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THE SECURITIES SETTLEMENT INDUSTRY IN THE EU

STRUCTURE, COSTS AND THE WAY FORWARD

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The study was conducted in the context of the Giovannini Group, a group of financial market participants who, under the chairmanship of Alberto Giovannini (Chairman of Unifortune Asset Management SGR), advise the European Commission on financial market issues. Established in 1996, the group has focused its work on identifying inefficiencies in EU capital markets and proposing practical solutions to improve market integration. In November, the Giovannini Group published its latest report, entitled *Cross Border Clearing and Settlement Arrangements in the European Union.*

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EXECUTIVE SUMMARY

Until very recently, securities settlement systems functioned as utilities serving the needs of Europe's segmented and state-protected capital markets. Their role has come more to the forefront as a result of market integration and rationalisation, but the current structure seems ill-adapted to meet the needs of a single European capital market. Policy problems have emerged that require specific responses.

The purpose of this study was to verify whether the costs for cross-border securities settlement were indeed as high as often assumed. Early on, however, it became evident that it was inappropriate to compare these costs in isolation, and that an overall comparison of the internal costs and operational structure would have to be made of the different institutions involved. For example, it is almost impossible to compare a single standard fee, since each one of the institutions involved has developed its own complex tariff structure that takes into account the kind of transaction, its volume and the size and nature of the client. Moreover, it has to be borne in mind that the cost issue is not only a question of domestic versus cross-border, but rather *intra* versus *inter* systems. Since no truly integrated European infrastructure exists for securities settlement, moving securities from one system to another will necessarily be more expensive than staying within one system.

Keeping these caveats in mind, this study has come to the following conclusions regarding the operating costs, fees and the surrounding debate on securities settlement systems in the EU:

- The operating costs of securities settlement systems in the EU are indeed higher than in the US, but the difference is much lower than often claimed and depends on what is being compared. Instead of being in the magnitude of 10:1, this study finds that the *operating income* per transaction after netting is 1.86 times higher in the EU than in the US. The comparison being made here is based on the final *netted* positions of the different institutions involved before settlement. If pre-netted transactions are taken as the basis, the difference becomes larger, i.e. the cost in the EU is 7.75 times higher. The figures change further if one excludes International Central Securities Depositories (ICSDs), which are quite different from domestic settlement organisations (CSDs). On a post-netted basis, the different domestic settlement organisations in Europe are as cost-efficient as the US Depository Trust and Clearing Corporation (DTCC), while their operational margins are much larger, meaning that they could become more efficient in response to market liberalisation. A centralised agency is thus not necessarily cheaper than competing organisations. The various options are summarised in the table below.

Different methodologies yield different results: Operating income per transaction, 2000

	Pre-netting		**Post-netting**	
With ICSDs	EU: €3.10 DTCC: €0.40 Ratio: 7.75:1	1	EU: €5.14 DTCC: €2.77 Ratio: 1.86:1	2
Without ICSDs	EU: €1.74 DTCC: €0.40 Ratio: 4.35:1	3	EU: €2.98 DTCC: €2.77 Ratio: 1.08:1	4

- It is very difficult, if not impossible, to compare settlement fees, as they vary according to market, instrument, mode of payment, etc. Moreover, it makes no sense to compare settlement fees in isolation. CSDs and ICSDs compete by offering a whole package of services, of which settlement is only one. Moreover, the client faces other costs than fees, e.g. back-office expenses and the cost of maintaining multiple interfaces and systems. Therefore, a client assessing the cost of using a particular CSD looks not only at the settlement fees but at the overall package being offered.
- Other cost elements are very difficult to quantify. For example, an assessment of the cost of cross-collateralisation would first involve a careful analysis of the differences in the legal certainty of the transfer of title, followed by a cost assessment.
- If it is deemed necessary to further assess costs in securities settlement, this ought to be undertaken by a public body that has the authority to request the data and the resources to process it. In our view, however, this is not needed.

The question thus emerges: Which policy should be followed to adapt these different systems to a pan-European capital market? A comparison with the EU's policy to liberalise access to communication networks and to make them inter-operable is revealing. It is important that action is undertaken now, however, to stimulate market restructuring and to avoid having to rely on the kinds of measures that have recently been enacted for EU-wide retail payments. We believe that the way forward lies in the policy proposed by the EU Commission in its latest consultation paper on the Investment Services Directive (ISD), which called for enforcing and supplementing the existing provision of the ISD to allow direct remote access to securities settlement systems, in combination with a vigilant attitude on the part of competition policy authorities. It is nevertheless important to avoid reliance on more complex regulations to open up markets, covering licensing, access, pricing and transparency, as this would delay market liberalisation and introduce excessive bureaucracy.

THE SECURITIES SETTLEMENT INDUSTRY IN THE EU
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Introduction

The integration of European capital markets has been advancing at a rapid pace. To a certain extent this is a result of technological progress, which makes location less important and enables market participants to enter foreign markets more easily. It also reflects policy initiatives and developments to liberalise market access and integrate Europe's financial markets. Since the early 1990s, the EU's banking, insurance and securities markets have been open to cross-border competition. The EU's Investment Services Directive (ISD) introduced the single licence and remote access for exchanges and non-banking investment firms. Monetary union has further accelerated this process, leading to calls for further refinement and streamlining of the regulatory framework.

Many elements of European capital markets still reflect different national origins and traditions, and hinder market integration. This is particularly the case with the securities market infrastructure, i.e. the securities settlement systems, which have developed in ways that reflect different national needs and preferences, but seem ill-adapted to face the needs of a truly European capital market.

Once a security has been transacted, the trade has to be cleared and settled so that the transaction can be completed. Each country typically has a highly centralised and integrated structure to carry out this service. In most cases settlement of domestic securities is carried out by a central securities depository (CSD), which used to be closely linked with the national stock exchange and/or central bank, and functioned as a quasi-monopoly. The two international CSDs (ICSDs) that are active in Europe emerged in response to the growth of the Eurobond and internationally traded domestic securities business.

Seen from a European perspective, the current structure is in need of radical change. Assuming that securities settlement is a business where essentially scale matters, a few CSDs would be sufficient to cope with the needs of a single capital market while maintaining a competitive element. This would be a more efficient and cost-effective solution for users. A multiplicity of systems causes a duplication of costs and imposes an artificial border for "cross-border" transactions. The question, however, is how to bring change and allow restructuring to happen in this industry. As with the lack of integration in the payment systems business, it is not a matter of attacking the symptoms, the high costs for transactions, but to analyse and remedy the causes.

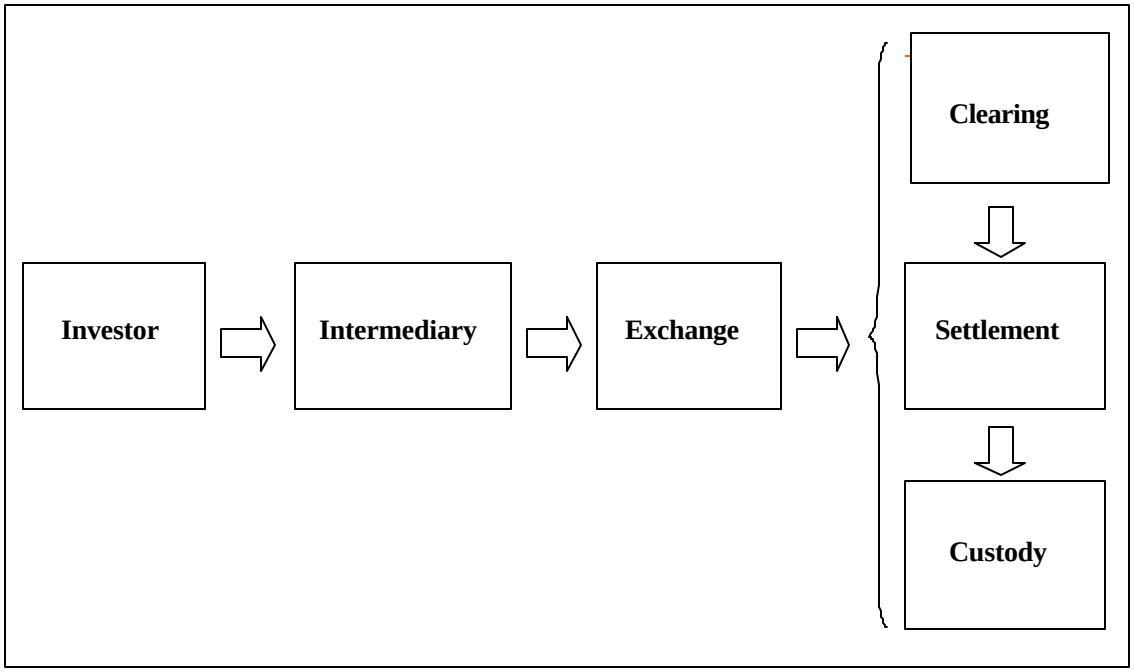
The purpose of the present paper is to provide an overview of the securities settlement industry in Europe, to compare the cost structure of the different bodies, to compare transaction fees and discuss alternative structures. Chapter 1 explains the foundations of the securities settlement business and details the different elements of the securities settlement process. Chapter 2 describes the current industry structure in the EU and the challenge of market integration. Chapter 3 analyses the cost structure of the different EU's securities settlement systems (CSDs and ICSDs). Chapter 4 discusses policies for liberalising the securities settlement industry in the EU, in comparison with policies followed in other communications networks.

CHAPTER 1
SECURITIES SETTLEMENT EXPLAINED

1.1 The securities transaction chain

A securities settlement system (SSS) carries out the transaction between the buyer and seller of a security. It makes sure that a buyer receives the security and that a seller receives payment. Until recently the importance of this function has been underestimated, as it was largely seen as an administrative, back-office task, performed at the end of a trade of a security. This view is misinformed, however. The SSS forms a fundamental link in the securities transaction chain and is often the focus of attention when the rationalisation of the transaction chain is discussed (see Figure 1).

Figure 1. The securities trade-processing chain (on-exchange)



Typically, an investor turns to an intermediary (e.g. a broker-dealer) when trading securities. The intermediary executes the investor's wishes on (or off) an exchange by either buying or selling securities. The transaction is then finished via the securities settlement system, where the trade is cleared (establishment of who owes what to whom), settled (payment and delivery) and placed in custody (safekeeping).

Each transaction carries a cost. While the focus of recent debate in the EU, and indeed this paper, has focused on the costs incurred by the inadequate structure of securities settlement, it is important to remember that there are other costs as well (e.g. trading commissions) and that the costs of securities settlement can be divided into several elements: the direct costs of operating several securities settlement systems and the wider costs paid by the end-users (paying intermediaries, maintaining back-offices and multiple interfaces).

Nevertheless, this does not mean that maintaining several systems is efficient. The high costs of end-users are to a large part explained by the current fragmentation of securities settlement systems. These intermediaries are forced to interact with many CSDs, all of which have different communications platforms and standards for settlement. Therefore, the current duplication has a cost. In addition, those intermediaries and CSDs that want to provide cross-border services have to possess the expertise and systems to deal with several markets that are differently organised. Thus, the current complexity also has a cost.

In sum, although the simultaneous functioning of several different securities settlement systems only accounts for a limited part of the overall trading costs, a simpler and more concentrated securities settlement structure would have a significant indirect effect as part of the current costs are linked to the existing duplication and complexity.

1.2 The functions of securities settlement

1.2.1 Clearing

Clearing in the securities business is the process that occurs between trading and settlement, involving the balancing of positions between the different parties to establish agreement on what each party is due, prior to the establishment of final positions for settlement. A clearinghouse clears financial market transactions and provides a range of services related to clearing and the management of risk associated with such contracts. It can either be a department of an exchange or a separate legal entity (either or not under the holding of an exchange). A clearinghouse can act as a central counterparty (CCP) by being a legal counterparty to both sides of a financial market transaction. The clearinghouse becomes the buyer to every seller, and the seller to every buyer, and replaces the original bilateral contractual obligations. This process is generally known as "novation". CCP netting vastly decreases the final number and the value of transactions that have to be settled and therefore is a powerful tool to reduce settlement costs.[1] But it creates risks at the level of the clearinghouse, since it replaces the counterparty exposures at the level of the participating institutions. A CCP thus operates in the context of a selective and strict membership structure. It requires members to provide collateral to minimise counterparty exposure, and may additionally create a fund or insurance policy to meet losses if one of its members defaults, and the volume of collateral held is found to be insufficient.

1.2.2 Settlement

Settlement, on the other hand, is the legal transfer of a security. This normally means the exchange of a security against money (money-transfer system). It could however also mean an exchange of assets (exchange-for-value system). Depending on the system, there are several ways of paying. Delivery versus payment (DVP) – the simultaneous exchange of cash and securities – or delivery free of payment (FOP) – delivery of securities without payment of funds – are some of the more common. A Central Securities Depository (CSD) normally carries out settlement.

[1] The DTCC's clearinghouse subsidiary the National Securities Clearing Corporation (NSCC), the US equity CCP, achieved 97% reduction in the number of settlements and 95% reduction in the settlement value thanks to netting.

It is very important at this stage to make the asset commitment period (ACT) as short as possible. Ideally, final settlement should coincide with the payment transfer. In some cases, the settlement system handles the clearing and the securities side of the settlement directly, while the cash side of the settlement is usually effected through the banking/payment system.

1.2.3 Custody

Custody refers to the safekeeping of assets and the administration of securities on behalf of intermediaries and investors. Most CSDs offer safekeeping as well, although with the growing dematerialisation of securities, this function means that a certain body has received a specific licence to act as the safekeeping agent for securities in circulation that are no longer material. Asset servicing, however, is primarily carried out by custodians. Custodians complement the CSD's services by providing asset servicing services. These services include but are not limited to corporate action, tax services, the exercise of voting rights and advanced income services.

Local investors look after their own market and the services provided by the local CSD are therefore sufficient. Foreign investors, however, need more services than a local CSD can offer, i.e. settlement and safekeeping, and this is where the custodians come in. Custodians target foreign investors who invest in several markets and who are unable or unwilling to acquire sufficient expertise on their own to exercise the obligations and rights connected with holding a security in a particular country.

Local custodians, or local agents, offer the expertise, i.e. knowing a particular country's risks, regulations, technology, market culture and contacts with the local CSD. Custodians thus act as the interface between foreign investors and the local CSD. They may either be a large local bank or the branch or subsidiary of a global custodian (see Financial Times, 2000).

If an investor wants to invest in multiple markets it is more efficient to go to a *global custodian* than to establish relations with local custodians in each market. The global custodian then acts as the interface in all markets where the investor wants to invest, either by having its own branches in place or by using local custodians.

As EU securities markets grow in size and become more integrated, global custodians will come to see the value of establishing themselves in these growing markets instead of buying the services from a local custodian. The local custodians are therefore likely to disappear or be absorbed by their global competitors.

1.3 Risks and risk management in securities settlement

As with other operators in financial markets, settlement operators face risks. Some of them are common to all financial market operators, while others are specific to settlement.[2] Risk also depends on which function of the CSD one is considering (depository, asset services, etc.). Most of the risks cited below are more pronounced in a cross-border context and may therefore not apply to a CSD that is operating solely in its national market.

[2] On risks in securities settlement, see for example Euroclear (1993), Scott-Quinn and Walmsley (1999) and BIS (2001).

- *Liquidity risk*. Risks associated with delays in the settlement pipeline arising from gaps between the processing cycles of various CSDs. This is especially important for an ICSD that is operating in different markets with different currencies and settlement procedures. In an effort to address this issue, the Group of Thirty and the BIS have published standards, since differences in standards could also give rise to systemic risk.
- *Contagion risk*. A failure of one transaction might cause the failure of other transactions. In addition, a disruption in one firm may cause disruptions in other firms. If this happens on a sufficiently large scale, the crisis may become systemic.
- *Legal risk*. There may be legal uncertainty about the finality of a transaction, ownership rights in case of bankruptcy, etc. This is serious in a cross-border context, but does not affect CSDs if they do not operate cross-border.
- *Operational risk*. The hardware, software or communications system of a financial institution or a CSD might break down.

In order to limit the risks inherent in securities settlement, the processing of trades should be largely automated and rapidly effected, and the legal provisions should be clear and transparent. These conditions are easier to achieve on a national scale. Cross-border trades give rise to more risks. The industry is trying to increase automation and reduce the time it takes to process a transaction.

One way of providing straight-through processing (STP) is to integrate trading, clearing and settlement into one single body. These so-called *vertical silos* make STP easier as a single interface is provided. This was an absolute value-added when STP technology was difficult to achieve. Today, however, increasing standardisation and decreasing communication costs mean that STP does not necessarily require a fully integrated system. Moreover, silos may also stifle competition, since the costs of the different elements of the transaction are less transparent.

Box 1. Pros and cons of vertical silos

Vertical integration has beneficial effects. It makes it easier for transactions to flow through the trade processing chain, since they remain within a single organisation. Furthermore, it increases legal certainty. Traditionally, vertical integration has increased speed, safety and risk management, just to mention a few benefits, and in that sense it reduces risks and costs. There may be less attractive side-effects as well, however.

- Silos may limit the choice for users. The choice of settlement system is preconditioned by the choice of a trading platform.. This discards the possibility for other CSDs to compete for this order flow, and thus hampers market consolidation.
- Silos can remove price transparency in the transaction chain by enabling trading systems to vertically subsidise, i.e. to “buy order-flow” (by decreasing the fees of securities settlement in order to entice clients to use a particular trading system). In other words, a vertical silo may compete via artificial means instead of competing via the inherent trading characteristics (spreads and services). The cost of this subsidy is borne by the users of the trading system. According to some observers, this arrangement constrains competition, but according to others it represents a normal commercial decision.

CHAPTER 2
THE EUROPEAN LANDSCAPE AND THE CHALLENGE OF INTEGRATION

In much the same way that capital markets in the EU have historically been split along national lines, so too have been the securities settlement systems. Confronted with the emergence of a truly European capital market, the national CSD structure seems outdated and faces profound restructuring. The only pan-European actors are the two international CSDs (ICSDs), Euroclear and Clearstream, which both originated in the 1970s with the eurobond business. Clearinghouses, which function as a central counterparty (CCP), are relatively new in the EU. There are currently three main participants in that sector: London Clearing House (LCH), Euronext's Clearnet and Deutsche Börse's Eurex Clearing.[3]

2.1 CSDs

As mentioned above, there is a high degree of centralisation in securities settlement systems (SSSs) at national level in the EU. They have, until recently, functioned as public utilities and quasi-monopolies. Their centralisation in recent years has become more pronounced as a result of rationalisations and technological developments. Bond settlement was merged with equity in several member states, and/or local CSDs were merged in a single entity. As a result of the consolidation in equity markets, this process is now also continuing on a cross-border basis.

Thanks to resulting economies-of-scale, the transaction costs of securities handled intra-system has been squeezed. One of the implications of this process is that the dominant position of the CSDs has become more evident at local level. In the case of CSDs this could take several forms, e.g. price overcharging. In many cases, however this has been dealt with either by price regulation or user ownership. In the former case, the law regulates the price; in the latter, the users of the CSD are the same as those making the decisions on prices.

Cross-border trades are more difficult to clear and settle in this national structure. The difficulty with a trade does not necessarily reside in the fact that it is being done across the border. A cross-border trade can actually be as easily processed as a domestic trade involving a security bought and sold domestically. The fundamental difference is whether the trade can be processed using the local CSD's links, the infrastructure of ICSDs or global custodians, or whether the investor will have to turn to local agents.

When discussing the problems of cross-border settlement, one often hears reference to the fact that a trade has to be processed externally, i.e. using local agents. This requires the use of intermediaries and the creation of back-office infrastructure, which increases the cost of a transaction. This problem is triggered by the requirements of several exchanges or national legislation to settle on the local CSD. Therefore, it is a problem that is more pronounced for equity trading. Bond trading largely takes place over-the-counter (OTC) and is therefore not as problematic.

ECSDA, the European association of CSDs, has addressed this problem by creating links between the national systems. Under the "relayed link" model, one CSD could be

[3] For a more comprehensive description of EU securities settlement, see Annex 1.

connected to another CSD, using its link with a third intermediary CSD, thereby avoiding a situation where every CSD has to be connected with every other CSD. To that end, CSDs had to agree on standards for cross-border settlement against payment of securities transactions (see ECSDA, 2000).

In addition, there are other difficulties that add to the cost of clearing and settling cross-border trades that are not related to settlement, but with other national idiosyncrasies. In many cases, laws protect national segmentation, e.g. laws requiring that shares be held in a specified CSD. Moreover, because company law remains highly divergent across the EU, it is difficult for a host CSD to exercise corporate actions.

2.2 ICSDs

The two ICSDs, Euroclear and Clearstream, emerged in response to the needs of the eurobond market in the 1960s, but have since striven to capture the settlement market of internationally traded securities. Both entities have set up links (direct and indirect) with the SSS in many different markets in order to be able to settle securities on a cross-border basis. These links are often established with the help of custodians.

Box 2. The eurodollar, the eurobond markets and the ICSDs

The origin of the ICSDs can be found in the growth of the eurobond market, i.e. bonds issued in another currency than that of the country where it is issued. The eurobond market in its turn originated from the eurodollar market, i.e. US dollars deposited in US banks outside the US.

The eurodollar market originated in the 1950s when the Soviet Union and other communist states decided to deposit its dollar oil-revenues outside the US, as it feared that these revenues might otherwise be frozen. However, this process soon spread to other market operators as well, who discovered that by placing their deposits abroad they could avoid exchange transactions and benefit from interest rate arbitrage (avoiding the US regulation Q, which sets a ceiling on interest paid by banks on their deposits). It was fuelled by the fact that these deposits were exempt from withholding taxes. An additional boost was that the US ran continuous balance-of-payment deficits, which increased the amount of credit flowing from the US to other countries. As more and more banks participated, this led to the creation of a liquid international money market.

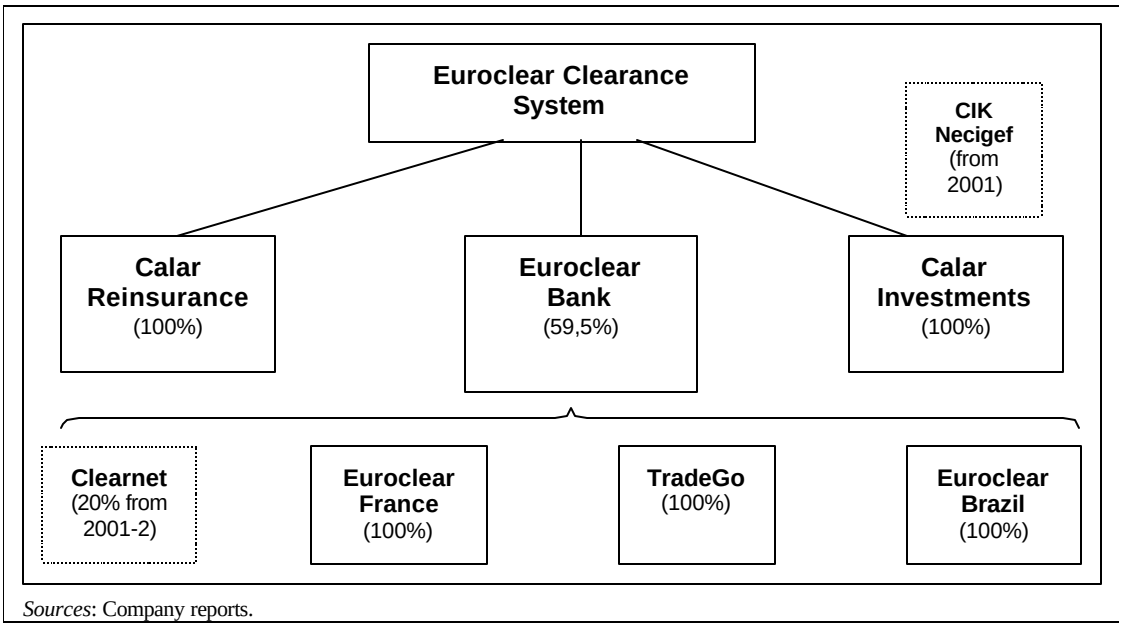
The eurodollar market expanded into certificates of deposits and eurobonds. Eurobonds are international bonds issued by a syndicate of securities houses in any international currency and placed in more than one country. An important characteristic of the eurobond market is the non-application of withholding taxes. Under the EU's draft savings taxation directive, the eurobonds already in circulation before 1 March 2001, will continue to benefit from this provision under a grandfather clause until 2009 (see Ecofin Council Conclusions, 27 November 2000, and Draft Council Directive, COM(2001)400 of 18 July 2001). Most trading in eurobonds is currently taking place in London – and to a large extent, over-the-counter (OTC). Euroclear and Clearstream (formerly Cedel) have been the main clearing and settlement houses for eurobonds ever since their inception.

Sources: Walter (1993) and International Dictionary of Finance (1999).

Euroclear was set up in 1968 by a group of banks and securities houses under the patronage of Morgan Guaranty. In 2000, the link with Morgan was cut back and Euroclear Bank was established as a limited company under Belgian law. The transformation of Euroclear coincided with its ambition to become the pan-European

settlement platform. Euroclear took over Sicovam, the French CSD, and is in the process of integrating the Belgian and Dutch CSDs, and the Irish bond settlement system. The value of the securities held in custody was € 7.4 trillion in 2000.

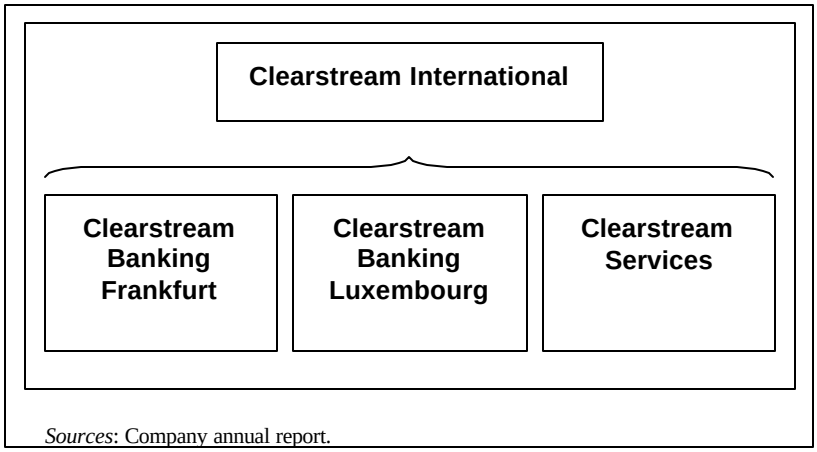
Figure 2. The corporate structure of Euroclear



Sources: Company reports.

Clearstream was formed in 2000 as a result of the merger between Cedel (Centrale de Livraison de Valeurs Mobilières) and Deutsche Börse Clearing. Deutsche Börse is now in the process of acquiring the remaining 50 per cent and it is therefore argued that Clearstream is part of DB's vertically integrated structure, especially as DB obliges its clients to settle with Clearstream Banking Frankfurt. The value of securities held in custody by Clearstream International (Clearstream Frankfurt and Clearstream Luxembourg) amounted to €7.4 trillion in 2000, i.e. the same as Euroclear.

Figure 3. The corporate structure of Clearstream in 2000



Sources: Company annual report.

2.3 CCPs

All CSDs have to clear trades in one way or another before settlement. For a variety of reasons, only a few clearinghouses have traditionally acted as CCPs for the stock markets in the EU. One important explanation is that the value of the netting service that a CCP provides increases with the size of the market and the EU's relatively small markets have so far not found it beneficial to invest in CCPs. A CCP also requires advanced rules on risk and collateral management of its member institutions. Since the EU's securities markets are integrating and expanding in size and volume, however, the use of CCPs is about to increase. Another reason underpinning this change is the shift to trading systems that permit the participant to operate anonymously (e.g. the London Stock Exchange's SETS). Although such systems are generally more efficient, they increase the difficulty of assessing counterparty risk. This risk is invalidated, however, by the performance guarantee offered by a CCP.

There are currently three major participants: the London Clearing House (LCH), Clearnet, and Eurex Clearing. The *London Clearing House* was established in the 19th century (1888), with the aim of clearing commodity contracts traded in London. Following a reorganisation in 1996, it is now owned by its members (75%) and by the three London derivatives exchanges (25%), and is a not-for-profit company. It clears its members' trades executed on IPE (since 1981), LIFFE (since 1982), LME (since 1987) and LSE (from 2001). LCH EquityClear will offer CCP services for virt-x cross-border business starting in mid-2002. Cash equity trades are settled through CREST. In addition to its exchange-traded business, LCH also provides CCP services to the OTC-fixed income market through LCH RepoClear, covering German, Belgian, Dutch and Austrian government repo and cash bonds, and "internationals". Settlement is as required, into Clearstream, Euroclear and elsewhere as appropriate. Through LCH SwapClear, CCP service is provided to the OTC wholesale interest rate derivative market.

Clearnet has its origins in the Banque Centrale de Compensation, formed in 1969 in order to clear contracts traded on the Paris commodity markets. In 1990 it became a subsidiary of Matif, which was subsequently taken over by the Société des Bourses Françaises (SBF, later Euronext) in 1998. Following the Euronext merger in 2000, Clearnet merged with the clearinghouses (acting as CCPs) of the Brussels and Amsterdam exchanges. As a result, it became the sole clearinghouse and CCP of Euronext. Trades in equities have been cleared since 1990. Clearnet is established under French law as a credit institution and is a wholly-owned subsidiary of Euronext, which has recently become a quoted company. Euroclear is soon to take a 20% stake in Clearnet. According to statistics from Euronext, Clearnet represented pro-forma revenues of €200 million in 2000, a year in which 3 million trades were cleared per day. Trades are settled via Euroclear/CIK/Necigef.

Eurex Clearing is owned by Eurex Frankfurt AG, set up in 1998 and owned by Deutsche Börse (49.97%) and the Swiss Stock Exchange, although economic interest, and thus control, is overwhelmingly vested in Deutsche Börse. It is the clearinghouse and CCP of Eurex Exchanges, which trades in derivatives. It expanded into German government bonds in 2000. Trades are settled with SIS and Clearstream Frankfurt.

In addition to these larger CCPs, there are a number of smaller ones, such as MEFF in Spain (derivatives) and the CC&G in Italy (derivatives), and new participants are joining. The Swiss Financial Services Group (FSG), of which the Swiss CSD SIS is a member, is setting up *x-clear*. When it goes live in mid-2002, it will act as the clearinghouse and domestic CCP of virt-x, whilst LCH will provide cross-border CCP services. The DTCC is also setting up a UK-regulated clearinghouse, the *EuroCCP*, to support the cross-border Nasdaq European market. It plans to be operational shortly.

There have been considerable market demands for a merger of the European CCPs in order to create a *pan-European CCP*. The case has been argued most forcefully but to date unsuccessfully by the European Securities Forum (ESF), which is an association of global and European investment banks.[4]

2.4 Custodians

A full discussion of the custody business is beyond the scope of this paper, but a few words are in order. This market is governed by *local* and *global* custodians. Local custodians are either the big local banks or the branches or subsidiaries of global banks. As mentioned above, local custodians are under intense pressure as ICSDs and global custodians find it increasingly beneficial to establish a local presence. This is reflected in the declining number of local custodians (see Table 1), whose market share has fallen to 26% since 1998.[5]

Table 1. Decline in the number of local custodians

	1998	1999	2000	Change 1998-2000 (%)
Belgium	5	3	3	-40
Denmark	3	2	2	-33
Germany	5	5	4	-20
Spain	8	8	8	0
France	8	8	6	-25
Italy	7	6	5	-29
Netherlands	7	5	4	-43
Austria	5	5	4	-20
Finland	3	3	3	0
Sweden	3	3	2	-33
UK	12	9	8	-33
EU*	66	57	49	-26
US	13	11	11	-15
Switzerland	6	6	6	0

* Excluding Greece, Ireland, Luxembourg and Portugal for which data are missing.

Sources: *Global Custodian Magazine* in "Global Custody", *Financial Times Survey*, 6 July 2001 and 14 July 2000 (http://specials.ft.com/globalcustody/index.html).

[4] ESF (2000).

[5] Financial Times (2001a and 2000).

Table 2. Ranking of global custodians, 2000

Rank	Name	Bank assets (billions of $)	Percentage representing global (cross-border) assets	Market share (%)
1	Bank of New York	6800	29	17
2	State Street	6100	16	15
3	JP Morgan	6000	38	15
4	Citibank	4300	41	11
5	Deutsche Bank	3661	46	9
6	ABN AMRO	2771	18	7
7	BNP Paribas	1800		5
8	Northern Trust	1650	25	4
9	HSBC	1087	63	3
10	Brown Brothers Harriman	904	65	2
11	Royal Trust	827	44	2
12	Société Générale	748	48	2
13	Credit Agricole group	523	33	1
14	PFPC	463	5	1
15	Fortis Bank	426	67	1
16	IntesaBci S.p.A.	395	68	1
17	Investors Bank & Trust Company	297	10	1
18	National Australia Group	214	8	1
19	Crédit Lyonnais	191	29	
20	KAS-Associatie N.V.	191	40	
21	Union Bank of California	137	10	
22	Pictet & Cie	117		
23	Bank of Bermuda	80		
24	Bank of Ireland	76		
25	Dexia BIL	76		
26	Bank Julius Baer	26		
27	Daiwa Securities	12		
	TOTAL	39872		

Note: The table is based on data supplied to globalcustody.net by the banks listed. Assets held on Mellon's network include ABN AMRO Mellon, CIBC Mellon and Mellon Trust.

Source: http://www.Globalcustody.net (2001).

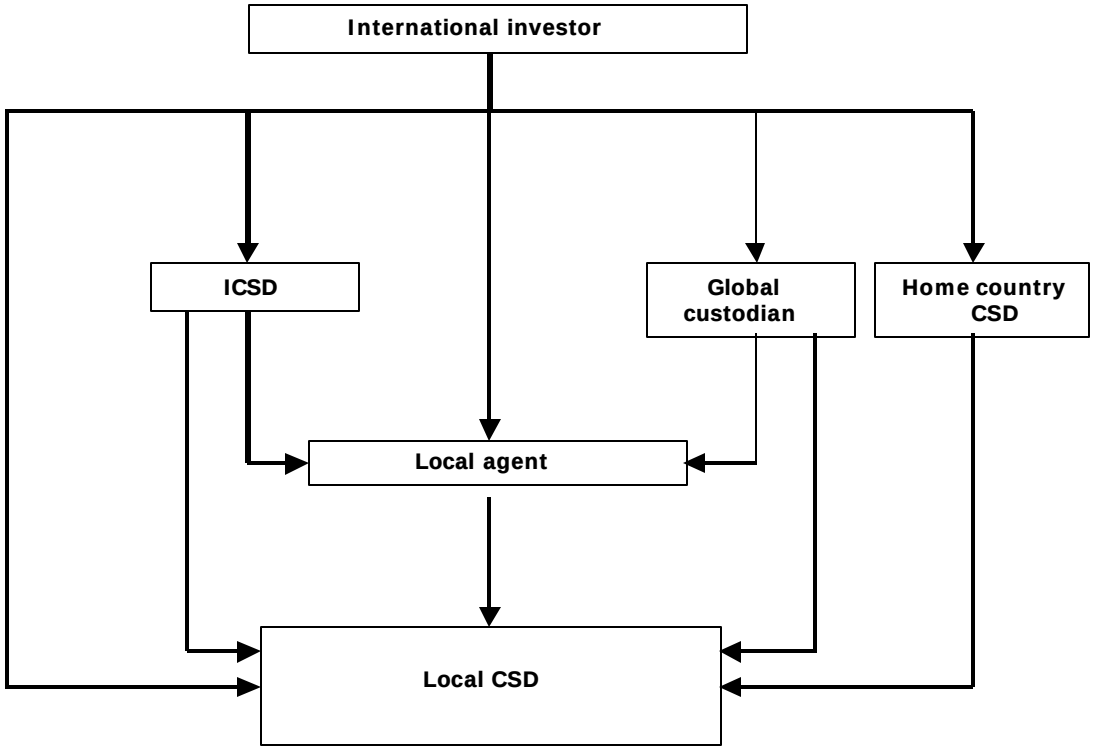
The market for *global custody* is highly concentrated (see Table 2). This is largely due to the large start-up and development costs as well as significant economies of scale.

The global market is dominated by the Bank of New York, State Street and JP Morgan Chase. Each of these companies has more than $6,000 billion in assets under custody and together make up over 40% of the global market. In Europe, however, the situation is somewhat less concentrated. The big three face competition from other US banks (e.g. Citibank) and from European banks such as Deutsche Bank, BNP Paribas and HSBC that want to tap the global custody market as well.[6]

2.5 Relationship between CSDs, ICSDs and custodians

The relationship between ICSDs and global custodians is competitive, but also complementary, as ICSDs get business from global custodians who typically choose to settle bonds in the ICSDs. At the same time local custodians help ICSDs to establish contacts and links with local CSDs. Whereas ICSDs target wholesale financial clients, global custodians concentrate more on institutional investors and providers of private banking services. Moreover, while ICSDs provide the same service to every client, global custodians customise their services according to individual client needs.

Figure 4. Various participants in cross-border securities settlement



Source: Giovannini Group (2001).

[6] Financial Times (2001a).

The relationship between ICSDs and local custodians is somewhat more competitive. Although the business models are different (ICSDs service several markets, local custodians master one market), there is a growing convergence and thus competition for the same services as ICSDs increasingly enter into the local market (e.g. Euroclear taking over CIK, Necigef and Sicovam; Clearstream taking over Deutsche Börse Clearing). The graph above puts these participants in their respective context and illustrates the different channels that cross-border settlement can take. As can be seen from the graph, an international investor can either use the local CSD, an ICSD, a global custodian or a local agent. The global custodians and the ICSDs may in their turn be using local agents as well.

CHAPTER 3
COST/INCOME STRUCTURE OF THE SETTLEMENT INDUSTRY

The previous two chapters outlined the functions of the securities settlement industry in the EU and its organisational structure. The picture that emerges suggests that the system is better equipped to serve the needs of national securities trading than those of the single capital market. It is often claimed that this complex infrastructure increases the cost to users of securities settlement services at European level.

This chapter takes a closer look at the cost/income structure of the settlement industry. The aim is to assess whether the EU's securities settlement system is as expensive and inefficient as often claimed. In order to make this assessment, we compare the national (domestic) EU systems with the US system (domestic), which in this case serves as a proxy for a centralised system.

The chapter starts by presenting the different types of costs involved in securities settlement. It then assesses the methodological problems of making cost/income surveys and finally discusses the results of our investigations.

3.1 Cost elements in securities settlement

Market participants face many types of costs in the settlement of a securities transaction. The following subsections characterise these costs.

3.1.1 Infrastructure costs

The most direct costs associated with the operation of a settlement system are the fees charged to users. Since these are difficult to quantify, the operating costs of a settlement system are used to act as a proxy.

3.1.2 Indirect costs to users

Users also face other more indirect costs, the size of which will depend on the channel used for cross-border settlement:

- *Back-office costs*: Users have to maintain back-office personnel, and invest in back-office systems.
- *Interface costs*: Users have to make sure that their communications networks can interface with a variety of CSDs employing widely differing technology and standards.
- *Banking and financial costs*: This cost comes in the form of interest charges in the case of overdraft. It can also manifest itself in the form of fees on securities borrowing if an investor lacks securities on the date of settlement.
- *Cross-collateralisation opportunity costs*: Sometimes it is not possible for investors to use securities deposited at one CSD as collateral when borrowing from a third party. This increases the net financing costs.
- *Failed transaction penalties*: This cost comes in the form of penalty charges, which are imposed if a party cannot fulfil its obligations by the settlement date.
- *Pipeline liquidity costs*: This is the cost that arises if a process is stuck due to gaps in the time between the processing cycles of CSDs. If this happens, either on the

delivery or payment side of the transaction, it may impose an additional cost if this cost is absorbed by the banking sector via the provision of intra-day credit.[7]

3.1.3 Cost of using intermediaries

Another cost that users face is the use of intermediaries. As explained above, investors are usually not able to use their domestic settlement system abroad. Instead, they have to settle with foreign CSDs, which is most easily done by using intermediaries such as ICSDs, global custodians or local custodians. This is nevertheless costly.

3.2 Methodological problems of assessing costs

It is beyond the practical limits of this paper to provide a full assessment of each one of the several costs enumerated in the preceding section owing to the sheer number of participants involved and the lack of information. Instead we concentrate on the first item, namely the problems associated with measuring infrastructure costs.

3.2.1 Problems in measuring infrastructure costs

3.2.1.1 Problems of measuring settlement fees

The problem of settlement fees is related to complexity. There is no general settlement transaction with a general fee. On the contrary, the fee structure is highly complex, depending upon a variety of factors, as follows:

- *Internal or external*: The most basic variation is due to whether a transaction is settled within the system (i.e. within a national or international CSD) or whether it has to be settled externally. The latter is more costly.
- *Market*: When a transaction has to be settled externally, fees differ according to country or trading system.
- *Instrument*: Moreover, fees differ between instruments. In many cases, fees are not the same for equity as for bonds. There is also a difference between domestic and international securities.
- *Volume*: Some operators offer discounts according to volume (amount of settled securities). Some CSDs offer end-of-year rebates also depending on volume. This makes it difficult to establish the final real fee as compared to the nominal fee figuring in the price list.
- *Method of payment*: Fees may also differ according to method of payment (e.g. DVP, FOP…).
- *Customer*: Another element of complexity is that fees are sometimes negotiated, meaning that fees may differ between customers even though they settle the same amount of securities.
- *Lack of information*: Due to this complexity many CSDs are reluctant to share their price lists in public, as they fear being misrepresented.

[7] For an overview of the various costs involved, see Euroclear (1993).

These numerous factors make the task of comparing fees extremely difficult and that of establishing and comparing the pricing structure is virtually impossible. Therefore, this paper does not attempt to provide an analysis of settlement fees. Nevertheless, examples of the difficulty of establishing one single fee are presented in the table below. As can be seen, it is difficult to pin down a typical domestic/internal transaction and compare it with a similarly typical external/cross-border transaction.

Table 3. Equity settlement fees of CSDs

Country	Settlement agent	Fee for internal transaction (€)
Denmark	VP	0.11-2.28
Germany	Clearstream Banking Frankfurt	0.25-0.40
France	Euroclear France	0.30-1.13
Italy	Monte Titoli	0.72
United Kingdom	CREST	0.32-0.90
United States	DTCC	0.04
Switzerland	SIS	0.26

The ranges are explained by the various discounts (sliding scale, etc.) offered to clients by their operators. The picture becomes more complex when looking at the fees of ICSDs, which actively settle international securities as well (e.g. eurobonds). The two tables below provide an overview of the settlement fees charged by two ICSDs, Clearstream and Euroclear. The fees are divided into three groupings: inside the system or outside (internal vs. external), international instruments or domestic instruments, and finally equity or bonds.

Table 4. Settlement fees of Clearstream for selected markets (€)

	Internal				External			
	International securities		Domestic securities		International securities		Domestic securities	
	Equity	Bond	Equity	Bond	Equity	Bond	Equity	Bonds
Clearstream LU	2.00	1.35	2.00	1.35				
Euroclear Bank					2.71	1.35	2.71	1.35
Switzerland					32.47	32.47	27.60-48.70	21.65-27.06
Germany			2.16	2.16	32.47	32.47	21.65	21.65
France					32.47	32.47	13.53-27.06	13.53-27.06
United Kingdom					32.47	32.47	10.82	10.82
United States					32.47	32.47	5.41	10.82

Table 5. Settlement fees of Euroclear for selected markets (€)

	Internal				External			
	International securities		Domestic securities		International securities		Domestic securities	
	Equity	Bond	Equity	Bond	Equity	Bond	Equity	Bond
Clearstream LU					1.03-2.71	1.03-2.71		
Euroclear Bank	0.49-2.16	0.49-2.16						
Switzerland			0.60-2.71	0.60-2.71			9,74-16,23	5,94-10,80
Germany			0.32-1.73	0.32-1.73			4.33-8.66	1.52-6.49
France			0.60-2.71	0.60-2.71			23.81-32.47	7.58-21.65
United Kingdom			0.54-2.16	0.54-2.16			6.49-10.82	9.74-16.23
United States			0.54-2.16	0.54-2.16			4.33-8.66	6.49-10.82

The figures in these tables show the difficulty of drawing a simple sketch of the fee landscape. It is hard to arrive at a typical internal fee and plot that against an equally typical external fee. Nevertheless, the data confirm the widely held belief that external (i.e. cross-border) transactions are more expensive than internal (domestic) settlements. As soon as a CSD/ICSD has a link with a market, it enables customers to settle their transactions between them within the books of the CSD/ICSD. Moreover, scale and efficiency of a particular market drive down the cost. Therefore, the highest fees seem confined to remote markets where little trading occurs and few links are established.

3.2.1.2 Problems of measuring operating costs

The operating income of a settlement system may provide a proxy of settlement income. The data on operating costs contained in this paper are based on publicly available information, i.e. companies' own financial statements as published in their annual reports. While these figures are easy to acquire, they are accompanied by a number of inconsistencies and idiosyncrasies that make their comparison difficult:

- *Not like entities*: Not all participants within a particular class (CSDs, ICSDs, CCPs) are comparable: even though all CSDs perform certain core functions (settlement, safekeeping), some do more, while others do less. This affects their financial revenues and thus makes comparisons difficult. For example, CREST of the United Kingdom does not charge for its safekeeping services, which deflates its income compared to other European CSDs, and VPC of Sweden gains the majority of its income from issuers business, which also has the effect of inflating its income vis-à-vis other CSDs.
- *Part of a larger company*: Comparisons are complicated in some cases by the fact that some securities settlement companies are part of a stock exchange (e.g. APK of Helsinki Exchanges, CIK of Euronext Brussels, Interbolsa of the Lisbon and Oporto Exchange) or part of a larger bank (Austria's OeKB). If the CSD's accounts are not published separately but are included in those of the parent company, the financial statements therefore would include revenues and expenditure that are not only related to the securities settlement function but also related to trading or banking.
- *Different accounting standards*: The financial statements are not prepared in the same way and according to the same rules. As a result, operating income and expenditure may not mean the same thing from one country to another.

The best way to get around these problems would be to rework the financial data of companies and re-allocate the results according to the particular settlement functions performed. That would enable deeper analysis and generate more robust policy recommendations. Unfortunately, such a task far exceeds the ambitions of this report.[8]

In the absence of comparable data, we have made the following adaptations in an attempt to reduce the problems:

- Those CSDs that are an integral part of an exchange or a bank have been excluded if reliable figures for the securities settlement part of the business are not available.
- The data have been standardised to the extent possible in order to increase comparability. Ideally, they should only include settlement income. However, the two other sources of revenue for settlement operators – safekeeping and corporate action income –are not always easy to identify in the profit and loss accounts. Instead, interest income, items of depreciation and amortisation and exceptional costs have been removed when identifiable.

Nevertheless, these corrections involve subjective judgements of what should be kept or removed and therefore create problems of their own.

3.2.2 Problems of measuring wider costs

The measurement of wider costs requires access to the expenses statements of settlement users. The same problems mentioned above also apply here, i.e. lack of information, huge number of entities to survey, problems of comparability, etc.

3.3 Operating costs

This section analyses the direct costs of operating a securities settlement system that is based on national CSDs and CCPs complemented with ICSDs. It compares this fragmented system with one that is more centralised. The US securities settlement system is used as a proxy for such a centralised system. This paper uses the same approach to measure operating costs as used by Oxera for the London Stock Exchange in its submission (London Stock Exchange, 2001) in response to a request from DG Competition of the European Commission. The section below first presents and discusses operating cost data. The data are then analysed from a variety of angles (e.g. appropriateness of comparison with the US, the particular case of ICSDs, etc.) in Section 3.3.2.

3.3.1 The figures

Table 6 presents an overview of the operating costs of EU securities settlement. It includes one CSD from each EU member state and the two ICSDs. For purposes of comparison, the US DTCC – the holding company incorporating the Depository Trust Company (DTC, the US CSD) and the National Securities Clearing Corporation (NSCC, the US CCP) – is included as a proxy for the costs of a centralised system.

[8] Such a task could be carried out by a public body if it had the authority to access internal company data. The most obvious candidate for the job is DG Competition of the European Commission as it already possesses the authority and the power to collect information (e.g. Art. 85 TEC and Art. 14 of Regulation 17 implementing Arts. 81 and 82).

Table 6. Gross operating costs – All participants

	Organisation	Number of transactions [a]	Operating income [b] (€)	Operating expenditure (€)
ICSD	Euroclear Bank	11,000,000	360,590,000	215,300,000
ICSD	Clearstream Banking Luxembourg	12,000,000	401,175,000	314,746,000
BE	CIK S.A.	n.a.	n.a.	n.a.
DK	VP A/S	6,800,000	27,122,013	20,683,893
DE	Clearstream Banking Frankfurt	125,000,000	295,508,000	167,343,000
ES	SCLV S.A.	11,000,000	72,878,000	54,114,000
GR	CSD S.A.	21,973,933	63,381,532	23,924,138
FR	Euroclear France	134,000,000	147,650,966	108,662,645
IT	Monte Titoli	126,395,972	22,175,332	14,833,675
NL	Necigef [c]	2,359,000	11,487,466	10,549,176
AT	OeKB	275,012 [c]	135,133,375	104,518,566
PT	Interbolsa	8,654,761	14,205,395	7,578,818
FI	HEX	4,278,000	74,785,000	44,038,000
SE	VPC AB [d]	14,633,242	43,125,089	25,980,118
UK (IE)	CREST Co	58,816,750 [e]	143,446,634	94,517,241
EU	EU Total	537,186,670	1,813,663,802	1,206,789,271
CH	SIS	17,745,900	103,231,065	74,833,761
US	DTCC (US)	1,585,900,000	715,624,459	706,114,719

[a] Pre-netting. The data have been taken from CSDs themselves (either annual reports or other public documents, websites, etc.). Additional information has been taken from the "Blue Book 2000" of the European Central Bank. Transactions should be single-counted, but this is not as straightforward as it appears. While it is easy to identify the number of buyers and sellers in a bilateral trading system, a multilateral and order-driven system is more difficult to decipher. Such a system searches automatically for any buy (or sell) order that matches with sufficient order(s) of sell (or buy). As soon as the instructions are matched, the transaction is considered a "matched transaction". Deciding what side of the transaction one must take into account for statistical purposes is not an easy choice. When the "matched transaction" is to be settled at the CSD, it has different alternatives: a) the transactions are "bilateralised" for settlement purposes or b) the transactions are kept "multilateral" and thus are "blind". Each of the two alternatives yields a different number of transactions and thus a different cost per transaction. In the case of SCLV, for example, option b) yields a number of 21.84 million transactions in 2000. The corresponding income per transaction would be €2,10.

[b] Taken from profit-and-loss accounts of CSDs, as posted in the CSDs' annual reports. The figures are from 2000 unless otherwise stated.

[c] 1999 data (ECB, 2001a).

[d] Daily average multiplied by 250 working days.

[e] VPC settlement income amounted to €15.2 million in 2000. The remaining two-thirds of total operating income is mainly made up of issuance income, which is not a core activity of a CSD. The total figure has been included, however, as it has not been possible to verify whether other EU CSDs also have issuance income.

Note: If data were not originally published in euro, the following exchange rates have been used based on averages published by the ECB for the 2000 period: 1€ = US$ 0.924; DKr 7.45; SKr 8.45; and £0.609.

Source: Annual reports.

However, as mentioned above, there are a number of problems with these figures:

- Some of the CSDs listed in the table are an integral part of a larger company, in most cases a stock exchange, and the revenues cited incorporate exchange revenues as well. This is the case of HEX and OeKB.
- Moreover, the organisations differ in the scope of their services. Therefore, the revenues may not reflect revenues from core CSD-services, but rather revenues deriving from other services. For some organisations these revenues form an integral part of their operations and should therefore continue to be included, which is essentially the case for the ICSDs. For CSDs, however, it can be argued that interest revenues for example that mainly come from banking services do not relate to the core function.[9] Therefore, such and other similar revenue streams should be excluded.
- In order to measure the efficiency of settlement systems and the actual costs charged by securities settlement systems to their direct users, post-netting transaction figures have to be used. The markets that benefited from equity netting in 2000 were France, Belgium and Holland (Clearnet), Italy (Liquidazione dei Titoli) and the United States (NSCC as part of DTCC). If transactions are counted post-netting, however, the operating costs of the organisation carrying out the netting should be included. This is particularly important since the US figure includes both NSCC and DTC.[10] This has the perverse and counter-intuitive effect, however, of attributing higher transaction costs to those systems that benefit from netting. While this is obvious from a purely mathematical and methodological point of view, it distorts the fact that *netting is beneficial* in that it reduces the number of transactions that have to be settled and thus *reduces the cost of settlement for users*. The benefits of netting are captured if operating income per transaction is compared before netting. There are therefore valid arguments for using both pre- and post-netting figures. Since the two approaches yield very different results, both are presented below.
- The ICSDs are primarily settling bonds. The focus of their business is cross-border and their services are adapted accordingly. Their business is therefore different and not entirely comparable with CSDs. Nevertheless, they do offer equity business services as well, although this only accounts for a limited share of their overall income. Moreover, they are one of the few participants that try to operate on a pan-European basis, thus incorporating all the current difficulties of operating across borders. For this reason, they may act as a proxy for the current costs of cross-border securities settlement in the EU, and therefore remain in our sample. Nevertheless, the special nature of the ICSDs and the particular circumstances under which they operate should be kept in mind when assessing the data. The ICSDs affect the EU average significantly and will be discussed further below.
- Some organisations only have data for 1999. For the sake of comparability, these have been excluded.

[9] Not many CSDs, however, perform banking services.

[10] The authors have not been able to establish the operating costs of LdT (Banca d'Italia).

When these comments are taken into account, a different picture emerges as shown in the tables below.

Table 7. Adjusted operating income and expenditure

	Organisation	Number of transactions (pre-netting) [a]	Number of transactions (post-netting) [a]	Operating income [b] (€)	Operating expenditure [b] (€)
ICSD	Euroclear Bank [c]	11,000,000	11,000,000	360,590,000	215,300,000
ICSD	Clearstream Luxembourg [c]	12,000,000	12,000,000	401,175,000	314,746,000
DK	VP	6,800,000	6,800,000	27,122,013	19,830,336
DE	Clearstream Frankfurt	125,000,000	125,000,000	268,746,000	167,343,000
ES	SCLV	11,000,000	11,000,000	45,758,000	40,480,000
GR	CSD	21,973,933	21,973,933	47,805,161	23,911,712
FR	Euroclear France	135,000,000	41,000,000	144,968,647	89,910,028
	Clearnet France			125,448,000	85,076,000
IT	Monte Titoli	126,395,972	8,783,635	22,175,332	13,230,171
	Liquidazione dei Titoli (LdT)			n.a.	n.a.
PT	Interbolsa	8,654,761	8,654,761	14,205,395	7,181,141
SE	VPC	14,633,242	14,633,242	43,125,089	25,660,710
UK	CREST	58,816,750	58,816,750	143,446,634	94,517,241
EU	EU	531,274,658	319,662,321	1,644,565,272	1,097,186,339
ICSD	SIS [c]	17,745,900	17,745,900	103,231,065	74,833,761
US	DTCC [d]	1,585,900,000	230,271,931	638,261,727	634,174,242

[a] For pre-netting instructions, see comments in footnote a of Table 6. The second transactions column is post-netting if applicable (i.e. if a CSD benefits from a netting service).

[b] CCPs: If a CSD benefited from netting in 2000 then the operating income of that CCP has been included (Clearnet France, NSCC). It has not been possible to determine the operating income of Banca d'Italia's LdT.

[c]) ICSDs: Banking revenues are core income for ICSDs, as their services are different from other CSDs. This is illustrated by the fact that if banking revenues are excluded from Clearstream Banking Frankfurt, then the company makes an operating loss. The banking revenues of Euroclear Bank, on the other hand, are largely excluded in the annual statement of Euroclear. This is due to an agreement relating to the exit of JP Morgan (see Euroclear's Annual Report for the year 2000, p. 65).

[d] If interest income is subtracted, the DTCC's discount policy makes expenses larger than revenues. The authors have therefore subtracted the share of interest income (11% of total income) from the discount as well. This produces an operating income of €638 million.

Note: Data adjusted for interest income, depreciation and amortisation and exceptional costs, which have been removed.

Source: Annual reports.

As depicted in Tables 8 and 9, a comparison of the costs per transaction reveals a different picture, depending on whether post-netted or pre-netted figures are used.

Table 8. Post-netting income, costs and margins

	Organisation	Transactions (post-netting)	OPINC/ Transaction (€)	OPEX/ Transaction (€)	Operating margin (%)
ICSD	Euroclear Bank	11,000,000	32.78	19.57	40
ICSD	Clearstream Luxembourg	12,000,000	33.43	26.23	22
DK	VP	6,800,000	3.99	2.92	27
DE	Clearstream Frankfurt	125,000,000	2.15	1.34	38
ES	SCLV	11,000,000	4.16	3.68	12
GR	CSD	21,973,933	2.18	1.09	50
FR	Euroclear France (incl. Clearnet France)	41,000,000	6.60	4.27	35
IT	Monte Titoli	8,783,635	2.52	1.51	40
PT	Interbolsa	8,654,761	1.64	0.83	49
SE	VPC	14,633,242	2.95	1.75	40
UK	CREST	58,816,750	2.44	1.61	34
EU	EU	319,662,321	5.14	3.43	33
ICSD	SIS	17,745,900	5.82	4.22	28
US	DTCC	230,271,931	2.77	2.75	1

Table 9. Pre-netting income, costs and margins

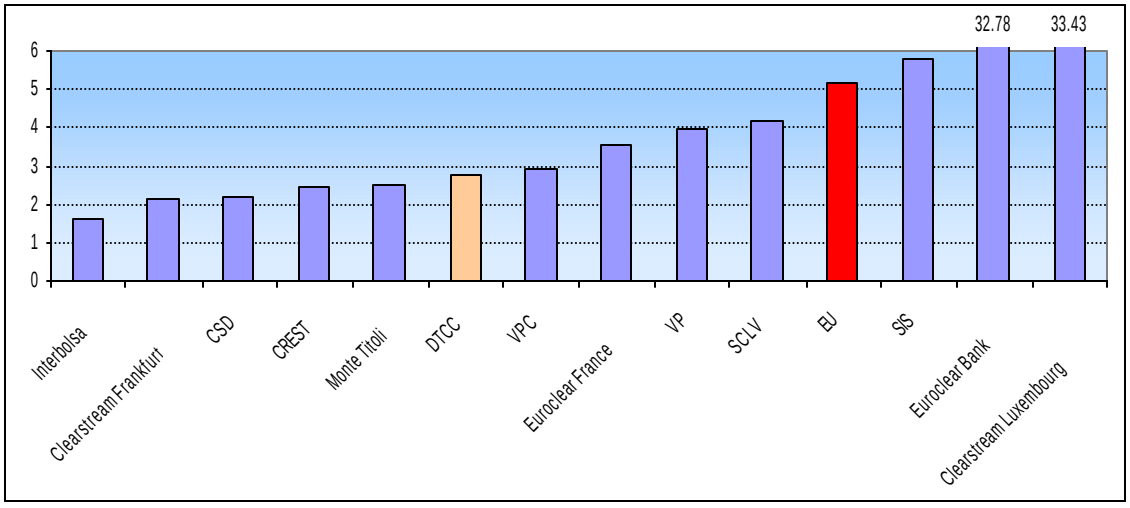
	Organisation	Transactions (pre-netting)	OPINC/ Transaction (€)	OPEX/ Transaction (€)	Operating margin (%)
ICSD	Euroclear Bank	11,000,000	32.78	19.57	40
ICSD	Clearstream Luxembourg	12,000,000	33.43	26.23	22
DK	VP	6,800,000	3.99	2.92	27
DE	Clearstream Frankfurt	125,000,000	2.15	1.34	38
ES	SCLV	11,000,000	4.16	3.68	12
GR	CSD	21,973,933	2.18	1.09	50
FR	Euroclear France (incl. Clearnet France)	135,000,000	2.00	1,30	35
IT	Monte Titoli	126,395,972	0.18	0.10	40
PT	Interbolsa	8,654,761	1.64	0.83	49
SE	VPC	14,633,242	2.95	1.75	40
UK	CREST	58,816,750	2.44	1.61	34
EU	EU	531,274,658	3.10	2.07	33
ICSD	SIS	17,745,900	5.82	4.22	28
US	DTCC	1,585,900,000	0.40	0.40	1

The differences may be summarised as follows:

- *Operating income*: The operating income of these European CSDs amount to €1,644 billion. This is 2.6 times as high as the income of the DTCC (€638 million).

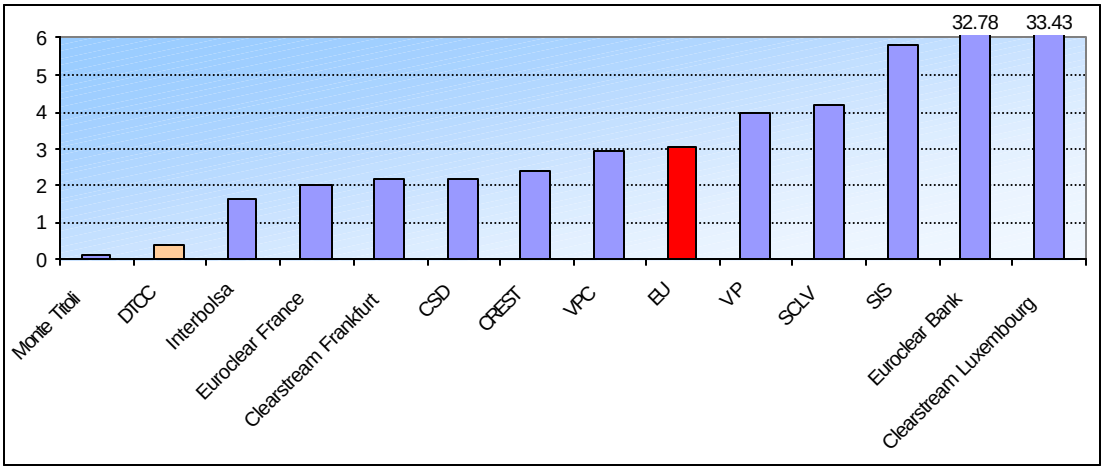
- *Operating expenditure*: The operating expenditure of EU CSDs amounted to €1,097 billion. That is 1.7 times as high as the DTCC (€634 million).
- *Transactions*: After netting, the EU settled 319 million securities transactions in 2000. This is more than the US, where 230 million transactions were settled. However, the US benefited from a very high level of netting by the NSCC. Therefore, the pre-netting figures look quite different. Before netting, the US received 1,586 billion settlement instructions. The corresponding figure for the EU was 514 million.
- *Income per transaction*: Post-netting figures show that the EU average operating income per transaction is higher than the US (€5.42 as compared to €2.77). This is 96% higher than the DTCC.

Figure 5. Ranking post-netting



Pre-netting figures yield a different result: the EU's average operating income per transaction amounted to €3.19. The DTCC's income per transaction is €0.40.

Figure 6. Ranking pre-netting



- *Expenditure per transaction*: Post-netting figures show that the EU average income per transaction is 1.25 times higher than the US (€3.43 compared to €2.75). As above, pre-netted figures yield a different result: the EU is 5.16 times as high as the US (€2.07 compared to €0.40).
- *Operating margin*: European CSDs have considerable margins between their income and expenditure. The EU average is 33% (both pre- and post-netting). This contrasts with the US where the DTCC just covers its expenses (1% margin, both pre- and post-netting).

In sum, the operating costs of the EU's securities settlement systems are higher than those of the DTCC. Nevertheless, the difference is not as dramatic as often stated. In addition, the EU average is blurred by the existence of two outliers – the ICSDs. If these two are excluded, the EU's operating costs are lower than in the US!

This comparison shows that a single centralised agency is not necessarily cheaper than competing organisations. There could well be several explanations for the relatively "high" operating costs of the DTCC (e.g. larger market, more services, etc.). What seems to be clear, however, is that the DTCC does not earn anything from its operations. With an operating margin of 1%, its income just covers its expenses.

There are a number of lacunae in the figures presented above, however. Although the major securities settlement participants are included, three member states are not accounted for (Belgium, Finland and the Netherlands) as well as the operating costs of parallel securities settlement systems (e.g. CADE in Spain). Moreover, despite attempts to standardise the kinds of revenue that have been included in operating income above, the variable continues to reflect the differences in the underlying scope of services that each participant provides. This is particularly the case for the ICSDs. They are different and their operating results are gross outliers. We elaborate on these comments below.

3.3.2 Problems of comparing the EU with the US

A prior question to ask is whether a comparison between the EU and the US makes sense. The rationale for comparing the EU with the US is that a centralised securities settlement infrastructure is one obvious model towards which the EU could strive. Moreover, the US example illustrates what concerted policy action can achieve. US centralisation did not happen by itself, however. On the contrary, the US Securities and Exchange Commission (SEC) and the US Congress forced it through the legislative process in 1976, in spite of strong opposition from market participants.[11] The US model of centralisation is also interesting as it was created in an environment of rapidly integrating and evolving markets, which characterises the current situation of the EU today.

It is true that the US realised significant cost savings when the DTC and the NSCC were set up in the 1970s. A study commissioned at the time by the SEC[12] on the effects of moving from seven CCPs to one CCP estimated a cost saving of 63.5%, with the cost per transaction estimated at somewhere between $0.50 and $0.20. Moreover, the cost to users would decrease as well. Some 63 firms that were deemed to represent a cross-

[11] ESF (2000).

[12] Shriver Associates (1976).

section of securities settlement users were estimated to save $150 million a year ($475 million in current prices) by moving to a centralised system.

As suggested above, however, the cost savings would perhaps not be of the magnitude often projected. It is true that the costs per transaction in the EU are higher than in the US, but the difference is less dramatic than often stated. Therefore, the gains from centralisation may not meet expectations. Moreover, because the EU is not a single jurisdiction, like the US, centralisation would also require legal harmonisation. The complex EU environment – including different company laws, tax rules, cultures, etc. – may well pose an insurmountable obstacle to full centralisation, at least in the short to medium run. Moreover, as the next chapter will show, the EU is unlikely to muster sufficient political will or strength to be able to impose a solution on the market. All of this calls into question the *feasibility* of US-style centralisation in the EU.

Moreover, is the US model *advisable* in an EU context? In many ways the DTCC actually operates in a less demanding environment. For example, the huge bulk of DTCC's transactions are domestic. While its domestic prices are very low, it appears to be less effective in dealing with cross-border transactions. It cannot yet handle settlement in different currencies, although such an initiative is now underway. Moreover, counterparty risk remains until the day after the transaction is made when NSCC guarantees the trades.[13] Finally, the DTCC does not net equity derivatives against equity cash positions.

To a large extent, these differences are a natural reflection of the different contexts in which EU and US securities settlement systems have developed. The NSCC, for example, was developed to solve the operational risk of large volumes rather than focus on counterparty risks. Volumes are much lower in Europe and therefore the focus in the EU is more on counterparty risk. Most users (and owners) of DTCC predominantly trade in the US. Therefore, multiple-currency settlement has been less in demand compared to Europe where cross-border trading is more common.

While the DTCC illustrates that regulation and user governance can mitigate the traditional problems of a monopoly (price and services), it remains an open question whether it will over time manage to overcome another problem associated with monopolies: the difficulty of creating benign conditions for innovation in the absence of competition.

3.3.3 Results sensitive to changes in underlying assumptions

The operating income results are very sensitive to changes in the underlying assumptions. Two issues in particular are very important: the choice of transaction variable and whether or not ICSDs are included in the EU average. The table below presents the outcome if those assumptions are changed.

[13] DTCC will address the timing of the trade guarantee as part of their T+1 initiative.

Table 10. Four options for calculating operating income per transaction

	Pre-netting	**Post-netting**
With ICSDs	EU: € 3.10 DTCC: € 0.40 (1) Ratio: 7.75:1	EU: € 5.14 DTCC: € 2.77 (2) Ratio: 1.86:1
Without ICSDs	EU: € 1.74 DTCC: € 0.40 (3) Ratio: 4.35:1	EU: € 2.98 DTCC: € 2.77 (4) Ratio: 1.08:1

The assumptions of square 1 (pre-netting, ICSDs included) yield a result that is closest to the common assumptions that EU securities settlement is ten times more expensive than in the US, in this paper 7.75:1. If the ICSDs are excluded from this calculation, the EU average operating income would still be higher than the US, but less so (4.35:1, square 3). If one uses post-netted figures and includes the ICSDs, then the difference is 1.86:1 in favour of DTCC. Finally, if using figures after netting and excluding the ICSDs, the difference becomes marginal (EU +8%). Which of these parameters is best is open for discussion. Including ICSDs in the ratio distorts the picture, since it adds complex international transactions on the EU side compared with all the transactions in a homogeneous US market on the other. Looking at pre-netting alone does not bring the efficiency improvements of netting into the picture.

3.3.4 Comparability of settlement systems

As mentioned above, different *settlement systems do not provide the same services*. The kind, level and pricing policy of the settlement system affect its operating income, and thus indirectly the results presented above.

As can be seen in the table below, there are three broad categories of services that a settlement system can provide: settlement, safekeeping and corporate actions.[14] The table below compares three settlement systems: CREST, CIK and the ICSD Euroclear Bank. All three provide settlement and safekeeping, but CREST does not charge for the latter service. CIK does not provide any corporate action services, and CREST does not provide such services to the same extent as Euroclear Bank. There is also a difference in whether they charge fees for their services or not.

Table 11. Different providers, different services

	Settlement		Safekeeping		Corporate actions	
	Service	Charges	Service	Charges	Service	Charges
CREST	✓	✓	✓	✗	✓	✗
CIK	✓	✓	✓	✓	✗	✗
Euroclear Bank	✓	✓	✓	✓	✓	✓

[14] To some extent, Table 11 oversimplifies the actual situation, as the list of functions is not exhaustive. There are other services as well, e.g. banking and collateral management-related services.

The kind of service provided and the pricing policy have an impact on the operating income results presented above. A settlement system that is a pure settlement provider will receive low income per transaction. A settlement system that provides more services, and therefore has a higher operating income, will receive higher operating income per transaction. For example, the high operating income per transaction for the ICSDs above is largely explained by their corporate action revenues.

It would therefore be better to use settlement income only when comparing settlement systems. However, as explained above, even though the figures have been standardised to better ensure comparability, it has not been possible to break out safekeeping and all corporate action income.

These data constraints have a direct bearing on any interpretation of the results of the ICSDs. As can be observed from Table 10, the two ICSDs push up the EU average. If they were excluded, the average operating income per transaction of the EU would change (see above). ICSDs are international CSDs, but they do more that simply emulate at the international level what CSDs do at a national level, as enumerated below:

- *Instruments*: ICSDs to a large extent concentrate on bonds (fixed income instruments) but the are nevertheless in the equity business as well.
- *Services*: ICSDs provide a number of services that a CSD does not, most importantly corporate action services (see Table 11).
- *Environment*: ICSDs operate in multiple markets with different currencies, legal and tax systems. Therefore, their operating environment is much more complex which requires more advanced technological solutions and human resources.

All these factors mean that the costs of operating an ICSD are *inherently higher* than operating a CSD. It is a reflection amongst others of the current complexities of EU cross-border securities settlement. To some extent, it is also an illustration of the wider costs involved in settling on a cross-border basis, in particular to maintain more complex back-office systems than is needed in a domestic environment and to use intermediary local custodians.

3.3.5 Operating margin

The figures obtained on operating margins are surprising, as they produce the most significant difference between the EU and the US, but they should be treated with caution. It could be argued that the differences in margins reflect a difference in ownership structure and regulation. For example, many European CSDs are user-owned and operate under price regulation. It may also be that the European CSDs use their margin in other ways, e.g. re-investing their operating revenues.

3.4 Wider costs

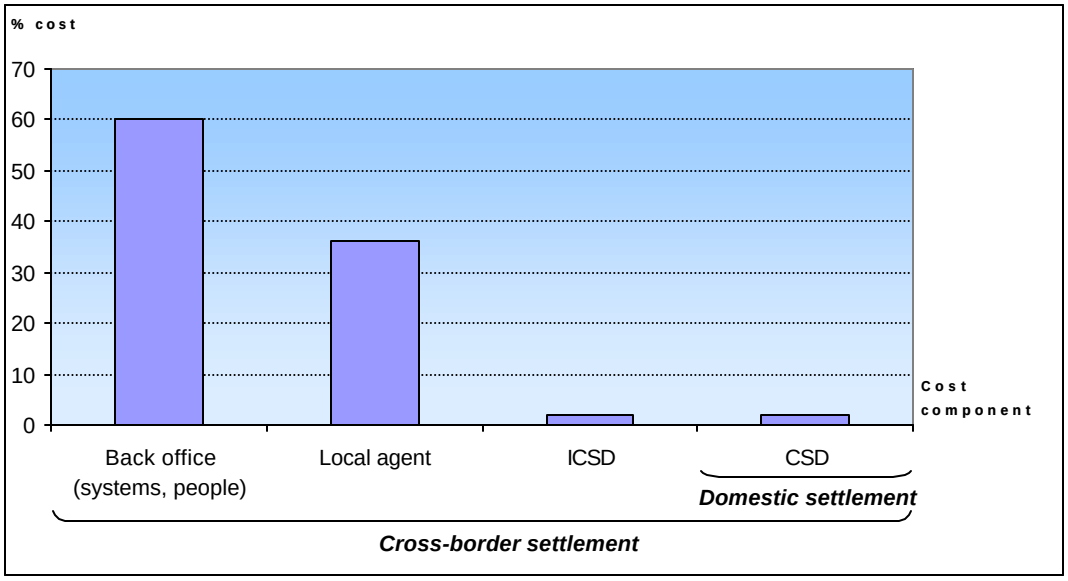
Overall, the figures above show that domestic settlement in the EU is not much more expensive than domestic settlement in the US. They do not say much about the costs of cross-border securities settlement, however, which is the focus of the present section.

A presentation exclusively of operating costs provides an incomplete picture of the total costs sustained in securities settlement. The main costs fall on users when trying to

settle across borders. In some cases, users can use the links of their own CSDs. Most often, however, they have to use intermediaries (e.g. a foreign CSD, local custodian, global custodians or ICSDs). In addition to this intermediary cost, users have to reinforce their own back-office and technological systems so that they can cope with dealing with several CSDs and other participants with varying technical and legal requirements.

Assessments of these costs have been made. Euroclear, for example, has tried to assess the total costs of cross-border settlement. In domestic settlement, the users only have to pay the fees of the local CSD and its back office. The complexity of settling in one's home country is limited, however, and the back office is therefore accordingly limited. Settlement across borders, however, increases the cost considerably.

Figure 7. Assessment of total settlement costs – domestic and cross-border (Euroclear)



Source: Euroclear.

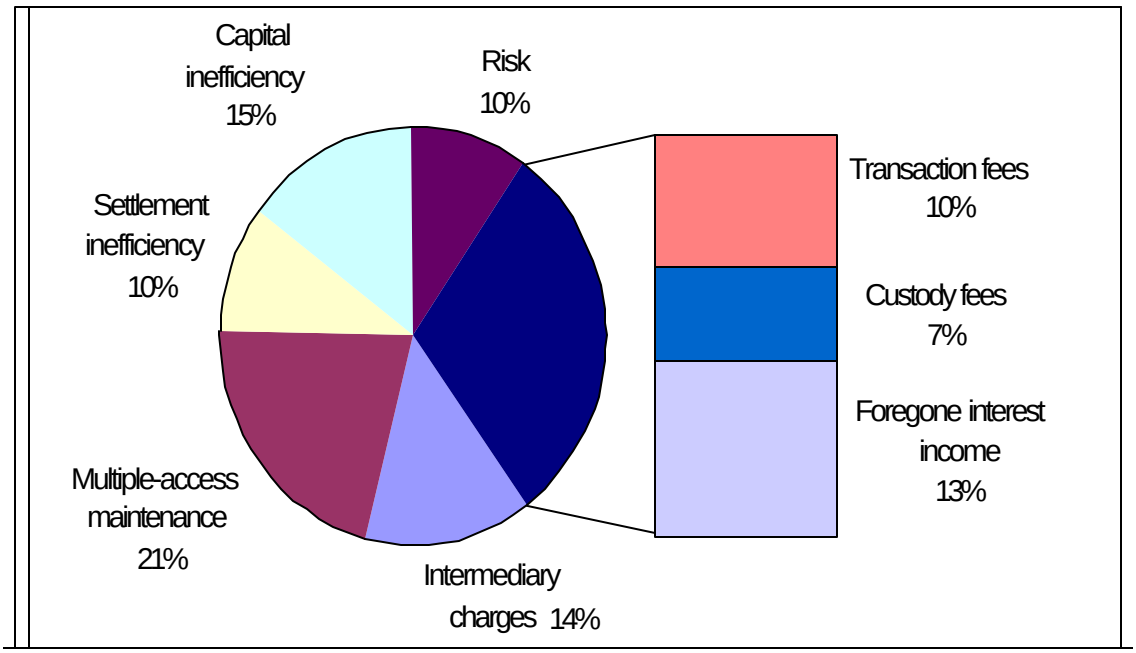
According to Euroclear's estimates, the cost of using a CSD or an ICSD represents only 4% of the total cross-border settlement cost. The largest cross-border cost for the end-user is the maintenance of back offices, i.e. staff and systems. The back-office costs represents 60% of total cross-border settlement costs. The use of local agents accounts for the remaining 35%.[15] Euroclear draws these figures from its own cost curve.[16]

[15] See e.g. Francotte (2001).

[16] Since Euroclear is a large customer of the local agents, the fees it pays are likely to be lower than the fees that smaller and more typical end-users pay. Euroclear's systems are also likely to be more complex and expensive, since Euroclear is dealing with several CSDs, markets and instruments. Therefore, the costs faced by a typical end-user are likely to be more evenly divided between back office and local agents.

Clearstream has also presented a rough assessment of some of the wider costs of securities settlement. According to Clearstream, 30% of the total settlement costs is linked to CSDs or ICSDs (transaction and custody fees, foregone interest income). The remaining 70% is explained by the cost of intermediaries (14%) and the cost of maintaining multiple accesses (21%), just to mention two.

Figure 8. Assessment of a typical user's overall settlement costs (Clearstream)



Source: Clearstream.

Although both assessments reach the same conclusion that the CSDs and ICSDs are not the main costs, there are wide differences. Clearstream's figure for intermediary costs is for example, much lower than Euroclear's. Part of these differences may be explained by the fact that it is grouping the costs differently or are measuring different things. The wide difference also implies, however that there is considerable uncertainty about the extent of particular costs. The numbers should therefore be treated with caution and further research in this area is needed.

3.5 Conclusion

A first glance at the data confirms the conventional wisdom that the operating costs of securities settlement are higher in the EU than in the US. The EU average for operating expenditure per transaction is higher, the operating income per transaction is higher and the operating margins are of a completely different magnitude.

These figures notwithstanding, however, the operating costs are not as high as often asserted. The data presented above suggest that the operating income in the EU is 7.75 times as high as in the US if pre-netted figures are used, but only 1.86 times as high if post-netted figures are used. Regardless of the measure used, the difference is much less

than the commonly held assertion that the operating cost is up to ten times higher in the EU than in the US. The lower value reflects that the CSDs are relatively cost-efficient operators designed to service their national markets: domestic settlement is cheap, fast and reliable. No matter which of these figures is used, however, it is clear that EU securities settlement systems handle domestic transactions in an efficient manner. The operating costs of the EU's 15 settlement systems are not that much higher than that of the DTCC's.

Cross-border settlement is much more costly than its domestic counterpart. Exactly how much more depends on which settlement channel is used. If users are lucky, they can use the links of their local CSD and thus settle their cross-border instructions as if they were an internal, domestic instruction. In the vast majority of cases, however, this is not possible. Instead, settlement users have to use intermediaries, such as ICSDs, global custodians and local agents, which carry a direct cost. In addition, users have to maintain staff and systems capable of communicating with these intermediaries.

Nevertheless, only anecdotal evidence exists so far on these kinds of costs. These wider costs are indirectly related to maintaining settlement systems along national lines. If the estimates of these costs provided by the ICSDs are in the correct range, there are indeed significant gains to be made from changing the current structure of securities settlement in order to reduce the need for, for example, costly back-offices and multiple interfaces.

CHAPTER 4

LIBERALISING EU SECURITIES SETTLEMENT NETWORKS

Technological progress has recently given a major impetus to structural change in securities markets. Advances in communications technology have served to minimise the fragmenting effect of location and allowed securities trading and settlement systems to better benefit from scale economies. At the same time, it has considerably reduced the cost of establishing the necessary infrastructures.

Like communications networks, securities settlements systems can be considered as network industries. Network sectors depend on the control of a fixed network that represents a natural or de facto monopoly within a given market, since the benefit of using a certain system increases with the number of users. This situation has led states to allow securities settlement systems to function as natural monopolies within their territories.

The question emerges, however, whether securities settlement systems should also be accepted as natural monopolies at EU level. Provided other regulatory differences are tackled, would a single EU securities settlement system be the solution for the incompatibility of the different national monopolies at European level? To analyse whether this response is really appropriate, it may be useful to analyse the method followed in the liberalisation of other network industries in the EU, most importantly communications networks.

This chapter thus addresses the following questions:

- What are the essential characteristics of network industries?
- Are networks natural monopolies?
- What is the EU policy with regard to network industries as applied for example to EU telecoms liberalisation or finance networks?

4.1 Network industries

Network industries provide services that are based upon control over a given infrastructure. They share certain technical characteristics (e.g. they operate within networks) and may perform certain public services functions. In this sense, they are also called (public) utilities. Typical network industries are telecommunications, public transport (railtracks, air slots, highways), energy and water distribution.

A crucial feature of networks are *network externalities*, i.e. the use of the network generates positive effects for the users in terms of services and costs. The more users the network manages to attract, the lower the unit costs, and the higher the willingness to pay for the network services by all participants. The viability of the provider of the network services thus depends on his ability to attract a critical mass of users.

Networks are generally considered to be vital for the economy. Their specific characteristics have led to a special regulatory regime. In many states, they have functioned as monopolies or quasi-monopolies, with a special state licence. However, the specific regulatory systems differ importantly from country to country and sector to sector, and their development is closely interwoven with local history and constitutional issues.

4.2 EU liberalisation of networks

In an EU context, these differences of national regimes raise the question of their compatibility with EU competition policy and the single market. National regimes to deal with the special rights of networks may de facto contradict EU rules. However, EC competition law had hardly been enforced in network industries until market liberalisation got underway in the 1980s (Slot and Skudder, 2001). The same is true for SSSs.

The liberalisation of networks at EU level was not the result of an overall plan, but more the result of an ad hoc and sector-by-sector approach and the pressure of EU's competition policy directorate. Moreover, it started only at the end of the 1980s, or some 30 years after the signature of the Treaty of Rome. The famous EC-1992 White Paper of 1985 does not speak about the liberalisation of network markets.

Certainly in the initial stages of the liberalisation process, sector-specific regulation was generally seen to be needed first before general competition law could be applied. In the later stages of liberalisation, competition policy started to play a more important role, and has even become the prime instrument for ensuring competitive markets.

The first proposals for a common gas and electricity market date from 1988. In 1989 the broadcasting sector was liberalised in the TV-without-frontiers directive. In 1990 telecoms liberalisation cautiously began; in 1991 the first rail "liberalisation" directive was adopted; in 1993 the final air transport liberalisation package was agreed and in 1994 the Council declared that the postal sector would be subjected to a "gradual and controlled" liberalisation process (Pelkmans, 2001).

This burst of liberalisation activity prompted much anxiety, as it threatened powerful vested interests. It was claimed that liberalisation would destroy the culture and the merits of public service, and that it was driven by unaccountable bureaucrats.

The fundamental idea behind liberalisation has been that public policy should pursue every means to improve the incentive for network industries to perform optimally on behalf of the public interest. It seemed that regulatory failure in (monopolistic) networks was best served by liberalisation. Second, the single market could not function with a juxtaposition of monopolies at member state level. This required EU-wide measures to come to liberalisation at national level. Different steps have been followed in this process.

The first question that needs to be addressed in the EU approach to network liberalisation is whether the network sector is characterised by a natural monopoly. Nowadays, it has become clear that few network industries are complete natural monopolies. Water supply and sewerage is probably the archetypal example. For such sectors, the incentives cannot come from introducing competition because this would *reduce* technical efficiency. What can be considered is competition *for* the market, via bidding for a franchise (or concession). Apart from ensuring non-discrimination, the EU is not involved in such matters. For instance, in a sector such as water, where cross-border trade barely exists, EU powers are inconsequential.

Box 3. What is a natural monopoly?

"An industry is a natural monopoly if total costs of production are lower when a single firm produces the entire industry output than when any collection of two or more firms divide the total among themselves."

New Palgrave

How to determine?

Competition remains the rule until it is proven that a market has the characteristics of a natural monopoly. The burden of proof falls on those who claim that competition should not apply. In general, competition is assumed to bring substantial benefits in a large majority of markets, in the sense of efficiency, choice, innovation, quality and lower prices.

It is difficult, but feasible, to test whether an industry is a natural monopoly, although relatively few industries meet the criteria. The focus is the cost function of industry competitors. If the total costs of production are lower if only one firm is active, then there is a natural monopoly (sub-additivity). Such a test is easy to define mathematically, but very difficult to verify empirically.

How to exercise control?

If a monopolist charges excessively high prices (profit maximisation by equating marginal cost with marginal revenue), competitors will be induced to enter the market with the same or superior technology.

This is the case if a network monopolist serving the whole country is forced to set prices according to average costs. This may lead to inefficient entry, or cream-skimming, when an inefficient competitor tries to catch low-cost customers (e.g. as happens in postal services, where there is competition for city letters, but no competition for countryside distribution where distances are greater…).

Sustainable prices are prices that deter entry by rivals with the same or inferior technology. A market is *contestable* if there are no barriers to entry and exit, such as sunk costs, which may cause a monopoly to be natural. If these conditions apply, then entry will not increase total industry costs. Entry occurs only if technological innovation reduces industry costs. If the market is contestable, the threat of entry will force a monopolist to keep sustainable prices (and therefore zero excess profits). But sustainability is a difficult concept (assumptions of behaviour of monopolist).

A major problem with monopolies in the long run is that the lack of competition leads to the disappearance of cost minimisation. As a result, dramatic inefficiencies will emerge over time. Under those circumstances, cost minimisation and asymmetric information (monopolist knows better than potential competitors), it is extremely difficult to outguess or second-guess what the true scale of the cost curve is. It is only when effective competition is introduced that the true scale curve is discovered.

Another way is to allow competition *for* the market rather than *in* the market. This can be done via ensuring that markets are contestable, or by regularly *franchising* out the right to control a certain market. The realisation that a company might lose its right to control a market if it overcharges may influence the behaviour of a monopolist.

A final way is to arrange for the monopolist to be owned by its users. This would ensure that the incumbent does not overcharge, as this would not be in the interest of its users.

Examples

There has been confusion in the literature over examples of natural monopolies. What was once considered to be a natural monopoly is no longer considered as such. Nowadays, there is probably a consensus that the hard infrastructure in railways, transmission grids in electricity, high-voltage grids for distribution in electricity, most water-supply systems and air traffic controls for high altitudes constitute natural monopolies.

Caveat

There is no guarantee that an industry will remain a natural monopoly. Changes in technology might change the cost function, and as a consequence, markets may be opened up to competition. However, such a change in technology has to be comprehensive and if no such radical change occurs, the monopoly is likely to continue.

The EU framework does matter once the natural monopoly is incomplete or absent. In that case, competition *in* the market for part or all of the complete service needs to be assured. If the network has monopoly rights at national level, it raises the issue of free movement of services. Art. 82 of the EU Treaty requires the member state(s) to justify exclusive rights, as it hinders cross-border competition. The universal service obligation for networks is only accepted as an argument if it can convincingly be shown that competition would be harmful. If a natural monopoly is seen as an essential facility, entry and access to that facility ought to be carefully regulated.

Before competitive entry is introduced, however, network industries must be put on an equal footing throughout the internal market, i.e. incorporated separately and restructured into separate entities. The network industry should be split into the "reserved" (natural monopoly) and the competitive elements, and the exclusive rights for the latter are abolished. Since the incumbent will be allowed to compete outside the 'reserved' activities, competitors should be guaranteed that no cross-subsidisation between the reserved and competitive business of the incumbent takes place. Separate accounting for divisions within the incumbent is therefore needed.

In the next steps, the obligations of the monopoly, its financing and the access rules need to be defined. A distinction can be made between network and service competition. In case of a single network, service competition can still take place. Pricing access to the single network may in this case play a crucial role, and the intervention of a regulator may be needed if new entrants are unhappy with the price. A related obligation for network providers is the need to interconnect. Access pricing and interconnection are related to proper costing models, which is extremely complex and not yet fully resolved at EU level. What is the cost for a new entrant in the airline market to connect to a big airport hub? Too high a rate may undermine the chances of a low-cost rival entering the market.

The final step relates to cross-border competition by network industries. Cross-border provision of services can only take place under common quality and technical standards, and when special, distorted cross-border prices are removed. In telecoms, for example, the International Telecommunications Union (ITU) had agreed on very high accounting rates for bilateral calls, which bore little relation to cost and stifled competition.

Box 4. Steps in EU network liberalisation

1. Competition: *In* or *for* the market?
2. Restructuring of monopoly and non-monopoly tasks, separate reserved and competitive activities; no cross-subsidisation
3. Define obligations of the network
4. Financing via access charges
5. Access rules and interconnection obligations for incumbents
6. For cross-border trade (intra-EU): removal of special cross-border prices (e.g. accounting rates for bilateral phone calls), EU-wide quality and technical standards

4.3 Parallels with EU telecoms liberalisation

The above overview is based on the traditional network sectors: energy, telecoms, postal, air and rail. Of these, the telecommunications sector, now called communications networks, is probably the most interesting in the context of this study. The parallels with the current SSS debate are striking indeed. The market was dominated by national champions or quasi monopolies, which derived their income from subscriptions and user tariffs. The costs lacked transparency and were not market based. Cross-border calls over a short distance were more expensive that long-distance national calls. The factor of 10 in the cost comparison between the US and the EU was repeatedly stressed.

Telecommunications were only liberalised in 1998. Up until then, telecommunications were regarded as a national issue (public utility, national champion, cash-cow for finance ministry, regional and social policy considerations meant that charges were often below costs for national calls). There was a failure to appreciate the market potential for liberalisation. The technology was not very developed, and the vertical integration of the national monopolies was a strong barrier to liberalisation (Pelkmans and Young, 1998).

Technological innovations have played an important role in weakening the case for telecommunications operators as publicly owned natural monopolies. New transmission systems decreased the cost of building infrastructures and eased network interconnection across the different sectors of communications networks. The internet revolution is a further catalyst in this process. Public ownership was seen to provide the wrong incentives to respond to this rapidly changing environment, leading to partial or full privatisation of European operators, and the opening-up of markets to new entrants.

The EU liberalisation process started in 1983 and was completed in 1998. EU legislation addresses licensing, pricing and transparency, and universal service obligations (Slot and Skudder, 2001).

- *Licensing*. The 1990 services directive (90/388/EC) lays down the principles relating to restrictions on the number of licenses and licensing procedures. The 1997 licensing directive supplements these principles with harmonised criteria for the issue of general authorisations. A new draft, still under discussion, will replace the 1997 directive and further harmonise and simplify national authorisation rules, since the margin of discretion in the current directive is seen to be too wide.

- *Pricing and transparency.* Control of tariffs and accounting separation is dealt with in the majority of harmonisation directives with the common theme that tariffs should be transparent, objective, non-discriminatory and, for operators with significant market power, cost-oriented and unbundled. National regulatory authorities are required to ensure that operators follow these principles. Once sufficient competition has been established, pricing should be left to the rigours of the market.
- *Access and interconnection*. The EU framework places the obligation on member states to remove any restrictions on direct interconnection between networks and obligations on the incumbents as to the terms on which they should provide interconnection, the cost-orientation of tariffs, the publication of terms and conditions, and the establishment of a suitable cost-accounting system identifying the cost elements for pricing interconnection. The proposed new regulatory framework (COM(2000)384) builds on the premise that competition rules will be the prime vehicle for regulating the electronic network communications market once the market becomes effectively competitive.

A recent issue concerns the need for technologically neutral rules, in anticipation of the convergence of technologies in the telecommunications markets.

4.4 Networks in finance

Many characteristics of network industries are also present in non-network industries. In finance, trading platforms, payment systems and securities settlement organisations are networks in the sense that they exhibit network externalities. The more users adopt the same (or compatible) exchange, payment or settlement system, the more this system is valuable to a user.

Networks in finance have benefited from developments in technology and in the traditional network industries, primarily in telecommunications. Technological developments have materially reduced the cost of providing trading, settlement and payment-related services, as has the liberalisation of and increased competition in the telecommunications industry.

As a consequence, the structure of the industry has been affected. In the exchange industry, the area on which most research exists from this angle, progress in transmission systems technology has allowed floor trading to be replaced by electronic trading, and allowed network effects to spread exponentially, as the physical location of traders has become irrelevant. Automation has significantly increased market contestability, in particular via its role in reducing sunk cost barriers to entry and exit. The effect has been to reduce the ability of exchanges to cross-subsidise different types of trading activity, as competitors can easier run away with the more profitable elements of the market (Domowitz and Steil, 1999).

It is difficult to compare costs in floor-based trading systems versus automated systems since many factors need to be taken into account. Nevertheless, some partial evidence is relevant. Overall, the costs of floor-based systems are at least three to four times more expensive than those of automated systems, and their costs are static, whereas those of the automated are declining. Tradepoint's automated trading system was developed in 1998 for less than $10 million, in stark contrast to $100 million in the cases of the

London Stock Exchange and Deutsche Börse, without there being any big difference in capacity between them. Liffe's floor-trading development plan, which was abandoned in the spring of 1998, was priced at more than $400 million, and a smaller bond futures trading floor was completed at the Chicago Board of Trade in 1997 for about $200 million (Domowitz and Steil, 1999).

The adoption of technology is a complex process, however. There are issues of standardisation at the institutional, national and international levels, complementarity with other parts of the trading process, and the selection of technology. A first mover may have a significant advantage, even if the technology it is using is not optimal. A new entrant may have to engage in penetration pricing in order to establish its own viable network, because of network externality effects at the level of the incumbent. As a result of the dramatic decline in the cost of developing automated systems, however, the first-mover advantage is increasingly eroded, meaning that network effects are becoming less important.

As a result, more and more equity trading systems have been established during the 1990s, primarily in the form of Alternative Trading Systems (ATS), and most visibly in the United States. In the US, some 30% of the trading volume is captured by ATSs, as compared to 5% in the EU.

Also at the level of securities settlement systems, more CSDs have been established globally during the 1990s than ever before. Thomas Murray, a specialised consultant, counted 122 CSD organisations worldwide in 2000. This reflects, however, the trend towards concentration of settlement and depository organisations at the national level. One of the aims has been to facilitate the efficiency of the national securities markets. At international level, some global players are emerging, such as Euroclear and Clearstream, which have recently been very active in expanding their coverage. However, the models supporting integration differ importantly, and in the latter case, the option was to integrate the entire services chain of Deutsche Börse (straight-through-processing or vertical integration), as compared to the more horizontal model of Euroclear, which is merging different settlement organisations, in close cooperation with the Euronext trading platform.

As with trading platforms, the same effects can be expected to apply: technological progress has eased the development of securities settlement organisations. Use of electronic book-entry systems based upon advanced technology has become increasingly widespread, and is helping to further shorten settlement lags. This could also be expected to facilitate cross-border transfers and settlement of securities.

It has recently been argued that securities settlement systems are a natural monopoly and should be integrated into a single system in Europe (London Stock Exchange, 2001). The above discussion, however, makes this a difficult position to hold. We are aware of only one paper that demonstrates significant scale economies in settlement and depository functions. It acknowledges nevertheless that regulatory and cultural diversity in Europe will continue to play an important role, hindering SSSs from exploiting these scale economies (Malkamäki and Topi, 1999). The question emerges to what extent does this diversity play a role in keeping securities settlement markets fragmented, or hamper them from exploiting scale economies.

4.5 EU policies as applied to finance networks

EU policies in the area of finance networks are essentially based on two factors: market liberalisation rules and competition policy. As in the area of telecommunications, competition policy has started to be applied as a result of the implementation of market liberalisation rules. Or to say it differently, the competition policy authorities only started to watch the finance networks once there was a problem at the level of market liberalisation. The most important measure in this context is the investment services directive. But before developing this idea, it may be useful to see what has (not) been achieved in the area of cross-border payments.

Cross-border retail payments have attracted the attention of policy-makers ever since the creation of the single financial market in 1992. However, no progress has been achieved to date by market operators, as was again proven in a survey by European Commission, published on 12 July 2001.[17] The problem is to a large extent comparable to securities settlement systems, in the sense that we have different national payment securities settlement organisations (and some international ones), which have developed within different historical contexts, with different governance, access, pricing and transparency traditions. At national level, these organisations function as quasi-monopolies, but as soon as they have to work on a cross-border level, the problem of interoperability emerges, leading to high costs for cross-border payments.

The aim of the authorities has been to regulate the pricing of cross-border transfers, but this proves difficult within the context of the EU Treaty. The 1997 cross-border payments directive (97/5/EC) regulates the performance and transparency of cross-border payments and prohibits double-charging by transferring institutions. The directive has been unevenly implemented so far, however, and its effects have not been felt in the market. The European Commission therefore proposed a regulation on 24 July 2001, which was adopted on 26 November 2001, establishing that the price of a cross-border payment operation in euro within the EU should not be different from one at the national level.[18] A regulation is a directly applicable legal instrument of the EU, meaning that it does not have to be transposed into national law like a directive. The European Commission says that this regulation is not a form of price fixing, but that it sets the principle of non-discrimination for fees applied to cross-border as compared to national payments. The banks remain free to set prices, but for the whole of the EU. The Commission says that comparable rules exist in other areas of Community law, such as car insurance, where a given premium should be the same for the whole of the EU. In the area of telephone calls, it continues, prices for cross-border calls have come down considerably, and there has always been a difference between local and long-distance calls. [19]

This proposal for regulation was the ultimate weapon of the European Commission to improve the situation with regard to cross-border payments in the euro area. Since the early 1990s, the European Commission has been calling for improvements in this area,

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[17] See http://europa.eu.int/comm/dgs/health_consumer/library/surveys/sur24_en.pdf

[18] Regulation of the European Parliament and the Council on cross-border payments in euro, Brussels, 26 November 2001; a political agreement was reached in the EU Council on 26 November 2001.

[19] See Commission press release of 24 July 2001, pp. 3-4 (see also http://europa.eu.int/comm/internal_market/en/finances/payment/news/egalityfaq.htm).

beginning first with non-legislative measures, and then a directive, and now a regulation. It would have been more opportune to act through the application of competition policy rules to payment system organisations, in the sense of regulating market and system access, governance, licensing, etc., but this would have taken more time. By acting rapidly now, albeit late, the European Commission hopes to avoid consumer disenchantment in January 2002, when the euro is introduced in notes and coins. Nevertheless, prices for making cross-border transfers or using direct debit cards in other EU countries will continue to differ importantly.

Unlike payment systems, where the consumer element plays an important role, the Commission is proposing to work through enforcement of free competition in the SSS sector. In the consultation paper on the proposed adjustment to the investment services directive (ISD), the European Commission proposes to enforce and supplement the existing provision contained in Art. 15.1 to strengthen free competition between CSDs. This article stipulates that authorised firms can have remote access to clearing and settlement systems. The Commission proposes to strengthen this by allowing market participants to designate the locus of settlement, and allowing regulated markets to use CCP services in other member states.[20]

Whether this will be sufficient is an open question. The analysis in the previous section effectively proves that there is insufficient competition among European SSSs. The average margin of SSSs in the EU is 33%, which is very high. But this also indicates that there are hidden efficiencies in the European systems, the benefits of which may come to the markets as a result of stronger liberalisation.

According to some observers (ESFRC, 2001), letting the markets work will not bring about the horizontal reconfiguration of securities markets, because of the historically strong vertical integration, and thus vested interests in maintaining the status quo. The choice is between further price and access regulation, or forcing trading platforms to divest their stakes in settlement systems. Since the former may end up in highly complex regulations, and will consequently be difficult to control, the latter option may be more likely to bring about the necessary change in market structure.

[20] This may however be in conflict with the view of the ECB that CCP facilities should, because of possible systemic risks, be located in the eurozone (see ECB, 2001b).

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Annex 1

Overview of EU Securities Settlement Systems

	Exchange	Clearinghouse	CCP	CSD
BE	Euronext Brussels	Clearnet	Clearnet	Euroclear (CIK)
	Government bonds	NBB Clearing		
DK	Copenhagen Stock Exchange	VP AS		VP AS
DE	Eurex	Eurex Clearing	Eurex Clearing	
	Deutsche Börse			Clearstream Frankfurt AG
GR	Athens Stock Exchange	HCSD SA		HCSD SA
ES	MEFF SA	MEFF SA	MEFF SA	
	Madrid Stock Exchange			SCLV SA
	Government bonds			CADE
FR	Euronext Paris	Clearnet	Clearnet	Euroclear France
IE	Irish Stock Exchange			CREST
	Government bonds			Euroclear
IT	Borsa Italiana	CC&G LDT	CC&G	Monte Titoli
LU	Luxembourg Stock Exchange			Clearstream Banking Luxembourg
NL	Euronext Amsterdam	Clearnet	Clearnet	Necigef (Euroclear)
AT	Vienna Stock Exchange (Wiener Börse)			OeKB
PT	MTS Portugal			SITEME
	Lisbon & Oporto Stock Exchange (BVLP)			Interbolsa
FI	HEX	HEX	HEX	APK (HEX)
SE	OM Stockholm Exchange			VPC
UK	LSE	LCH	LCH	CREST
	virt-x	LCH	LCH	CREST SIS
	IPE	LCH	LCH	
	LME	LCH	LCH	
	LIFFE	LCH	LCH	
US	NYSE	NSCC	NSCC	DTC
	NASDAQ	NSCC	NSCC	DTC
	CBOT			DTC
CH	virt-x	x-clear	x-clear	SIS

Sources: ECB (2001a) and various exchanges, clearinghouses and CSDs.

Glossary

Alternative Trading Systems (ATS): an entity which, without being necessarily regulated as an exchange, operates an automated system that brings together buying and selling interests – in a system and according to rules set by the system's operator – in a way that forms, or results in, an irrevocable contract (FESCO).

Central Counterparty (CCP): A CCP replaces several counterparty exposures at the level of member institutions and reduces the risk for the participating groups, but assumes the risks at the level of the clearing house. A CCP therefore operates in the context of a selective and strict membership structure.

Central Securities Depository (CSD): Provides settlement for domestically traded securities.

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.

Clearinghouse: An institution that nets out mutual indebtedness between organisations.

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

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

Delivery versus payment (DVP): A system that 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 certificates or other documents on paper. In the digital age, the ownership of a security exists only as an electronic accounting record.

Depository Trust and Clearing Corporation (DTCC): Established in September 1999, the DTCC is a US holding company that oversees two principal subsidiaries, the Depository Trust Company (DTC) and the National Securities Clearing Corporation (NSCC). These two firms provide the primary infrastructure for the clearance, settlement and custody of the vast majority of equity, corporate debt and municipal bond transactions in the United States.

Depository Trust Company (DTC): One of the two principal subsidiaries of the US Depository Trust and Clearing Corporation (DTCC).

ECSDA: European Association of CSDs.

Electronic Communication Networks (ECN): ECNs bring buyers and sellers together for electronic execution of trades. The SEC has defined ECNs as "any electronic system that widely disseminates to third parties orders entered into it by an exchange market maker or over-the-counter ("OTC") market maker, and permits such orders to be executed in whole or in part." See also ATS.

European Securities Forum (ESF): An association of global and European investment banks.

(Delivery) Free of Payment (FoP): Delivery of securities without payment of funds.

Giovannini Group: A team of financial market participants who, under the chairmanship of Alberto Giovannini (Chairman of Unifortune Asset Management SGR), advise the European Commission on financial market issues. Established in 1996, the group has focused its work on identifying inefficiencies in EU financial markets and proposing practical solutions to improve market integration.

Global custodian: The provision of custody services off securities on a global basis.

International Central Securities Depository (ICSD): A depository (financial intermediary that accepts deposits) that settles trades in international and internationally traded domestic securities.

Investment Services Directive (ISD): EU legislation that introduced the single licence and remote access for exchanges and non-banking investment firms

National Securities Clearing Corporation (NSCC): One of the two principal subsidiaries of the US Depository Trust and Clearing Corporation (DTCC).

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

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

Securities Settlement System (SSS): A system that mainly provides services and final delivery of securities from the buyer to the seller. It includes the central securities depositories (CSDs) and the international central securities depositories (ICSDs). The two international depositories in Europe 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.