlement systems hampers the emergence of a truly integrated European repo market. Although consolidation in the clearing and settlement industry is advancing rapidly, a high degree of fragmentation remains in place. The decentralised execution of monetary policy in EMU further contributes to keep the current structure in place.
- The integration of clearing and settlement systems raises the question of the appropriate structure for supervising these systems. Today, most CSDs are supervised by a national authority, in most cases the national central bank. The increasing linkages between European CSDs and the rise in cross-border activity mean that this level of supervision may no longer be adequate, as the risks to which the national central banks are exposed may exceed their means of assessing them.

(4) Prudential issues

- As interbank exposures form an important element in the European banking system, its collateralisation should be promoted to reduce systemic risk. Since interbank markets have become euro-wide since the start of EMU, it follows that all barriers to the emergence of a proper euro repo market need to be eliminated, as systemic risk would otherwise increase at euro level. This also raises the issue of the ECB's role in monitoring financial stability.
- The development of the repo markets has also contributed to highlight the distortions in the current Basel Capital Adequacy regime, since their existence will have contributed to stimulate securitisation. Repos can play an important role in the implementation of the internal ratings method, as part of the risk mitigation techniques of the Basel Capital Adequacy Review. Also from this perspective, barriers to a fully operative euro-wide repo market need to be eliminated, to allow banks to fully use collateralisation at European level.

(5) Need for more and better statistics

- Apart from repos with the central bank, there are no good data available on the size of the repo market in the EU. This is all the more important, since it could indicate to what extent interbank loans, for example, are collateralised. The interbank market accounts for 17% of the total assets of banking sector in the EU, as compared to 3% in the US. The interbank market is an important promulgator of systemic risk, which can be reduced through collateralisation of such loans.

I. An Introduction to Repo Markets

The economic importance of the repo market is too often insufficiently appreciated. Part of this can be traced back to the technical complexity that surrounds repos, another part to the secrecy of central banking, with which the repo business is closely associated. Repo markets do, however, perform an important function in easing liquidity constraints of financial institutions, and thus in improving the efficiency of financial markets. In a European perspective, with one of the important goals of EMU being the deepening and improvement of efficiency of financial markets, the development of a euro-wide repo market is of crucial importance.

This chapter is intended to unravel the technicalities of the repo market. What are repos? What role do they have? How important are they?

A. *Repo markets defined*

A repurchase agreement (repo) is an exchange of cash for securities, with the agreement to reverse the transaction at a specific future date. The securities serve as collateral for what is essentially a cash loan. The most important characteristic of a repo is that the cash lender/securities borrower acquires full ownership of the security for the duration of the agreement, which differentiates it from simple collateralised lending. The latter only creates a securities interest in the collateral, which does not have the same legal power as an outright transfer of ownership.¹

1. Motivation

The motivation for entering into a repo can either be cash-driven or security-driven. In a **cash-driven** transaction, a market participant wishing to obtain funds will provide a security to the cash lender as collateral. This tends to reduce the interest rate payable by the cash borrower to below the uncollateralised interbank rate. Cash-driven repos are often used to fund long positions in securities, or to build leveraged long positions in securities markets since securities lenders maintain their exposure to the underlying securities. The cash raised through an initial repo is used to buy more securities, which, again, will be repo-ed out. With each transaction, the leverage ratio increases. Cash-driven repos are general collateral repos as it is not crucially important what kind of security is used as collateral.

In a **security-driven** transaction, a market participant wishes to obtain temporary access to a specific security. This specific security may be used to make deliveries on a futures contract or to cover a short position in securities. Here, the collateral given to the security lender is in the form of cash. The ability to take a short position fulfils an important economic function: to hedge interest rate risk. Thus, repos play an important role in risk management. Security-driven repos are special collateral repos as they require a specific underlying security.

¹ Chapter IV further explores the importance of this difference.

The most common securities used as collateral are sovereign debt instruments.² Other collateral securities include bank or corporate-issued notes, mortgage securities and equity. Some repo contracts include substitution clauses that allow for alternative securities to be substituted as collateral over the lifetime of the contract.

The **maturity** of a repo varies, but tends to be below one year. The maturity can be either overnight (single day maturity), term (fixed maturity longer than one day) or open (parties have the right to terminate the contract every day).

2. Forms of transactions

There are three different contractual forms of transactions, which have the same economic function, but differ in terms of legal status and accounting treatment.³ The term *repo* in this report comprises all three forms.

a) *The classic repurchase agreement*

A repurchase agreement involves the sale of an asset under an agreement to repurchase the asset from the same counterparty. Interest is paid on the repurchase agreement by adjusting the sale and repurchase price. A reverse repo is the purchase of an asset with an agreement to re-sell the same or a similar asset. Income payments on the asset, such as coupon or dividends, that fall due while the asset is repo-ed out, are transferred back to the original owner of the asset in the form of 'manufactured' payments.

There are different types of custodial arrangements associated with repurchase agreements:

- A **hold-in-custody** repurchase agreement refers to a transaction in which the cash borrower receives cash from the cash lender but continues to hold the collateral securities in custody on behalf of the cash lender. The cash lender is thus potentially exposed to fraud and failure on the part of the borrower;
- A **deliver-out** repurchase agreement is where the collateral securities are delivered to the cash lender's custodian in exchange for funds;
- In a **tri-party** repurchase agreement, securities serving as collateral are held by a third party custodian. The third party ensures that the collateral meets the cash lender's requirements, and provides certain services, such as margining and marking-to-market.

b) *Sell/buy-back agreements*

A sell/buy-back agreement consists of two distinct outright cash market trades, of which one for forward settlement. A key feature is that the separate sell and buy trades are entered into at the same time. The interest rate (repo rate) is used to

² The term collateral is conventionally used to refer to the security leg of a repo. Of course, when looking at it from the *securities borrower* in a cash driven transaction, collateral can also be the cash leg of a securities-driven transaction. For reasons of clarity, this report will use the term collateral to refer to the securities leg only.

³ The definitions are based on the Bank for International Settlement (1999), the Technical Committee of the International Organisation of Securities Commissions, and the Committee on Payment and Settlement Systems (CPSS) of the central banks of the Group of Ten countries (1999).

derive the forward contract price relative to the spot price. Income payments on the asset are not transferred to the original owner but incorporated in the price of the forward contract, i.e. the repo rate.

c) *Securities loan transaction*

In a securities loan transaction, the securities owner lends the security to the borrower. The borrower in turn becomes contractually obliged to redeliver a like quantity of the security to the original owner. The securities borrower is required to provide collateral to the securities lender. If this collateral is in the form of cash, it has the same economic features as a classic repurchase agreement.⁴

3. Relation between the repo and other financial markets

a) *Uncollateralised money markets*

Market participants active in the repo market tend to also be active in the uncollateralised money market because of the functional similarity of the two instruments. It would seem plausible to expect market participants to substitute away from money market instruments to repos, due to the lower credit risk of a collateralised transaction. This lower credit risk is the reason why repo rates often are below the uncollateralised money market rate, as can be seen in Table 1. The spread shows the average difference of the uncollateralised money market rate over the repo rate during the first quarter of 1998.

Table 1: Spread between the uncollateralised money market rate and the repo rate (averages of Q1 1998)

	Japan	UK	US	France
Overnight	-12	12	8	4
1 week	9	16	3	5
3 months	58	21	6	8

Source: BIS (1999).

In practice, however, the substitution effect towards repo markets tends to be quite small, if the money markets function quite well and the banking system is perceived to be stable. In fact, repo markets can have a *complimentary* effect as repos are used to finance money market instruments and therefore contribute to demand for these instruments. In countries where data is available, there is little sign of a decline in money market volumes as the repo market has expanded.⁵

b) *Securities markets*

The existence of a well-developed repo market normally increases liquidity in the markets of the securities used as collateral (i.e. mostly fixed income and to a smaller

⁴ Collateral in a *securities loan* transaction can also be in the form of other securities or a bank-issued letter of credit. However, the transaction in this case has different economic features than a repurchase agreement and is therefore not considered in this report.

⁵ BIS (1999).

extent equities). Repos are a source of demand for those securities and facilitate position taking. Hence it is in the interest of securities issuers (governments as well as corporates) to have an efficient repo market as improved liquidity and efficiency in the underlying markets can reduce funding costs.

Overall, the development of a well-functioning, efficient repo market leads to greater integration between the money and bond market as arbitrage is promoted between the two markets.

c) Derivatives markets

The interaction between the repo market and the derivatives market arises from the arbitrage opportunity between general repo rates and rates on derivatives contracts, especially interest rate futures. Special repos are mainly used to obtain a security that needs to be delivered at the maturity of a securities futures contract. Thus, the existence of repo markets tend to reduce the potential for failed settlement because securities can be borrowed on a very short term basis.

B. Risks and economic benefits of repo markets

Participants in a repo transaction are exposed to various *risks* the most important ones being market and operational risk. Other common financial risk, such as credit risk, are minimised as a result of the collateralised nature of the transaction. The impact of repo markets on systemic risk is unclear. The collateralised nature of a repo transaction is seen as a risk reducing element, while it may also increase interdependence in the financial system.

1. Risks of repo transactions

The main risk in repo transactions arises from the volatility in the value of the underlying collateral (market risk). In order to mitigate this risk, the collateral taker usually requires margins. These consist of initial margin, which is based on the perceived volatility of the security, and variation margin, which is based on marking to market practices. Ideally, marking to market and resulting margin calls should be made on a daily basis to avoid exposure building up. Such practice helps to reduce systemic risk. Undocumented sell/buy-back agreements typically do not allow for margining and marking to market, which means that such agreements are exposed to larger market risk than repurchase agreements.⁶ Other risks inherent in repos include operational and legal risk (see below). Credit risk, i.e. the risk that the collateral issuer defaults, is minimal since collateral used in European repo markets is usually of the highest quality (tier 1 bonds).

Repo markets can have implications for **systemic risk** through the linkages of repo markets with other financial and securities markets, as outlined above. The existence of repo markets can have both positive and negative implications for systemic risk. It can increase systemic risk in the following ways: First, repos play an important role in facilitating the ability of market participants to build leverage. Leverage increases the

⁶ The Bank of England considers undocumented sell/buy back agreements, which do not allow for marking to market, margining and close-out netting, as imprudent (Bank of England 1998).

impact of a shock and therefore contributes to systemic risk. This is especially relevant if risk management practices are not appropriate. Second, securities used as collateral are withdrawn from the pool of collateral available to a bank that would be available to unsecured creditors in the event of a bankruptcy. Third, repos link money and securities markets; this link has the potential to become a channel for transmitting shocks. In times of distress, margin calls could lead to liquidity pressures for market participants. Fourth, systemic risk at European level can also increase if the legal framework is not harmonised, if the rights of repo lender and repo borrowers are not equal across jurisdictions.

On the other hand, repo markets can have positive implications for systemic risk: First, the existence of repo markets increases the overall liquidity of securities markets, which reduces the chance that any given shock will be systemic in nature. Given that repos are collateralised, the transmission of shocks can be reduced. When a bank fails to pay, the creditor bank has the collateral to compensate for this loss. Second, when a shock occurs, the existence of a repo market can help maintain institutions' access to liquidity. Since it is a collateralised market, liquidity may be less likely to dry up in emergency situations relative to an uncollateralised market. Especially when uncertainties about counterparty risk arise, which could be a problem on the uncollateralised money market, the collateralised nature of repos will increase the availability of funds.

Overall, it is difficult to assess whether the existence of repo markets increases or decreases systemic risk. Collateralisation of exposures should have an important effect on reducing systemic risk, whereas transmission of shocks through the repo market and increased leverage can be contained by sound risk management practices. Within a European context, with a highly developed interbank market, collateralisation should be increased in interbank lending to reduce systemic effects. This is discussed in detail in chapter V.

2. The economic benefits of an efficient repo market

There are several economic benefits of having a well-functioning and efficient repo market at a European wide level. Most of these benefits stem from the fact that an efficient repo market has beneficial effects on **liquidity** in the markets of the underlying securities, as pointed out above. Demand for securities used as collateral increases with the expansion of the repo market, which increases liquidity and the integration of the different markets of the respective collateral securities (government bonds, corporate bonds and, to a lesser extent, equities). The result is deeper and more liquid capital markets. This in turn has two beneficial effects. First, it reduces funding costs, i. e. the cost of capital, which promotes investment and therefore economic growth. Second, it can reduce systemic risk, as discussed above.

Furthermore, efficient repo markets have positive implications for **monetary policy**. Deep and liquid capital markets improve the transmission mechanism of monetary policy as interest rate changes feed through to the real economy more quickly and more evenly. Thus, it is in the interest of the central bank to have an efficient repo market.

C. European repo markets in practice

1. Market size

Beside government securities markets, comparable statistics on repo markets are not readily available. Most transactions are conducted 'over the counter' (OTC), meaning that they are privately negotiated, and therefore not recorded by a central trading system or a central trading floor. Furthermore, central bank statistics vary so much in the underlying definitions that comparisons become difficult. As a result of the lack of data, neither the exact size of the individual national repo markets, nor the size of the overall EU repo market can be determined. Given the importance of repo markets for the European financial system, it is strongly recommended to improve the coverage and the quality of market statistics.

The Giovannini report (1999) published figures of daily turnover in EU repo markets. They were based on data from national depositories and the two International Clearing and Settlement Depositories (ICSDs) **Euroclear** and **Cedel**. The report did not indicate how repos were defined for each individual country. It is unlikely, however, that they were defined in a consistent way. Nevertheless, these figures give an indication of the relative importance of the individual countries in the European repo markets in terms of their liquidity.

Table 2: Turnover in European Repo Markets as estimated by depositories (1998)

	Average daily turnover (€ bn)	European Market share (%)
Germany	60	24 %
Italy	50	20 %
France	40	16 %
Belgium	25	10 %
Spain	20	8 %
UK	15	6 %
Other	35	14 %
European repo market	245	100 %
US	420	

Source: European Commission (1999)

In addition to considering market liquidity, it is important to look at the size of the market. The only good data available is for repos of government securities, for which central banks and/or securities regulators maintain statistics. Table 3 shows the scale of activity in the government securities loan and repo markets for eight EU countries for which data are available. However, other important segments of the repo markets are excluded from these statistics, the figures thus do not give a complete picture. In

particular, there are several caveats: First, the term 'government securities loan' in this table not only includes securities lent against cash, but also securities lent against other securities or letters of credit. Thus, the figures in Table 3 are likely to overstate the actual size of the national public repo markets. Second, not all transactions involving the repo or lending of government securities are captured by these figures, but only those recorded by the authorities. Third, the percentage of government bonds on loan may be overstated to the extent that the same issue may be on-lent several times. Fourth, it should be noted that many of these figures are based on estimates.

Table 3: Size of the government securities loan and repo markets (in \$ bn)

	A	B	C	D	E	F
	Value of government securities on repo	Value of government securities on loan	Total (A+B)	Total value of government securities outstanding	Percentage on loan or on repo (=100*C/D)	Reporting date
Belgium	73	1	74	253	29.3%	Jun 98
France (1)	257	3	260	704	36.9%	Mar 99
Germany (2)	121	41	162	866	13.9%	Mar 99
Italy	101	n.a.	101	1063	9.5%	May 98
Netherlands (2)	34	24	58	194	30.1%	Sep 98(3)
Spain	46	n.a.	46	201	23.1%	Feb 99
Sweden (4)	37	0	37	128	28.9%	Dec 98
UK	135	45	180	483	37.2%	Jul 98
EU-8 (5)	804	114	918	3892	23.5%	-
US (6)	1376	478	1854	3356	55.3%	Feb 99

Source: IOSCO and CPSS (1999), BIS (2000).

Notes:

(1) Figures reflect the activity of the primary dealers.

(2) Figures are obtained by market estimation; for Germany, the total value of outstanding government securities corrected on the basis of BIS data.

(3) June 1998 for (A).

(4) Figures are a rough estimate by the central bank.

(5) For comparison, total government securities outstanding by end 1998 in the EU-15 was bn. 4570 \$.

(6) Figures reflect the activity of 35 primary US government securities dealers and 19 bank lenders.

"Securities on loan" refers to all types of securities lending, not only those against cash, which of course goes beyond the definition of repos in this report. The table uses official data maintained by central banks or securities regulators.

The data shows that France has by volume by far the largest repo market for government securities. The size of the other markets is limited in comparison. As a percentage of the total government securities markets, France's repo market is almost on par with the UK with 37%. Italy, although having the largest amount of government securities outstanding, has the smallest percentage on repo or on loan

(9.5%). The size of the repo markets in the 8 EU countries covered here is not even half of size of the US market.

2. Accounting practices

The accounting treatment of repurchase agreements commonly reflects the economic, rather than the legal nature of the transaction.⁷ The rationale behind the accounting treatment of repos is that at the end of the transaction, the underlying security goes back to the original owner. This means that the cash borrower/securities lender remains exposed to movements in the price of the security during the time of the transaction. This is the case despite the fact that legal ownership of the security is, during this time, transferred to somebody else, the cash lender/securities borrower. The underlying security remains on the balance sheet of the cash borrower/securities lender and is not recorded on the balance sheet of the cash lender/securities borrower.

Thus, the balance sheet of the cash borrower/securities lender expands by the size of the repo. At the time of entering into the repo contract, the security used as collateral in the repo transaction remains on the asset side of the balance sheet; a footnote points to the fact that the security has been repoed out. The cash received as a result of the repo is recorded as 'cash' also on the asset side, while the corresponding entry on the liabilities side is a 'loan'.

The balance sheet of the cash lender/securities borrower does not expand as a result of entering into a repo. The asset side is switched from 'cash' to 'loan' and a footnote to the accounts will show the future requirement to complete the second leg of the repo when the 'loan' is unwound.

This means that the balance sheet of credit institutions involved in repo transactions differs from the entries in the securities depositories. The security remains on the balance sheet of the cash borrower/securities lender, even though it has moved to the cash lender/securities borrower's account at the depository. Meanwhile, the balance sheet of the cash lender/securities borrower shows a loan, rather than a security, even though it has legal ownership of it.

3. Legal documentation/master agreements

In most jurisdictions, some form of legal documentation is used to establish the terms and conditions of repurchase agreements. This legal documentation often comes in the form of a 'master agreement', which "defines the terms that apply to all or a defined subset of transactions between parties, including remedies in the event of counterparty default".⁸ The use of master agreements contributes to efficiency of transactions, since the legal and credit terms do not have to be negotiated transaction by transaction. Another benefit is that the collateral taker can dispose of collateral immediately on the occurrence of the default. It is commonly acknowledged that the failure to use master agreements can increase the credit risk involved in repurchase agreements.

⁷ This section is based on Bank of England (1998).

⁸ IOSCO and CPSS (1999).

In many jurisdictions national master agreements exist, which are used predominantly for domestic transactions. In some markets, the domestic contracts are also used for cross-border repos.⁹ It is more common, however, to use the PSA/ISMA Global Master Agreement, which was developed by the Public Securities Authority (now the Bond Dealers Association) and the International Securities Market Association (ISMA).

So far, there is no single standard of legal documentation on a European level. Market participants argue that this lack of standard creates uncertainty and keeps the costs of repo transactions high. To fill the void, the European Banking Federation and the European Savings Banks Group agreed to the Euro Master Agreement (EMA) on 29 October 1999. The EMA merges various master agreements used within the euro zone and certain neighbouring countries into a single set of harmonised documents. Using the same text all over the EU, EMA is based on a multi-jurisdictional approach, although the counterparties can choose the applicable law. Moreover, it is multi-product in that it can cover many types of financial market transactions, including swaps, forwards and derivatives. The initial version addresses repos and securities lending. The EMA should come into force by the end of the year 2000. It is being translated in the different languages of the countries of the euro zone and checked on its conformity with national law.¹⁰ However, as one repo trader reported: "the different legal environments and to some degree fiscal differences make it extremely difficult to get this document accepted euro-wide for the time being".¹¹

4. Principles of best practice

In order to contain the risk involved in repo operations and ensure safe and sound operations, it is important that certain market practices are followed. These include taking initial margins, daily marking to market of the value of the collateral and ensuring that the top-up collateral is transferred on the same day. Furthermore, repo agreements should be covered by an appropriate legal documentation.

In some countries, codes of best practice have been designed, which encourage safe and sound market practices. In the UK, for example, there exists a 'Gilt Repo Code of Best Practice', which establishes principles of best practice.¹² Often, principles of best practice are also included in the master agreements.

II. The Impact of EMU

The integration of European repo markets has been stimulated by the start of EMU and the introduction of a single monetary policy in the eleven member states that are part of it. The harmonisation of the operational framework for monetary policy at the

⁹ Mainly the French and German form of master agreements (Bosch, 1999).

¹⁰ For further discussion of Master Agreements, see the Giovannini Report (1999) and Bosch (1999). A copy of the EMA can be downloaded from the website of the European Banking Federation (www.fbe.be).

¹¹ Godfried De Vids of Fortis Bank and the European Repo Council in ECB (2000c).

¹² Bank of England (1998). The 'Gilt Repo Code of Best Practice' can be found on the webpage of the Bank of England.

level of the participating National Central Banks (NCBs) in the eurosystem has contributed to overall integration of the markets. Repurchase agreement are used as the main monetary policy instrument of the European System of Central Banks (ESCB), which, in turn, has stimulated the spread of this instrument in other transactions. Eligible collateral for monetary policy operations was harmonised at EMU level.

Although the ECB's monetary policy decisions are centralised, the execution of monetary policy operations has remained at the national level. In order to accommodate national preferences, the procedures for the execution were not fully harmonised. This existence of different operational procedures at NCB level is reflected in differences in local market practices, which in turn contributes to fragmentation of the euro markets. Thus, the national differences in execution of ECB monetary policy are one element hampering further integration of European repo markets. This chapter will first outline the operational framework of the ECB and then discuss the implications for repo markets.

A. The operational framework of the ECB

The ESCB operational framework for monetary policy operations consists of open market operations, standing facilities and minimum reserves. Open market operations, aimed at the provision or absorption of liquidity, consist of four main types, which differ in frequency and maturity, all of which can be either liquidity providing or absorbing.¹³

- ***Main refinancing operations (MRO)***: regular reverse transactions with a weekly frequency and a maturity of two weeks;
- ***Longer-term refinancing operations (LTRO)***: reverse transactions with a monthly frequency and a maturity of three months, intended to cater for a limited part of the total re-financing volume;
- ***Fine-tuning operations***: adapted to the prevailing circumstances and to the specific objectives of managing the liquidity situation in the market or of steering interest rates; and,
- ***Structural operations***: intended to affect the structural position of the banking system vis-a-vis the ESCB.

Different types of instruments can be used for these operations: repurchase agreements or collateralised loans, outright purchases, issuance of ESCB debt certificates, foreign exchange swaps and collection of fixed term deposits, employed in combination with three different procedures (normal and quick tenders, as well as bilateral procedures).

As part of the standing facilities, the ECB provides and absorbs overnight liquidity at fixed rates. The marginal lending facility thus sets a ceiling and the deposit facility a floor for overnight rates. The marginal lending rate stands 1% above the interest rate of the main refinancing operations, the deposit facility 1% below.

¹³ See ECB (1998b).

Open market operations are executed by all the participating NCBs at the same time and under the same conditions, but not necessarily under the same procedures. Bilateral operations are executed on a rotating basis by small groups of different NCB's. Standard tenders for refinancing operations are announced at the end of a business day (t-1), with a deadline for submissions at 9:30am the following day (t). Tender results are made public two hours later, with settlement following the day after (t+1). With quick tenders, this process happens over 2 hours. The ECB can either set a fixed rate or a fixed quantity. Monetary policy is executed through the ESCB's real time payment system TARGET.

A remunerated reserve requirement of 2% is applied on deposits of banks and financial institutions that hold accounts with the ESCB. The reserve requirement applies to the following items of the liability base: overnight deposits; deposits with agreed maturity up to 2 years; deposits redeemable at notice up to 2 years; debt securities issued with agreed maturity up to 2 years; and money market paper. The holdings can be averaged over a certain period so that banks have some leeway in their liquidity management.¹⁴

Institutions subject to the reserve requirement are eligible for standing facilities and regular open market operations. Counterparties for monetary policy operations must be located in the euro area, and at least be subject to harmonised supervision at European Economic Area (EEA) level as further to the Second Banking Directive. At the end of the day, all debit positions of counterparties are automatically considered as a recourse to the marginal lending facility.

So far, the ECB has essentially used repurchase agreements for the main refinancing operations and the longer-term refinancing operations. Other instruments have only been used marginally.

Lending by the ESCB (liquidity-providing operations) has to be based on adequate collateral (Art 18 of the ESCB statutes). With the aim of protecting the ESCB from incurring losses in its monetary policy operations or in the provision of intraday credit in TARGET, ensuring the equal treatment of counterparties and enhancing operational efficiency, underlying assets have to fulfil certain criteria in order to be eligible for ESCB monetary policy operations. The list of eligible assets, first published by the ECB on 26 October 1998, are deemed by the ECB to fulfil these criteria.¹⁵

Eligible assets as collateral for ESCB credit operations are subdivided in two tiers. This does not imply a difference in the quality of the assets or their eligibility, but reflects differences in financial structures across the Member States.

¹⁴ Council Regulation (EC) No. 2531/98 concerning the application of minimum reserves by the ECB, Official Journal, 27.11.1998. The Council Regulation specifies three aspects of the ESCB's minimum reserve system, namely the reserve base, the maximum permissible reserve ratio and the sanctions to be imposed in cases of non-compliance. All other features of the system may be decided upon by the ECB within the limits set by the Statute of the ESCB and the Council Regulation. The ECB Regulation on the application of minimum reserves, adopted on 1 December 1998, defines the applicable reserve ratios, the institutions subject to reserve requirements, the calculation of reserve requirements, and the remuneration of holdings of required reserves.

¹⁵ See ECB web site (www.ecb.int) for more information and continuous updates of the eligible assets.

- **Tier one:** consists of marketable debt instruments which fulfil uniform euro area-wide eligibility criteria specified by the ECB. The assets must be located in the euro area and denominated in euro, the issuer can be located in the European Economic Area (EEA, the EU plus Norway, Iceland, Liechtenstein);
- **Tier two:** consists of additional assets, marketable and non-marketable (loans on the books of banks), which are of particular importance for national financial markets and banking systems and for which eligibility criteria are established by national central banks, subject to the minimum eligibility criteria established by the ECB. The assets must also be located in the euro area, denominated in euro, and the issuer needs to be located in the euro area.

No distinction is made between the two tiers with regard to the quality of the assets and their eligibility for the various types of ESCB monetary policy operations (with the exception that tier two assets are not normally used by the ESCB in outright transactions). At present, the list of eligible assets contains around 19,000 tier one assets and around 1,800 marketable tier two assets. The outstanding value of marketable assets amounted to € 6,156 bn at the end of 1999. Non-marketable tier two assets are not included in the list on an asset-by-asset basis. Table 4 shows the eligible assets for Eurosystem monetary policy operations.

Table 4: Eligible assets for Eurosystem monetary policy operations

Criteria	Tier one	Tier two
Type of asset	<ul style="list-style-type: none"> • ECB debt certificates; • Marketable debt instruments. 	<ul style="list-style-type: none"> • Marketable debt instruments; • Non-marketable debt • Equities securities traded on a regulated market.
Settlement procedures	<ul style="list-style-type: none"> • Instruments must be centrally deposited in book-entry form with national central banks or a CSD fulfilling the ECB's minimum standards 	<ul style="list-style-type: none"> • Assets must be easily accessible to the national central bank which has included them in its two list.
Type of issuer	<ul style="list-style-type: none"> • ESCB; • Public sector; • Private sector; • International and supra-national institutions. 	<ul style="list-style-type: none"> • Public sector; • Private sector.
Credit standard	<ul style="list-style-type: none"> • The issuer (guarantor) must be deemed financially sound by the ECB. 	<ul style="list-style-type: none"> • The issuer/debtor (guarantor) must be deemed financially sound by the national central bank which had included the asset in its tier two list.
Place of establishment of the issuer (of guarantor)	<ul style="list-style-type: none"> • EEA.^{a)} 	<ul style="list-style-type: none"> • Euro area.
Location of asset	<ul style="list-style-type: none"> • Euro area. 	<ul style="list-style-type: none"> • Euro area.
Currency	<ul style="list-style-type: none"> • Euro. 	<ul style="list-style-type: none"> • Euro.
Cross-border use	<ul style="list-style-type: none"> • Yes 	<ul style="list-style-type: none"> • Yes (<i>in principle</i>)

Note: a) The requirements that the issuing entity must be established in the EEA does not apply to international and supra-national institutions.

Source: ECB (2000c).

Both forms of assets can be used on a cross-border basis within EMU, i.e. counterparties may obtain funds from the national central bank of the member state in which they are established by making use of assets located in another member state. The ESCB has therefore instituted a 'correspondent central banking model' (CCBM), under which central banks act as custodians for each other. The CCBM is however a temporary solution, in the expectation of closer links between the different domestic settlement systems. Under the CCBM, counterparties in the monetary policy operations of the Eurosystem can obtain credit from their home NCBs, but use collateral held in other countries. The counterparty must arrange with the Security Settlement System (SSS), where the collateral has been deposited, for the collateral to be delivered to an account maintained by the local NCB. This local NCB will then hold the collateral on behalf of the central bank granting the credit and thus act as the correspondent central bank. By December 1999, collateral worth € 162.7 bn. was held through the CCBM, while € 35.8 bn. was provided through links with SSS that comply with the ECB standards (ECB, 2000b). This corresponds to about 3.6% of all collateral in the eurosystem. The share has increased rapidly in the first months of EMU, and is expected to increase even further in the coming months, as a result of the consolidation in the SSS industry (see Chapter III.).

Risk control measures are applied to collateralised assets. The value of the underlying assets must be equal to the amount of the credit granted plus a 2% initial margin, taking into account the exposure time for the ECB. In addition, valuation margin of up to 5% will be applied, according to the residual maturity of the assets (with probably a larger margin for tier two assets).

All assets eligible to be used in monetary policy operations can also be used to collateralise intraday credit in TARGET. In addition, for the collateralisation of intraday credit, TARGET participants may use collateral proposed by EU central banks of non-participating member-states. EU central banks in participating Member States can admit such collateral, but only for the purpose of collateralising intraday credit. Such collateral will have the same quality standards as the assets eligible in the euro area. These assets are not included in the list of eligible assets published by the ECB.

The list of eligible assets is updated on the Internet on a weekly basis. The updates are made available to the public at 8 a.m. ECB time (C.E.T.) each Friday. In addition, the ECB reserves the right to exclude, at any time, individual assets from use in ESCB monetary policy operations. Procedures for monitoring and continuous checking have been put in place to ensure that the list remains up-to-date, accurate and consistent.

B. The functioning of the framework

Overall, the operational framework has functioned well. Although the framework was initially seen as too complex as a result of the decentralised execution, this has not hampered the effectiveness of the single monetary policy. The most striking problem was the overbidding for MROs, but this was tackled by the ECB in the meantime. The

other problems are less evident to be solved, and related to differences in collateralisation techniques in the Eurosystem.

1. From fixed to variable rate tenders

In terms of volume, the most important instrument for regulating liquidity are the main refinancing operations (MRO), while longer term refinancing operations and standing facilities are used to a much lesser extent. At the end of July 2000, for example, main refinancing operations accounted for 72.4% of lending to the financial sector, longer term refinancing operations for 27.5%.

Initially, the weekly auctions of the MROs were executed through fixed rate tenders, but in June 2000, ECB moved to variable tenders. The reason for the change was that the MROs had increasingly suffered from overbidding at these weekly auctions, a trend which was intensified by the ECB policy of gradually raising official interest rates from early 2000 onwards. On average, the allotment ratio (amount of bids/volume allotted) under the system of fixed rates stood on average well below 10 %, with a declining trend. On 7 June 2000, for example, it stood at a mere 0.9%, just before the increase of the Lombard rate to 4.25%. Banks' fear of remaining underfunded led to submitting excessive bids. At the MRO auction of 7 June 2000, for example, the number of bids amounted to 8,491 bn. euros, which is well above the total amount of collateral for open market operations available in the euro area.

The practice of overbidding at these auctions was undesirable for a number of reasons.¹⁶ First, it distorted the information content of the auction results for the ECB from the point of view of conducting monetary policy. These results should provide the ECB with information about the liquidity demand of the banking sector, which is an important factor in monetary policy analysis of a central bank. Under the system of fixed rate auctions, counterparties in monetary policy operations submitted bids in excess of their true demands of liquidity, which eroded the information content of the auctions, thereby making the ECB's liquidity forecasting more difficult. Second, it introduced an undesirable element of uncertainty. The financial institutions taking part in the auctions were uncertain as to what percentage of their bid would be satisfied at the auctions. Often, excess collateral had to be reserved to settle the transactions, which means that it could not be used in other transactions. Thus, it was not put to its most efficient use and meant that the price of these funds, i. e. the price at which the tenders were held, did not represent the true cost of funds to the financial institutions. Thirdly, it introduced an undesirable distortion in financial markets, as big banks with fairly readily available collateral of an unexpected large allocation would place very large bids and squeeze smaller banks out of the market.

Before EMU, several central banks worked with fixed rate tenders, but they were able to limit the problem of overbidding by requiring counterparties to have a sufficient amount of collateral available to cover full bids. In EMU, this did not work, primarily because techniques of collateralisation differ. The advantage of the fixed rate tenders was the clear signalling of the monetary policy stance.

¹⁶ See Stadler (1999).

After 18 months into EMU, and with a well functioning framework, the ECB Governing Council decided on 8 June, to move to variable rate tenders. Under the new system, a given amount of liquidity is tendered to the market, from a certain minimum rate onwards. Bids with the highest interest rate levels are satisfied first, and bids with lower rates will be accepted until the total liquidity is allotted.¹⁷ The first experience is accommodating, since the weighted average rate of all accepted rates under the variable rate stood at 4.31% during the first weeks, 6 basic point above the minimum bid rate. The allotment ratio increased drastically and has varied between 26% and 56% so far. There are also no signs that the move has increased the variability of money market rates.

2. Towards a greater harmonisation in collateralisation techniques

The decentralised execution of monetary policy remains an important impediment to further market integration. Given that the national central banks execute reverse and fine-tuning operations, national markets have them as their main contact with the system. NCBs collect repo bids from local markets and send them to a central computer in Frankfurt, which allocates the repos according to the ECBs criteria, once all bids are collected and the market price is determined. Execution is in the hands of the local central banks.

The main problem here is that marked differences exist in the way collateral is managed by the individual NCBs. Some countries use a repo system (delivery versus payment, DVP), while others use a pooling system.

- In the **pooling system**, the eligible credit institution bidding for central bank credit is required to pre-deposit (or *pledge*) the collateral at the central bank in a collateral pool *before* submitting its bid. The credit institution submitting the bid will only know at the end of the business day which exact securities of the pool have been used as collateral. This means that the entire collateral pool - which usually is much larger than what will be needed as collateral - is blocked and cannot be used in other transactions. The foregone interest that could have been earned on such transactions represents a cost to the credit institution and introduces distortions in eurozone money market interest rates.
- Under the **repo system**, collateral is earmarked to a particular credit. There is no need to pre-deposit collateral at the NCB in a repo transaction and the credit institution itself can decide which securities to deposit at the time of settlement (t+1). It can be used on day t, which is not possible for institutions in countries with a pooling system. This difference does not only represent a disadvantage for the countries that use a pooling system, but is also a status quo maintaining practice which hampers integration of market practices.

Moreover, pooling and repo techniques differ between countries in terms of legal basis, regulatory environment, messaging, timing and procedures, including the margining process. For the cross-border use of collateral, additional procedures are used. Since the CCBM is used for cross-border transactions, different procedures

¹⁷ See ECB press release 'Switch to variable rate tenders in main refinancing operations' of 16 June 2000.

may be required to settle central bank credit operations. The difference in collateral management systems is a particular problem for the settlement of a 'global' repo (i.e. collateralised transactions involving many different underlying securities, implying one settlement of cash against a number of settlements of securities). With different settlement procedures, it can be difficult to know when a transaction can be considered as finally settled. Thus, the existence of different systems represents an obstacle to further integration of financial markets – repo markets included – in the Euro area.

Although it can be argued that it is desirable, and even necessary, to harmonise collateral management procedures, the question remains whether it is possible, to do so. Opponents argue that, first, the different systems are too closely related with the different banking systems and, second, that harmonisation will be too burdensome. It all comes back to the fundamental question of the degree of centralisation in the Eurosystem. Two groups are likely to oppose harmonisation. First, participating central banks may wish to maintain some residual powers and will therefore resist harmonisation. This can also be related to the question of financial stability control in the Eurosystem, which is a competence of the NCBs, not of the ECB. If harmonisation is pursued, it would make it easier for the ECB to take closer control of financial stability as well. Today, the ECB has to go via the NCBs if it wants to steer liquidity in the markets. A second group opposing harmonisation would be the smaller banks. Harmonisation of collateral management procedures would essentially benefit the bigger banks. It would help banks with significant operations in several EU countries to further integrate their money markets operations at EU level and further outperform their smaller competitors. As of today, the European banking system is still too fragmented to find much support for harmonisation.

Another element of the set-up for monetary policy that hampers market integration is the freedom given to NCBs on tier two assets. This freedom can be used by NCBs to protect the local market. In fact, there is evidence that some NCBs have refused certain foreign tier two securities as collateral. This has given rise to a demand for greater harmonisation of tier two collateral, which, in turn, is likely to be opposed by countries with less tier one collateral. Another problem is that remote access for financial institutions to other NCBs is not possible. Banks have to work through their own NCB if they want to take part in liquidity providing operations, and arbitrage between the different collateralisation techniques of NCBs is avoided.

III. The Clearing and Settlement Function

The clearing and settlement function is an integral part of financial market transactions: securities settlement systems (SSSs)¹⁸ form the backbone of financial market infrastructure. Unfortunately, their importance is often underestimated as it is essentially seen as an administrative, back-office job. Their continued fragmentation also explains the lack of integration of the EU's repo markets.

¹⁸ Security settlement systems include the national clearing and settlement depositories (CSDs) and the International clearing and settlement depositories (ICSDS), Euroclear and Clearstream International (the former Cedel). This definition conforms with ECB terminology.

This chapter presents the current structure of the European SSSs industry, outlines trends, examines the factors behind the continued fragmentation and raises policy issues related to SSSs.

A. Definitions and clarifications

Clearing and settlement are services that arise from securities trading. The discussion of clearing and settlement is complicated by the lack of exact definitions of key terms. Moreover, many terms are often used interchangeably, which adds to confusion. Before embarking on their role, it is therefore useful to start with a clarification of the different terms.¹⁹

Clearance involves the determination of what each party is due to receiving. **Clearing** is the process of transmitting, reconciling and in some cases confirming payment orders, or security transfer instructions, prior to settlement and the establishment of final positions for settlement. At the end of the clearing process, positions are ready for settlement. The clearing process may also include **netting**, which means that gross positions of two counterparties are set off against each other and the final positions for settlement are established on a net basis.

Settlement is the completion of a transaction, in which the seller transfers securities or other financial instruments to the buyer and the buyer pays the seller. Settlement can be provisional or final. In many cases, the SSS handles the clearing function and the securities side of the settlement directly, while the cash side of the settlement is usually effected through the banking/payment system.

A **clearing house** is a separate entity that clears financial market transactions and provides a range of services related to clearing and settlement and the management of risk associated with such contracts. It can either be a department of an exchange, or a separate legal entity under the holding of an exchange. A clearinghouse often acts as **central counterparty** by being a legal counterparty to both sides of a financial market transaction. Contracts are entered into bilaterally and then transferred to the clearinghouse, which becomes the buyer to every seller, and the seller to every buyer.

The confusion between clearing and settlement arises from the fact that 'clearing' is sometimes used to refer to the *transfer* of securities on the settlement date. However, the transfer is really part of the settlement process. Even if most SSSs handle both the clearing and the settlement of transactions, the processes remain distinct.

B. Implications of the Euro for financial market infrastructure

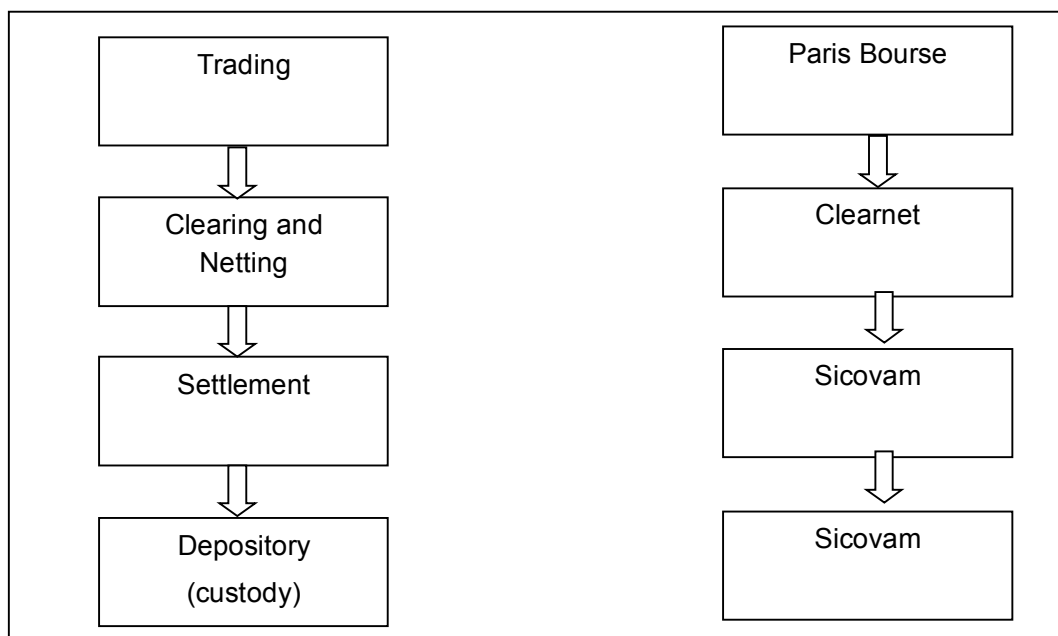
Traditionally, the components of financial market infrastructure were vertically integrated within each country. A trade was executed on a domestic trading platform, cleared through a domestic clearinghouse, settled at a domestic settlement agent and held in a domestic depository. This was true for most national equity and fixed

¹⁹ Based on EMI (1997), IOSCO and CPSS (1999) and Ian Giddy, Anthony Saunders and Ingo Walter (1996).

income markets in Europe. So far, this traditional system of vertical integration has remained more or less in place.²⁰

Graph 1 gives a graphic representation of this system and illustrates it with the example of the French equity market. A share is traded on Paris Bourse, cleared settled through and deposited in Sicovam. A foreign investor can trade on the Paris Bourse as a remote member, but needs to go through a French broker or bank to clear and settle the transaction.

Graph 1: *Structure of national financial market infrastructure and the example of the French equity market.*



This system of vertical integration developed in a Europe that was characterised by distinct national capital markets connected via the foreign exchange market. Different currencies were one of the main reasons for fragmented listing, trading and settlement. However, with the introduction of the euro, technological developments, growing competition and European market integration, this system has come under increasing pressure. The industrial economics of securities clearing and settlement favour greater centralisation of the different components of financial market infrastructure.

1. The advantages of consolidation

Assuming that financial products are fairly homogenous, a more integrated securities settlement infrastructure leads to significant economic welfare gains. Such an

²⁰ Note that although clearing and settlement are distinct processes, in most European countries clearing is carried out by the settlement agent, which often also acts as the depository.

infrastructure would reap gains from economies of scale, economies of scope and, probably, positive network externalities.²¹

Economies of scale stem from the fact that SSSs require large financial investments in information technology and communication networks, which can only be recovered if a critical mass of customers use the same service. Greater integration of SSSs would allow the fixed costs to be spread over a larger number of customers, thereby lowering the unit costs of each transaction.

Economies of scope arise from the fact that SSSs need to provide a wide range of products and services related to settlement, such as clearing, netting and custodial services, in order to attract customers. Two or more SSSs together can provide a larger portfolio of services at a lower unit cost than if they were acting alone. Thus, the more SSSs are integrated, the greater the potential economies of scope.

Network externalities in the SSSs industry arise from the fact that use of the network generates positive effects for the user in terms of service and cost. The viability of the provider of SSS services depends on his ability to attract a critical mass of users. The economics of centralised networks, which can also be applied to finance, can provide users with considerable positive externalities.²²

The argument that a more integrated securities settlement infrastructure leads to significant economic welfare gains is based on the crucial assumption that financial products are homogenous, and markets integrated. At this point in time, financial products within the EU can clearly not be considered homogenous, and markets insufficiently integrated. Nevertheless, the national legal frameworks, tax regimes, and standard market practices in the SSS industry start to become more harmonised.²³ This will considerably reduce heterogeneity and can therefore be expected to lead to greater centralisation and thereby consolidation of clearing and settlement services – a trend that can already be observed.

2. The importance of settlement independence

a) What is settlement independence?

Consolidation was difficult to achieve in the old model of vertical integration of the European financial market infrastructure, as each national clearing and settlement depository (CSD) was linked to the national trading platform. In order to achieve a more horizontally integrated model, which transcends national borders, the tight link between trading and settlement should be loosened. So far, the strong link between trading and settlement makes each national SSS indispensable. It thus acts as a barrier to consolidation of the SSS industry. Thus, for consolidation of SSSs to occur, settlement independence should be achieved.

²¹ For a discussion of the economics of the clearing and settlement industry, see Giddy, Saunders and Walter (1996).

²² See Economides and Himmelberg, 1993.

²³ For the countries of the Eurosystem, one key element of heterogeneity – the different currencies – has already been eliminated.

The link between stock exchanges and settlement systems is particularly strong - mainly because the national settlement body is often owned by the national stock exchange itself. The link has historically been less strong in the fixed income market, as most trades are conducted on an OTC-basis and can therefore be cleared and settled in any system. However, now that bond trading increasingly takes place on trading platforms (e.g. Euro-MTS, the largest platform for trading European government bonds²⁴), the consolidation of the settlement industry is becoming more of an issue in the fixed income market as well. Fragmentation of the European clearing and settlement business increases the cost of trading, also in the fixed income business.

b) Market developments

Signs of change can already be observed in the financial market infrastructure of the Euro countries. The introduction of the Euro has unleashed competitive pressures, which have already led to various alliances between stock exchanges, clearing houses and settlement systems. The increased level of competition between trading platforms, heightened by the creation of electronic trading systems, can be expected to result in traditional stock exchanges focusing more on their core business: listing, trading and price dissemination. One likely consequence of this will be the loosening of the link with the settlement bodies, which will facilitate independence of the CSDs and thereby further horizontal integration.

Furthermore, a trend towards domestic consolidation of CSDs can be observed. Several EU member states had multiple SSSs at the beginning of 1999, some of which have since merged. Spain is one example. SCL and Espaclear, two of the six domestic CSDs, merged in 1999 and more mergers are likely among the remaining ones.

In addition, there are other signs that market participants are no longer willing to accept the fragmentation of SSSs and the inefficiency this leads to for European investors. The European Securities User's Industry Group (ESUIG), an *ad hoc* group of major users of the settlement infrastructure in Europe, released a statement in May 1999 about the principles on which the future structure of the SSS industry should be based. Recognising the industrial economics of the SSSs industry, the group said that it favoured a single, integrated process in Europe for clearing and settlement of debt and equity transactions. It further stated that it was not prepared to pay for duplicate developments.²⁵ This strongly reflects the demands from the market for a more integrated and competitive system of SSSs in Europe.

²⁴ Euro-MTS provides a screen-based service for trading benchmark euro-denominated government bonds in lot sizes of 5 million. The system engenders considerable benefits in terms of straight through processing links by offering direct settlement links and automatically provides instructions for both sides of the trade to the appropriate central securities depository. Euro-MTS began its operations at the end of March 1999, and has already become the largest trading platform for government bonds.

²⁵ Press release by UBS (1999).

C. Different models of consolidation

Despite the introduction of the Euro, all of the 26 European CSDs and the two ICSDs, Euroclear and Clearstream, have remained in operation.²⁶ The US, for comparison, has 3 securities settlement systems, while it has a more developed securities market. Nevertheless, proposals have been made to achieve further integration of SSSs. More specifically, three different models have been proposed. One aims at maintaining the existing structure of national SSSs by linking together the individual systems (the Eurolinks model). The other two are based on an increased centralisation of services, while maintaining more (the hub and spokes model) or less (the European Clearing House model) of the existing national SSSs. These models are discussed below.

1. ECSDA's Eurolinks model

Anticipating the increased competitive pressure on infrastructure providers, the national CSDs of the EU formed an alliance in 1997. The alliance, known as the European Central Securities Depository Association (ECSDA), proposed to link together the existing national CSDs in the Eurolinks model. Euroclear and Cedel were excluded from this association. Indeed, the Eurolinks model was aimed at eliminating the need to use either of them.

The Eurolinks model attempted to cater for the increased use of cross-border transactions that were expected to come with the creation of the single currency. The aim was for each national CSD to build a link with every other national CSD, thereby creating a web of bilateral relationships.²⁷ In this model, each CSD would become a gateway into every other CSD, thereby providing a single point of entry into the European market for the national investor. For this to work, each CSD would have to have an account at every other CSD. If a home investor in this model owned foreign securities which have been issued in country A, the 'home' CSD would hold these securities, on behalf of the investor, in an account at the CSD of country A. For example: if an Italian investor owned French government bonds, his home CSD (Monte Titoli) would hold the bonds, on his behalf, in an account at the French CSD (Sicovam). The holdings of the individual investor would only be documented in the home CSD - in the above example the Italian one. The law of the issuing country would therefore govern these holdings.²⁸

The ECSDA model is motivated mainly by the protective desire of the national CSDs to survive at a time where rationalisation is needed. It is not clear, however, whether cost savings will be sufficient to generate a competitive advantage over the other two models. Rather than integrating systems, the ECSDA model merely envisages linking the existing infrastructure of the individual systems together. Technical integration would therefore be limited, as would cost savings. Even though there are market

²⁶ Clearstream is the entity that has been created after the merger of Cedel and Deutsche Börse Clearing.

²⁷ This model is also sometimes called the 'spaghetti model'.

²⁸ Or the jurisdiction of the relevant intermediary, if Article 9(2) of the Settlement Finality Directive applies - see Richard Potok (1999).

pressures to develop cheaper technology, there may be too many players and national interests to find consensus. Furthermore, new investments are needed in order to provide facilities for cross-border transactions. This could even increase costs.

Overall, the fundamental flaw of the ECSDA model is that linking together such a large number of systems is very difficult to achieve. With 26 CSDs in the EU, a very large number of links is necessary to create such a web of relationships. If n CSDs form a system of bi-directional links, the total number of connections will be $n(n-1)$. This means that 650 bilateral links would be necessary to link together all the national CSDs.²⁹ The progress so far illustrates the problems involved. So far, only 53 links have been found to comply with ECB standards.³⁰ In addition, it might not be profitable to build links between some countries, for example Portugal and Ireland. Indeed, neither of these countries has a single ECB-approved link. This highlights the fundamental weakness of the Eurolinks approach to achieving integration, which only works if most of the existing CSDs are linked together.

Despite these weaknesses, national interests are likely to work in favour of this model – for a while at least. As long as elements of heterogeneity in Euro area financial products (as pointed out above) remain, national markets will continue to exist. This will favour the ECSDA model. However, as integration continues, ECSDA's fortunes will undoubtedly diminish. This is already clear as a result of the alliances. Several ECSDA members are at the same time member of the two other models explained below.

2. Euroclear's hub and spoke model

In the pre-euro world, the market for settlement was divided between the national CSDs, dealing with domestic transactions, and the European ICSDs, dealing with cross-border transactions. With the emergence of a Euro-denominated securities market, this division is no longer valid. The national CSDs have found themselves in direct competition with the ICSDs.

As a consequence, Euroclear has proposed a new settlement division - the hub and spokes model. The idea is that each national CSD (the spoke) will be linked to a central hub. The spokes will continue to carry out domestic transactions, while cross-border transactions will be routed through the hub. For example, a transaction between Italy and France will be routed from Monte Titoli via Euroclear (the hub) to Sicovam. Also, the hub can be used as a gateway for a European investor into non-European markets (and vice versa).

Although the model has existed for some years, Euroclear only formally proposed to adopt it in May 1999. At that stage, Euroclear attempted to merge with Cedel in order to provide a single European hub. Cedel rejected the offer and instead merged with DBC to form the European Clearing House (later called Clearstream) in the same

²⁹ As there are 26 CSDs in the EU, there are therefore $26 \times 25 = 650$ possible links.

³⁰ ECB (2000). The number of links is uneven because the link from Deutsche Börse Clearing to Euroclear is not eligible, while the link in the other way is. The objective of the ECB standards is to protect the bank from the risks in the settlement of operations. It concerns criteria on legal soundness, settlement, custody, supervision, transparency and risk management procedures

month. They invited all domestic European CSDs, and Euroclear, to join. At the time of the original announcement, Sicovam signed a memorandum of understanding to join this new entity. However, six months of negotiations failed to produce an agreement. Instead, Sicovam announced on November 23 1999 that it had formed a strategic alliance with Euroclear.

This alliance is a significant event in the competitive repositioning of Euroclear to adapt to the euro capital market. On November 4 1999, it was announced that Euroclear, together with London Clearing House (LCH) and the US Government Securities Clearing Corporation (GSCC), would offer a joint facility for settling and netting European government debt securities from the beginning of 2000, including also repos. The new entity is called the European Securities Clearing Corporation (ESCC) and will be based on LCH's Repoclear. Furthermore, from the beginning of 2000, Euroclear will settle Eurobond trades that are executed on ISMA's new electronic trading system Cordeal.

The alliance between Euroclear and Sicovam certainly looks as an important step towards a more integrated SSSs landscape in the Euro area. It is not clear, however, what the structure of the new alliance will be. It is unlikely that Sicovam will accept the status of merely being a spoke while leaving all the cross-border transactions to Euroclear. Thus, it is likely that the outcome of Euroclear's efforts to promote consolidation will be somewhat different from the theoretical model it proposed. But as long as it provides a sufficient degree of consolidation, the market is likely to favour it.

Critics of this model argue that there are no incentives for the national CSDs to create links with the hub. The hub would handle all the profitable business only leaving peripheral activities for the spokes.³¹ In this model, efficiency gains can be expected from the fact that the spokes can use the cross-border facilities of the hub, while the hub does not need to get involved in servicing a large number of sub-accounts at the retail level. Also, the required number of links between systems in the EU is only 56.³² So far, the process of creating these links has been fairly slow. By the end of May, there were four bilateral links with the Euroclear system: CREST, the real-time settlement system for UK and Irish equities; Italy's Monte Titoli; Belgium's BXS-CIK; Sicovam. It is clear that the success of the hub and spokes model crucially depends on establishing more efficient and sound links to national CSDs.

3. Clearstream's European Clearing House Model

Another model for the integration of SSS was Cedel's European Clearing House model. Rather than establishing links between the existing CSDs, the Clearing House model was based on the idea that all the national CSDs should merge with Cedel. This would create a single central European clearing and settlement platform and would take away the separation between domestic and cross-border transactions. However, if a CSD were reluctant to agree to an outright merger, it would also have the option of creating a bilateral link with Cedel.

³¹ Scott-Quinn and Walmsley (1999).

³² There are 28 SSSs in the EU, including Cedel. Thus, the number of bilateral links is 28*2.

The first, and so far only merger of this type was the one with Deutsche Börse Clearing. The new legal entity, Clearstream International, is owned 50% by Cedel and 50% by Deutsche Börse Clearing.³³ At the time of creation, CEDEL and DBC argued that the European clearing house allow standardised access to all markets, an in-house clearing facility to enhance collateral management, borrowing and stock lending, and greater efficiencies via aggregation of volumes. It was estimated that the eradication of duplication of processes would save the market up to \$ 250 million per year.

The failed agreement with Sicovam may be indicative of the reluctance of national CSDs to agree to an outright merger, as this would mean that they ceased to exist in their own right. Although theoretically the model could bring the necessary integration and consolidation to the European market for SSSs, it would in practice be very difficult for the CSDs to give up their national identity. On the other hand, in so far as this model contemplates mere link-ups, it is difficult to see how this differs from Euroclear's hub and spokes model.

Another concern that has been expressed is that the new entity will be using the new Creation software, which was developed by the former Cedel. It has barely been tested in a live environment and, as it was developed mainly for cross-border settlement, it is not clear how the software will manage the additional complexity of domestic activities that will have to be dealt with as national CSDs join.

Market developments seem in the meantime to favour a greater centralisation of services. The two dominant new stock exchange models which have emerged over the last months, iX and Euronext, coincide each with one of the more centralised models, Clearstream, respectively and Euroclear. However, this does not mean that the Eurolinks model is out. CREST, the prime mover behind Eurolinks, is as large as Clearstream, which is in turn larger than the Euroclear/Sicovam Alliance. CREST and the Swiss could still play a major role in shaping the future CSD landscape by joining one or the other of the rival alliances with some of the undecided parties. CRESTCo acts as clearer for Irish and UK equities of Tradepoint, a European equity trading platform, which has just formed an alliance with Swiss Exchange.

D. Issues for Policy

The continued fragmentation of SSSs in Europe is an obstacle to further integration of capital markets in general and repo markets in particular. Despite increasing cross-border activity in the financial markets, SSSs are far from fully adapted, which is one of the reasons why the repo market continues to be so fragmented. In most cases, it remains easier to carry out domestic rather than cross-border transactions. Integration of SSSs is essential for the creation of a truly European financial market and for the increased efficiency of repo markets.

A more integrated system of SSSs is necessary for the Correspondent Central Banking Model (CCBM) to be phased out. This is a medium term goal of the ECB. However, the ECB remains neutral with respect to the different models for

³³ Clearstream (2000).

consolidation: "As the standards of the Eurosystem are compatible with the three models [...] the Eurosystem will leave it to market forces to decide the lines along which the restructuring should take place".³⁴ At the same time, the ECB emphasises that forces of consolidation will be met with great resistance given that the segmentation of different markets has existed for so long.

The ECB's view can be supported. However, the CCBM can also be seen as a form of protection for the different CSDs. It provides the CSDs with further respite to adapt to the Euromarket. It is thus crucial to monitor statements by the ECB on the continuation of the CCBM. Since the national CSDs are so closely linked with the national central banks, they may ensure that their survival is guaranteed before agreeing with the suspension of the CCBM.

First, in order to achieve an efficient operation of financial markets during the phase of consolidation, it is necessary to ensure that DVP linkages between European SSSs improve so that increased cross-border activity can be accommodated. So far, only FOB links exist, which is not sufficient to create true integration. To this end, the ECB's regular assessment of the links between SSSs contributes to the integration of the system. Second, the current supervisory framework needs to be re-assessed and the question of whether a European-wide supervision of SSSs is needed, as the consolidation of the SSS industry has implications for systemic risk. Euroclear and Clearstream are regulated by the regulator of the country in which they are based, i.e. by the National Bank of Belgium³⁵ and the Banque Centrale du Luxembourg respectively (see Annex I for an overview of European SSSs and their regulators). Their increasing linkages with other European CSDs and the rise in cross-border activity means that this level of surveillance may no longer be adequate, or that the risks to which the national central banks are exposed may exceed their means, and acquire euro-wide systemic dimensions.

This does, however, raise a sensitive issue. The ECB has only a very limited role in financial supervision and stability, which remains the competence of the member states. This can only be changed as the result of a formal decision by the EU Council, on a proposal from the Commission under Article 105.6 of the EU Treaty. Within the current structure, there is a clear danger that the risks faced by national central banks in supervising integrated clearing and settlement systems reaches far beyond their capacities.

Third, policy makers should consider to what extent the fragmentation of SSSs in Europe is actually maintained by the current decentralised structure of the Eurosystem. As outlined in Chapter 2, methods of collateral management differ among the Euro countries NCBs. As the private market is heavily influenced by practices in the official market, the system of decentralised execution of monetary policy actually contributes to heterogeneity and maintains fragmentation in the private

³⁴ "Payment and Settlement Systems in EMU", Speech by Tommaso Padoa-Schioppa, 13 September 1999.

³⁵ Euroclear used to be supervised by the Fed New York and the State of New York Banking Department while it was managed by Morgan Guarantee Trust Company of New York (MGB). Since the introduction of the euro, it has been subject to the oversight of the National Bank of Belgium, as it changed its legal status to a cooperative.

markets as well. In order to create an integrated system of SSSs, which is a prerequisite for more efficient European repo markets, one of the first issue to be addressed must be the harmonisation of monetary policy procedures of the Eurosystem.

The more unified solution to pan-European clearing and settlement also contains problems, however, as this may lead to monopolistic practices. As a SSS clearly are an example of a network, which generate positive externalities with a greater mass of transactions, clear rules will need to be set as far as entry to these systems is concerned, as well as for pricing. In the longer term, a remaining degree of competition may do markets no harm.

IV. Cross-Border Repos and Legal Certainty

The lack of legal certainty with regards to the validity and enforceability of cross-border collateral is another important obstacle to further integration of European repo markets. The increasing use of global repos has highlighted the desire of market participants to extend collateralisation beyond national borders.³⁶ However, it is essential that this trend is backed by an appropriate legal framework, which ensures that cross-border collateral enjoys the same legal certainty as domestic collateral.

So far, the European framework is insufficient. Differences in national jurisdictions introduce uncertainties, which also have implications for systemic risk. If collateral is not adequately protected in case of counterparty default, it can set off a chain of failures. For the efficiency and integration of European repo markets to improve, these uncertainties with regards to cross-border collateral have to be eliminated. This chapter examines the current regulatory framework for cross-border collateral and discusses the issues that still need to be addressed.

Section one outlines the most important aspects that are required to ensure legal certainty of cross-border collateral. Section two describes the current regulatory framework for cross-border collateral, which addresses a number of important issues, but is not sufficient to ensure legal certainty of all cross-border collateral. This chapter ends with some considerations for policy.

A. The Core Elements of Legal Certainty

1. Full Transfer of Title

In general, the collateral underlying a repo transaction is provided to the collateral taker by way of **outright transfer**, rather than by creating a securities interest (or pledge). It is only if securities are provided by way of outright transfer that the collateral taker acquires complete ownership of the securities. Even though a repo agreement includes the obligation to redeliver securities equivalent to the original collateral security at the expiry of the agreement, the outright transfer ensures that in

³⁶ A global repo is based on collateral security originating from more than one country.

case of bankruptcy or insolvency of the cash borrower, the cash lender can enforce his legal title to the collateral security.

This is why a repo agreement involves less credit risk for the cash lender than an uncollateralised transaction. In case of a security interest, the collateral taker has only limited proprietary rights in the collateral security, as the collateral giver retains some legal rights over the securities.³⁷ Thus, the full transfer of title to collateral in a repo transaction must be ensured to create legal certainty.

2. Protection from Recharacterisation

Recharacterisation risk is the danger that a court does not recognise that the collateral taker has acquired full legal title to a collateral security. Instead, the court recharacterises the interest of the collateral taker as a **security interest** instead of an outright title. Other than outright transfers, security interests need to be registered in many jurisdictions. The danger is that a security interest could be declared void for want of registration. The collateral would then be worthless and make the collateral taker an unsecured creditor.

The risk of recharacterisation exists in some jurisdictions and causes uncertainty as to whether cross-border collateral is legally enforceable or not. For an efficient pan-European repo market to emerge, collateral must be protected against this kind of risk.

3. Recognition of Insolvency Set-off or Close-out Netting

The purpose of providing collateral in a repo transaction is to ensure that in the case of counterparty default, the cash lender has the right to enforce his legal title to the collateral securities. He is, in this case, freed from the obligation to redeliver the securities at the end of the transaction. This aspect of a repo agreement makes the cash lender a secured, rather than an unsecured creditor. Rather than suing for its assets – as is the case for an unsecured creditor – the collateral taker is released from the obligations to redeliver the securities. However, this right is only enforceable in a jurisdiction where insolvency set-off or close out netting is legally recognised.

If the jurisdiction recognises insolvency set-off, obligations of counterparties are set-off against each other upon counterparty default. This usually follows a four-step approach.³⁸ First, the redelivery date for all outstanding obligations is brought forward to coincide with the date of the default. Second, the obligations of the collateral taker to redeliver equivalent securities are converted into an obligation to pay a cash sum equal to their current market value. Third, all cash sums are converted into the same currency. Fourth, all cash sums owed by one party to another are set off against each other, so that only a net sum is payable by each party. If appropriate margins have been taken and mark to market practices have been followed, this net sum should be

³⁷ In legal terms, the proprietary rights that are retained by the collateral giver are referred to as “the equity of redemption”. This is the right to the return of the securities upon discharge of the secured obligation. Contrary to an outright transfer, this right of return is directly enforceable against the assets. (Benjamin, Joanna (1997))

³⁸ Benjamin, Joanna (1997).

equal to the agreed excess of the value of the collateral over the exposure of the collateral taker to the collateral provider, i.e the margin.³⁹

If insolvency set-off, or close-out netting (or even netting in general) is not supported by the jurisdiction in question, the insolvency official could argue that set-off is not effective to discharge collateral redelivery rights and even though the collateral taker is in possession of the securities, he may be sued. Thus, for legal certainty of cross-border collateral to improve, it must be ensured that insolvency set off and netting practices are recognised on a European wide basis.

4. Recognition of Top-up Collateral

Sound market practices for management of collateral involve **marking to market**, i.e. regularly adjusting the value of the collateral to its market value. As a result, margin calls are made to cover the exposure that arises from price movements. If the collateral has lost value, the collateral giver needs to provide the collateral taker with more collateral to re-adjust the total value of the collateral so that the exposure is covered again. This additional collateral is referred to as **top-up collateral**. It can involve large amounts if price movements are large. It is important that it has the same legal status as the initial collateral if it is to protect the cash lender from exposure.

The lack of recognition of top-up collateral can have implications for systemic risk. If default occurs in times of volatility, large price movements can lead to large amounts of collateral being transferred. If such large amounts are not included in the insolvency set-off, this could have significant implications for the collateral taker and his creditors (which might already be under pressure) and have substantial knock-on effects with even systemic implications – as recent crisis in financial markets have shown.

5. Protection from Retroactivity

Collateral needs to be protected from retroactivity. If the legal title was made during a specific period prior to insolvency, the suspect or preference period; there is a risk that the legal title to collateral might be invalidated during the insolvency procedures. In this case, it might not be included in the insolvency set-off calculation and the collateral taker essentially becomes an unsecured creditor.

In addition, the collateral might be subject to the “zero hour” rule, which exists in some jurisdictions.⁴⁰ According to this rule, formal insolvency proceedings start at the midnight immediately preceding the time that the formal insolvency proceedings were initiated. Accordingly, all transactions become void from the midnight before the actual openings of insolvency proceedings. A liquidator could challenge transactions initiated during this time and insist that the collateral is returned to the failed institution. In order to ensure legal certainty of validity and enforceability of collateral, it must be protected even if it was transferred during the preference period or after the ‘zero hour’, for the same reasons that it is important to protect top-up collateral.

³⁹ The collateral taker must sue for margin as an unsecured debt.

⁴⁰ The zero hour rule exists in the Netherlands, Austria and Italy.

6. Recognition of Substitution

The rights of substitution is the right of the collateral giver to repossess the collateral security and substitute another security in its place. This market practice contributes to market liquidity as it encourages the participation of more lenders in repo markets.

The reason is that the practice allows them to repossess a specific security if the need arises; for example to meet unexpected delivery obligations. For true legal certainty of collateral in repo transactions, substituted collateral should have the same legal certainty as the initially provided collateral.

7. Conflicts of Law

Conflicts of law in cross-border collateral arrangements arise from the fact that different aspects of the arrangement may be covered by different legal systems. First, the collateral taker might be dealing with a counterparty that is incorporated in another jurisdiction (foreign counterparty). Second, the collateral securities might be legally recorded in another jurisdiction, or even in a range of different jurisdictions (foreign collateral). Thus, it is often not clear which part of the collateral arrangement is covered by which legal system. Furthermore, different legal systems give different answers to the same question. This represents an uncertainty that may act as a deterrent to engaging in cross-border transactions.

Given the large differences in legal frameworks, it is important to clarify which laws need to be satisfied in order to obtain legal certainty regarding the entitlement to the collateral as against third parties. Historically, there have been two approaches to solve this problem.

One approach is to look at the **law of the location of the underlying securities** (“place of the underlying securities approach”). However, if the collateral is made up of a pool of securities originating from different jurisdictions, as is the case with global repos, the collateral taker would have to satisfy each jurisdictions laws. This is even more complicated by the fact that portfolios are frequently changed.

The other approach is called the “place of the relevant intermediary approach” (PRIMA).⁴¹ This applies where interests in securities are credited to an account on the books of an intermediary. In that case, the collateral taker would look to the **law of the intermediary** to determine the validity and enforceability of the collateral against third parties. The advantage is that only one legal system needs to be considered. This is particularly helpful when deciding which legal system to apply to immobilised and dematerialised securities, which often can be a very complex exercise.

B. The Settlement Finality Directive

The Settlement Finality Directive (SFD) addresses a number of the issues that are required for legal certainty of collateral.⁴² It “aims at contributing to the efficiency and cost effective operation of cross-border payment and security settlement

⁴¹ Potok, Richard (1999a).

⁴² Directive 98/26/EC of the European Parliament and of the Council of 19 May 1998 on settlement finality in payment and security settlement systems. All quotes in this section are taken from this Directive.

arrangements in the Community” and states that “the reduction of *systemic risk* requires in particular the finality of settlement and the enforceability of collateral security”. The deadline for EU member countries to implement the Directive was 11 December 1999.

The primary concern of the SFD is to protect payment and settlement systems as well as central banks. Article 1.c. states that the provisions of the Directive only applies to “collateral security provided in connection with participation in a system, or operations of the central banks of the Member States in their function as central banks”. **Systems** are defined by Article 2.a. of the SFD as a “formal arrangement between three or more participants, without counting a possible settlement agent, a possible central counterparty, a possible clearing house or a possible indirect participant”. Thus, the Directive only addresses exposure between participants of a system and exposure between central banks and private banks, while bilateral agreements between two private banks are not covered by the provisions of this Directive.⁴³

The Settlement Finality Directive ensures the following:

- i. Netting and transfer orders are legally enforceable and binding on third parties. They can not even be unwound in case of insolvency proceedings, provided that transfer orders were entered into the system before the moment of opening of such insolvency proceedings. If, exceptionally, transfer orders are entered into a system after the moment of opening such insolvency proceedings, they are binding on third parties only if it can be proved that the settlement agent, the clearing house or the central counterparty was not aware of the opening of such proceedings. (Article 3(1))
- ii. Settlement cannot be taken back after insolvency proceedings have started. The proceedings are considered to start at the moment when the “relevant judicial or administrative authority handed down its decision” (Article 6(1)). This means that insolvency proceedings can not have a retroactive effect on the rights and obligations of participants in a system (Article 7). Thus, collateral is protected from zero hour rules and suspect periods.
- iii. The rights to collateral securities are insulated from the effects of insolvency proceedings against the provider of the collateral and can be realised to the benefit of the claimant (Article 9(1)). This is important because it will make it easier to contain systemic risk through the avoidance of liquidity squeezes of other participants.
- iv. The collateral securities are governed by the law of the Member State in which the collateral is legally recorded on a register, account, or centralised deposit system (Article 9(2)). Thus, the place of the relevant intermediary approach is applied to situations of conflicts of law.

Thus, the SFD ensures that netting and insolvency set-off is recognised on a European wide basis (point i.). Collateral is protected from retroactivity (point ii.) and cannot be affected by bankruptcy of the collateral giver (point iii.). The last provision

⁴³ In certain cases, member states can designate a system in which only two institutions participate, if this is ‘warranted on grounds of systemic risk’ (Article 2 (a)).

effectively guards repo collateral from re-characterisation, because collateral securities cannot be touched, even in the case of bankruptcy, and thereby not re-characterised. Furthermore, conflicts of law situations are resolved by applying the place of the relevant intermediary approach. This is also important for immobilised and dematerialised securities; it has often been difficult to determine which jurisdiction governs such securities.

However, legal certainty has only been established with regards to system participants. Due to the exclusion of bilateral agreements, the Settlement Finality Directive has created only partial legal certainty of with regards the enforceability and validity of collateral. This may have implications for systemic risk. Inter-linkages of market participants – both outside and inside systems – are very widespread. The failure of one risks to cause large knock-on effects with potentially systemic implications.

In order to create true legal certainty, the provisions of the SFD must be extended to cover financial market participants outside systems and to include top-up and substituted collateral. In order to create a more efficient repo market, legal certainty with regards to the enforceability of collateral must be extended beyond the scope of the Settlement Finality Directive.

So far, there is no full report on the implementation of the Directive in the individual Member States. There has, however, for some time been a debate on how Article 9(2) should be implemented.⁴⁴ According to the financial law literature, there is a 'broad' and a 'narrow' view of the scope of this Article.

According to the **narrow view**, Article 9(2) should only be applied to a subset of system participants, which include the central banks of member states, the ECB and "those participants providing liquidity to an EU payment or security system to which the Finality Directive applies".⁴⁵ Advocates of the **broad view** are in favour of the Article to *all* system participants, which means that the place of the relevant intermediary approach would also be applied to system participants conducting bilateral transactions. The Giovannini report recommended that member states adopt the broad view in implementing Article 9(2).

In order to illustrate the different views, consider the following example: Two members of Euroclear use Spanish government bonds as collateral in a bi-lateral transaction and one of them becomes insolvent. Advocates of the broad view would argue that because they are systems participants, the transaction should be governed by Belgian law (because they are members of Euroclear) despite the transaction being a bilateral one. Advocates of the narrow view would argue that the transaction should be governed by Spanish law (because the collateral is Spanish) even though the participants are members of a system; however, the transaction is a bilateral one and does not provide liquidity to a system, and is therefore outside of the scope of Article 9(2) of the Settlement Finality Directive.

⁴⁴ Potok, Richard (1999a) and the Giovannini Report (1999).

⁴⁵ Potok, Richard (1999a).

According to a recent report on the implementation of the directive, the broad interpretation of Article 9(2) is clearly favoured, although 4 countries, Austria, Denmark, the Netherlands and Spain have followed the narrow view, whereas it is unclear in Ireland and Luxembourg.⁴⁶

Table 4. Implementation of the Settlement Finality Directive and Interpretation of Art. 9(2)

	Implementation	Interpretation Art. 9(2)
B	11/06/99	Broad
DK	underway	Broad
D	done	Broad
GR	03/00	Broad
E	12/11/99	Narrow
F	underway	Broad
IRL	end 98	Unclear
I	underway	Broad
L	underway	Unclear
NL	01/01/99	Narrow
AUS	10/12/99	Narrow
P	11/12/99	Broad
FIN	Nov-99	Broad
SWE	01/01/00	Broad
UK	done	Broad

Source: Potok (1999b), own investigations

C. Issues for policy

The most important element to strengthen legal certainty in the repo market is that a repurchase agreement should be recognised legally as an outright transfer, rather than a securities interest. Other elements to improve the legal underpinnings, and thereby the efficiency of repo markets, are the application of netting and insolvency set-off in transactions outside systems. In addition, collateral must be protected from retroactivity, such as suspect periods and zero hour rules.

The question of whether the insulation of collateral against insolvency proceedings should be extended to bilateral agreements is a difficult one. Such a protection would of course be extremely beneficial for the repo market, since legal certainty would be almost all-encompassing. However, if it is applied to all securities posted as collateral in any kind of circumstances, this might have very wide implications. Such a provision would invalidate any bankruptcy proceedings against collateral security and could give rise to moral hazard problems. Further consideration should be given to this point. Also, it must be ensured that collateral used in bilateral transactions is guarded against the risk of recharacterisation.

Currently, the European Commission is working on a proposal for a new directive on cross-border collateral. The current timeframe suggests that consultations for the directive will be launched in spring 2000. A proposal for the directive is expected to be presented by the end of 2000. Adoption should follow in 2003.

⁴⁶ Potok, Richard (1999b).

V. Prudential issues raised by the repo markets

Two issues of prudential supervision are of particular relevance to repo markets today. It concerns the reduction of systemic risk through collateralisation of interbank exposures and the revision of the capital adequacy rules by the Basle Committee.

A. Collateralisation of interbank exposures

Interbank markets are an important transmitter of systemic shocks. If a bank is in rapid need of liquidity, it will try to realise its most marketable and immediate items. Interbank loans are in general short to very short term, and will be one of the first elements to be touched. If a large bank had a problem, the sale of assets could be have a snowball effect in the financial system. This effect could be contained if most loans are based on collateral. In this case, rather than asking its money back, the bank could also realise the collateral on the market.

As of today, interbank markets form a very important part of the aggregate balance sheet of the European banking system. In total 17% of the asset side of the balance sheet is interbank in the EU, as compared 3% in the US. An important potential shock transmitter is thus in place in Europe.

As can be seen from Table 5, the size of the government bond repo market as a share of the interbank market differs strongly across countries. Assuming that most government repos are national, it varies between 16% and 96% for the countries for which data are available. At EU level, with an estimated size of European repo markets of 1 trillion euro, the share of the repo market in the interbank market is 28%.

Table 5: Interbank and repo markets compared

in euro bn.	aggregate interbank deposits (assets) (end- 1997)	size of repo markets (early 1999)	interbank as % of balance sheet total	repo as % of interbank
B	254	74	32	29
DK	34		18	
DE	1005	162	23	16
EL	11		13	
E	155	46	17	30
F	1259	260	37	21
I	106	101	7	96
IRL	41		18	
L	316		56	
NL	156	58	14	37
AU	134		3	
P	63		27	
SF	4		4	
SW	51	37	20	72
UK	229	180	13	79
EU11	3492		19	
EU15	3557	(est.) 1000	17	28
US	158	1854	3	1170

Note: Interbank data are 1997, repo data are taken from table 1 and are early 1999.
Source: OECD (1999) and Table 3 of this report.

The development of the repo market could thus contribute to contain the transmission of systemic shocks in European banking. Since interbank markets have become euro-wide since the start of monetary union, and shocks can propagate on that level, the development of a eurowide repo market becomes imperative from this point of view. If the repo market does not adapt to the existence of a eurowide interbank market, the danger of systemic risk will increase. It also implies that the European Central Bank should be given stronger coordinating powers in the domain of financial stability.

B. Prudential treatment of repos

Repos can be subject to two sets of rules: solvency ratios for the banking book or the trading book rules for banks and investment firms. The former are set out in the solvency ratio directive (SRD), the latter in the capital adequacy directive (CAD). For most banks, the CAD rules apply, but for less sophisticated banks it generally concerns the SRD. In the latter case, the credit risk weightings of the 1988 Capital Accord apply, which is under profound review at the moment. In case the CAD rules apply, banks can opt for the internal ratings or risk assessments under the different forms of risk. This part discusses the current regime for the banking book and the impact for the repo markets. It also raises the question whether the growth of the repo markets may have speeded up change of the Basel Accord. A second part discusses internal ratings and repo transactions.

1. The banking book regime

The capital charges of the solvency ratio directive are copied from the Basel Capital Accord. This agreement, reached by the G-10 Basel Committee of Banking Supervision in 1988, requires a minimum 8% ratio of capital to risk-weighted credit exposure. Capital is subdivided in two tiers, core capital and the supplementary items, such as subordinated debt. Credit exposures are assigned to five broad categories of relative risk. They are given weights ranging from 0% to 100%. Loans to official OECD borrowers get 0%, claims on banks from OECD countries 20%, inter-bank claims of less than one year 20%, residential mortgages 50% and all other loans, including foreign currency loans to non-OECD countries and credits to the private sector 100%. Off-balance sheet items (i.e. securitised products) with a maturity of less than 1 year do not have a capital requirement, those with a maturity over 1 year have a credit conversion factor of 50%. The Accord was amended in 1995 to address market risk, but interest rate, operational and liquidity risk are not explicitly addressed.

However, the rigid weighting categories of the Basel Accord have not always been a good indication of a bank's financial condition: "The current risk weighting of assets results, at best, in a crude measure of economic risk, primarily because degrees of credit risk exposure are not sufficiently calibrated as to adequately differentiate

between borrowers' differing default risks."⁴⁷ Also the emerging market crisis revealed the limits of risk weightings, since loans to some of these countries had a 0% risk weighting as OECD members.

"Another related and increasing problem with the existing Accord is the ability of banks to arbitrage their regulatory capital requirement and exploit differences between true economic risk and risk measured under the Accord. Regulatory capital arbitrage can occur in several ways, for example, through some forms of securitisation, and can lead to a shift in banks' portfolio concentrations to lower quality assets".⁴⁸ It was well known that banks concentrated for example on <1 year in interbank loans, because of the huge difference in risk weighting. Also loan securitisation poses a problem, since it increased the apparent capital ratio relative to the riskiness of the actual book of the bank, making the ratios more difficult to interpret and less meaningful. A recent study by the Fed revealed that the ten largest US banks had issued securitisation products equivalent to a quarter of their risk-weighted loans. For some of them, the proportion was as much as half.

These problems gave rise to a drastic reform of the Basel capital ratios, proposed in June 1999. The new guidelines propose to base risk weightings on external credit assessments of the rating agents, or allow sophisticated banks to use their internal credit ratings. The external ratings approach was in the meantime abandoned for the internal credit ratings approach, but the final outcome of the consultations is not yet known.

The distortions caused by the calibration of the weightings are also applicable to the repo markets, in two different ways. First, the same risk weights apply to loans as to repos. A repo in the banking book is treated as a collateralised deposit and so no counterparty risk charge is required. However, the securities lender/cash borrower must continue to report securities as if they were still held by it. The securities are weighted according to the category of the issuer of the security and not according to the counterparty with whom the transaction has been entered into. A reverse repo is treated as a collateralised loan, with the risk being measured as an exposure to the counterparty.

Second, since off-balance sheet items got a favourable treatment under the 1988 Basel Accord, it may have given an additional stimulus to the growth of repo markets, particularly in the US. As securitised paper is used as collateral in repo transactions, the existence of a well functioning repo market may have further stimulated securitisation.

2. The internal ratings regime

The Basel Review also proposed that sophisticated banks should be allowed to use internal ratings to set capital charges for credit risk. This option was already available for the trading book (market risk) in the amendment to the Capital Adequacy Directive (CAD II) in 1997. It is likely that the internal ratings regime will now be expanded for all banks, because of the strong reaction from the European side against the external

⁴⁷ Basel Committee (1999), Consultative paper p. 9.

⁴⁸ Basel Committee (1999), Consultative paper p. 9.

ratings approach in the first draft of the Basel Review (June 1999). Internal ratings may incorporate supplementary customer information which supervisors or external ratings agents do not have. It does however raise the problem of the lack of homogeneity among the rating systems of the different banks, reduces homogeneity across borders, and supposes superior skills of supervisors.

As part of risk mitigation techniques, the Basel Review attaches great importance to the use of collateral to reduce credit risk in internal ratings. The 1988 Basel Accord attached only limited importance to the subject, in view of the varying practices among banks in different countries and the different experiences of stability of physical and financial collateral values. In the Review, the Committee has considered to expand the scope of using collateral. Eligible collateral would be expanded to all financial assets that attract a risk weight lower than the underlying exposure, provided that collateral is supported by a robust legal opinion and has a readily determinable value. The legal opinion should ensure that the contracts are correct and that the institutes ensure that they are operative.

The outcome of the Basel Review is not yet known, but the trend to expand collateral would also benefit to the further development of repo markets, from the areas to which they are limited today, essentially the government bond market, to the other securities. In a European perspective, it would be a further boost to the emerging high yield or corporate bond markets.

VI. Conclusions

To an outsider, repo markets belong to the specific jargon of central banks and financial markets, with little relevance to European policy. A closer investigation shows that repo markets are at the centre of money markets, and its current inefficiencies have important bearings upon integration of and distortions in European financial markets, the functioning of the financial market infrastructure and the stability of the financial system. This is why the full integration of the repo markets was singled out as a priority in the Financial Services Action Plan by the European Council of Lisbon (March 2000).

The most urgent issue, on which there is consensus, is the adaptation of the EU's settlement finality directive to allow for a broad interpretation of collateral, to ensure legal certainty to all holders of collateral. A second issues are the collateral management procedures for participation in the ECB's repurchase agreements should become more harmonised. Today, the national central banks of the Eurosystem use two different systems of collateral management, a pooling and delivery-versus payment system. Continued acceptance of the existence of two different systems maintains strong barriers to further financial market integration of the euro countries. This is related to the whole decentralised set-up of the execution of monetary policy in the eurosystem, which also maintains the fragmentation of the local securities settlement systems.

The need for more integration of repo markets is, for public policy reasons, even more important from a prudential point of view. If collateralisation is to be promoted

as a credit risk mitigation technique in banking, barriers to a euro-wide repo market need to be tackled imperatively. As interbank markets have become euro-wide since the start of EMU, the degree of collateralisation of assets will have decreased at euro-level, as a result of regulatory idiosyncrasies. This raises the spectre of systemic risk, which the ECB is not in a position to tackle. Also from this perspective, the decentralised set-up of the ESCB is a problem.

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Glossary

Cash-driven repo transaction: A transaction motivated by the wish to borrow (invest) an amount of cash through a repo (loan) of securities.

Central securities depository (CSD): note that in this report CSD refers to the domestic settlement systems, while International Central securities depository (ICSD) to the international one. Security settlement system (SSSs) includes both of the former terms.

Clearing: the process of transmitting, reconciling and confirming payment orders (or security transfer instructions) prior to settlement and the establishment of final positions for settlement.

Clearing house: Any institution that settles mutual indebtedness between organisations.

Close-out netting: An arrangement to settle all obligations to and claims on a counterparty by one single payment, immediately upon the occurrence of default.

Collateral: Used to secure an obligation. Originally the US term for security. US definition now includes goods, intangibles, paper and proceeds. In repo transactions, securities serve as collateral for a cash loan.

Credit risk: The risk of a trading partner not fulfilling his obligations in full on due date or at any time thereafter. Includes replacement cost risk, principal risk and cash deposit risk.

Delivery-versus-payment (DVP): ensures that the delivery of the securities occurs if, and only if, payment occurs. Such a link increases settlement efficiency of financial market transactions.

Dematerialisation: the process by which new digital signs of ownership are taking over old physical ones, such as certificate or other documents on paper. In the digital age, the ownership of a security exists only as an electronic accounting record.

Free-of-payment (FOP) delivery: delivery of securities without payment.

General collateral: the security in the transaction is not defined in the repo contract, but satisfies the general requirements of a lender to secure its cash lending. Consists of securities that are not in high demand.

Global custodian: the provision of custody services, i.e. trading and settling of securities, on a global basis.

Haircut: The margin between the market value of the security and the amount lent out. The aim is to protect itself against declines in the value of the collateral.

Hold-in-custody repo: a transaction in which the cash borrower receives cash from the cash lender but continues to hold the collateral securities in custody on behalf of the cash lender.

Initial margin: margin deposited at the start of a transaction.

International Central Securities Depository (ICSD): a depository (financial intermediary that accepts deposits) that settles trades in international and domestic securities through links to local CSDs.

Legal title: a legally enforceable title, with clearly established ownership, which may, however, carry no beneficial interest.

Margin: the amount the collateral value exceeds the value of the assets (cash or securities) on loan. Most often expressed in per cent (e.g. 2%, 7%), but sometimes expressed as the value of total collateral versus the value of the loan (e.g. 102%, 107%).

Margin call: a demand for additional collateral, if the market value of collateral falls too much (relative to the asset on loan). Similarly, if the value of collateral rises above a certain value, the return of collateral may be required.

Netting: gross positions of two counterparties are set off against each other and the final positions for settlement are established on a net basis.

Mark-to-market: the regular adjustment of the value of collateral to its current market value.

Master agreement: an agreement that sets the terms and conditions for all current and future transactions between two parties.

Over-the-counter (OTC): securities trading taking place outside stock exchanges. In OTC-markets, participants trade directly with each other or via brokers.

Pledge: a delivery of property in order to make sure that the debtor/pledger fulfils its obligations to the secured party. The debtor pledges part of its property to the creditor, thereby creating a security interest. If the debtor does not fulfil its initial obligation, the pledged property will by default be sold.

Real-time Gross Settlement (RTGS): the continuous completion of transfers of funds or securities on an order-by-order basis (without netting).

Repurchase agreement (repo): an exchange of cash for securities, with the agreement to reverse the transaction at a specific future date. The securities serve as collateral for a cash loan.

Reverse repo: an exchange of securities for cash.

Security settlement system (SSSs): include the national clearing and settlement depositories (CSDs) and the International clearing and settlement depositories (ICSDs). The two international depositories are Euroclear and Clearstream International (previously Cedel).

Settlement: the completion of a transaction. The seller transfers securities, or other financial instruments, to the buyer and in return the buyer transfers money to the seller.

Special collateral: the security used in the transaction is identified in the repo contract. Consists of very popular securities. Repo rates on special collateral are thus higher than for general collateral.

Substitution: to recall securities from a borrower and replace them with securities of similar market value.

Term repo: see >term transactions.

Term transaction: transactions with a fixed end.

Title transfer: the handing over of ownership interest in property from one counterparty to another.

Top-up-collateral: the additional collateral demanded if the original collateral has decreased in value (see >margin calls).

Tri-party repo: securities serving as collateral are held by a third party custodian. The third party ensures that the collateral meets the cash lender's requirements, and provides certain services, such as margining and marking-to-market.

Annex I: SECURITIES SETTLEMENT SYSTEM IN THE EU⁴⁹

SSSs IN THE EURO AREA		
Country	Name of SSSs	Authority in Charge of Regulation and/or Control
Belgium	NBB Clearing System	National Bank of Belgium (NBB)
	CIK (Caisse Interprofessionnelle de Dépôts et de Virements de Titres)	NBB
	Euroclear System	NBB
Germany	Deutsche Börse Clearing (DBC)	Federal Banking Supervisory Office
Spain	CADE (Central de Anotaciones de Deuda Española)	CADE, which is a department of the Banco de España, is subject to control of a joint Advisory Committee composed of the central bank, the Securities and Exchange Commission (CNMV) and the Ministry of Economy.
	SCLV Espaclear	Securities and Exchange Commission (CNMV).
	SCL Barcelona	Regulated by the Securities Market Law and regional legislation and subject to the supervision of the Autonomous Government of Catalonia.
	SCL Bilbao	Regulated by the Securities Market Law and regional legislation and subject to the supervision of the Basque Government.
	SCL Valencia	Regulated by the Securities Market Law and regional legislation and subject to the supervision of the Valencia Government.
France	Sicovam SA RGV	Direction du Trésor (Ministère de l'économie et des Finances), CMF (Conseil des Marchés Financiers) and the Banque de France.

⁴⁹ Based on ECB (1999b) and ECB (1998a).

Ireland	CBISSO (Central Bank of Ireland Securities Settlement Office)	CBISSO is part of the Central Bank of Ireland and thereby part of the normal management structure of the central bank. Thus, it is subject to the same internal and external audits as the central bank.
	NTMA (National Treasury Management Agency).	NTMA is a government agency created by the Minister of Finance, and is therefore subject to the control and general superintendence of the Minister for Finance.
Italy	LDT (Liquidiazione Dei Titoli)	LDT is a department of the Banca d'Italia (BI). It is regulated in accordance with Article 69 of the "Codified Banking Law on Financial Intermediation" by the BI in agreement with Stock Exchange Commission (CONSOB). LDT, being operated by the BI, is subject to the internal audit and reporting of the bank.
	CAT (Conti Accentrati in Titoli)	CAT is a department of the BI. It is regulated by decrees of the Ministry of the Treasury, Budget and Economic Planning and by operational regulations issued by the BI in its capacity as manager of the system. CAT, being operated by the BI, is subject to the internal audit and reporting of the bank.
	Monte Titoli	CONSOB in agreement with BI.
Luxembourg	CEDEL	Banque Centrale du Luxembourg.
Netherlands	NECIGE	The legal and institutional aspects are supervised by the Ministry of Finance. The Nederlandsche Bank (DNB) in co-operation with the Securities Board (STE) is responsible for the oversight of the SSS.
Austria	OeKB (Oesterreichische Kontrollbank AG)	Ministry of Finance.
Portugal	Sitome	Sitome is not a distinct legal entity but used by the Banco de Portugal, which also regulates operational characteristics as well as rules of access and exit. It is not subject to the Supervision Department of the central bank, but instead to the internal audit procedures.

	INTERBOLSA (Associação para a Prestação de Serviços às Bolsas de Valores)	Stock Exchange Commission (Comissão de Mercado de Valores Mobiliários, CMVM).
Finland	APK/OM system	The Financial Services Authority and the Central Bank of Finland (Suomen Pankki).
	APK/RM system	The Financial Services Authority and the Central Bank of Finland (Suomen Pankki).

SSSs IN THE EU, BUT OUTSIDE THE EURO AREA		
Country	Name of SSSs	Authority in Charge of Regulation and/or Control
Denmark	VP (Vaerdipapircentralen)	Financial Supervisory Authority.
Greece	BOGS (Bank of Greece Security Settlement System)	The Bank of Greece is in charge of regulation. Given that BOGS is a department of the Bank of Greece, it is also subject to the internal control procedures of the Bank of Greece.
Sweden	VPC (Värdepapper centralen VPC AB)	Finansinspektionen
United Kingdom	CGO (Central Gilts Office)	Bank of England. Given that CGO is part of the Bank of England, it is also subject to internal and external audit by the Bank of England.
	CMO (Central Moneymarkets Office)	Bank of England. Given that CGO is part of the Bank of England, it is also subject to internal and external audit by the Bank of England.
	CREST	The Financial Services Authority.

For the eligibility of links to be used by the Eurosystem, see the webpage of the ECB (<http://www.ecb.int>).

Graph 3. Main Refinancing Operations of the ECB

