

## **Elimination of Technical Barriers in European Securities Settlement**

Torsten Schaper

*Securities settlement in Europe is still said to be highly inefficient for cross-border transactions. One reason can be seen in the technical barriers of the different settlement systems. This paper evaluates different models for the integration of European securities settlement. The central securities depository-link model, the hub and spokes model, and the central European central securities depository are models that aim to integrate the securities settlement. They have in common that they address the problem of interlinkages of national central securities depositories and differ essentially in the way of achieving integration. These models and currently discussed approaches are introduced and the current status is presented. The models are systematically compared with each other considering transaction costs, risks, and the integration of the cross-border securities settlement process.*

Field of Research: International Financial Markets, Clearing and Settlement

### **1. Introduction**

During the last decades trading on securities markets increased considerably. This implies that not only more transactions need to be settled, but more of these transactions need international settlement. Trading activity, market liquidity, and capital market growth depend on safe and efficient trading and settlement systems. The importance of an efficient securities settlement system (SSS) lies in the safer transfer of ownership of assets against payment. Such systems must be developed in a way to minimise the risks involved in securities transactions and it must offer lower costs, which do not hinder the intention to trade securities. Technological innovations and a changing regulatory environment are fundamental catalysts behind the past and the future changes in securities settlement. The Central Securities Settlement Institute (CSSI), the Single Settlement Engine (SSE), and TARGET2-Securities (T2S) are centralised platforms for achieving integration of securities settlement in Europe.

---

Torsten Schaper, Goethe-University Frankfurt, Chair of e-Finance, Grüneburgplatz 1, D- 60323 Frankfurt, Germany. E-Mail: [schaper@wiwi.uni-frankfurt.de](mailto:schaper@wiwi.uni-frankfurt.de)

## **Schaper**

The aim of this paper is to introduce different models for integration of European securities settlement and to compare these models with each other using an evaluation framework considering transaction costs, risks, and integration of the settlement process. Until now little attention has been given to the issue of integration of European cross-border securities settlement. As far as the author knows, only Kröpfl (2003) has evaluated different models of integration. The paper is organised as follows. In section 2 different models and recent approaches for integration of European settlement are introduced and discussed. The presented approaches are evaluated in section 3. Section 4 concludes.

## **2. Integration of Securities Settlement Systems**

### **2.1. Introduction**

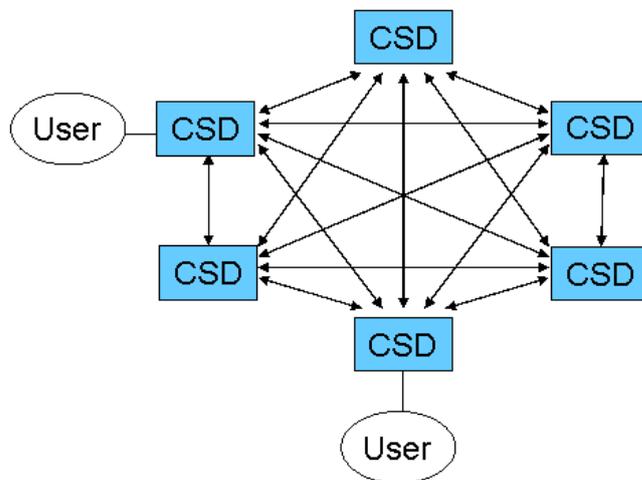
SSSs are critical components of the infrastructure of global financial markets. Weaknesses in SSSs can be source of systemic disturbances to securities markets and to other payment and settlement systems. A financial or operational problem in any of the institutions that perform critical functions in the settlement process or at a major user of a SSS could result in significant liquidity pressures or credit losses for other participants. Any disruption of securities settlements has the potential to spill over to any payment systems used by the SSS or any payment systems that use the SSS to transfer collateral. In the securities markets themselves, market liquidity is critically dependent on confidence in the safety and reliability of the settlement arrangements. Traders will be reluctant to trade if they have significant doubts as to whether the trade will in fact settle or not (Bank for International Settlement 2001). In the 27 European countries mainly one domestic CSD (central securities depository) has prevailed. Therefore, different channels for the settlement of cross-border transactions coexist and the usage of additional intermediaries is needed for the settlement of these transactions. The usage of intermediaries increases the complexity of the process. These intermediaries increase risks, cause higher transaction costs (due to multiple IT-systems), and generate additional costs in the back-office. The interlinkage of the different SSSs represents a challenge to achieve an efficient and integrated European financial market. In the following section a selection of different models and currently discussed approaches for integration of securities settlement is presented.

# Schaper

## 2.2. CSD-Link Model

The establishment of links between all CSDs is one possibility to improve the settlement of cross-border transactions. These links allow the investor to take ownership of foreign securities through its domestic CSD. Bilateral delivery versus payment (DVP)-links could reduce direct and indirect settlement costs, because a participant does not have to pay for membership in more than one CSD or pay an intermediary to grant access to the foreign market. The resulting network of CSDs is visualised in figure 1.

Fig. 1. CSD-link model (Kröpfl 2003)

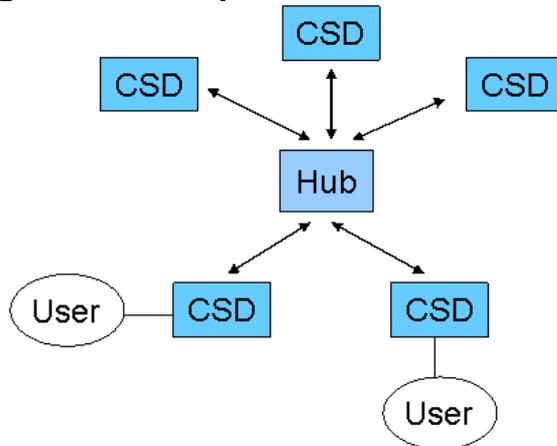


Such network is difficult to implement completely, given the high costs associated with the establishment of bilateral DVP-links and the current low use of most of these links<sup>1</sup>. However, the all-in savings would likely be low, because the redundant infrastructure remains in place.

## 2.3. Hub and Spokes Model

The hub and spokes model follows a study of Euroclear from 1993. The approach foresees a central hub that has the function to direct transaction to the national CSDs. Each CSD would only have to establish one link to the central hub (see Fig. 2). The CSD would remain the single point of entry for their clients.

Fig. 2. Hub and spokes model



In the following, two current approaches related to the hub and spokes model, the CSSI and the T2S project, are introduced.

### 2.3.1. Central Securities Settlement Institute

The CSSI was a proposal from five CSDs for an integrated platform that is similar to the hub and spokes model. The idea was to overcome the hurdles and inefficiencies in the cross-border equities business by establishing a cross-border operating organisation (Hallan and Idelson 2003). This entity could either be based on an existing organisation or a new company owned and governed by the participating CSDs. Existing systems which could meet the requirements for European cross-border business should be leveraged. The CSSI would deliver a central linkage to the national systems. The CSDs would still provide the single point of access for domestic and cross-border business (Werner 2003). Establishing a CSSI for the interlinkage of domestic CSDs would only touch the process of settling cross-border transactions. The domestic institutions and infrastructure would remain unchanged. The settlement would take place in the issuer CSD, which provides that regulatory requirements are met. Since CSDs are exclusively clients of the CSSI, the CSD of choice would be solely responsible for handling the relationship with its customers. Savings are expected to be derived from the fact that only one organisation, the CSSI, is to implement and to manage the cross-border network. The market participants will instead continue to settle across borders via their domestic entry into this structure. The need to maintain several different access points will stop (Werner 2003). Each domestic CSD remains in its current state and function and all access points can still be used. Compared to other concepts, this would lead to a high acceptance by both the CSDs and their users. It is of significant importance to note that this model does not require the write-off of huge investments in various national settlement systems for domestic business. Reduced

## Schaper

interconnection costs are expected regarding negotiations, link processing, interfaces, synchronisation of systems, data formats, link contracts, liquidity requirements, and effective use of collateral. In addition, the application of the CSSI will achieve network externalities leading to further cost savings shared by the whole community, as centralised linkage will help in standardising processes and practices (Werner 2003). While a bilateral link might be too costly to be justified by the relatively small amount of transactions for a small CSD, a central link does not rule out the possibility of small players benefiting from economies of scale. Although the proposal to link the domestic systems via a CSSI does not lead to a substantial risk concentration in a single system and the safety or stability of systems shown in the domestic environment is not endangered. The concept of the CSSI provides a basis for further consolidation and integration of the European capital market, because the linkage of domestic systems increases the pressure to apply common technical standards, harmonised rules and regulations, identical tax treatment, and handling of country-specific taxes. The vision is to develop common operating standards and principles such as the simplification of cross-border corporate actions and consistent legal frameworks regarding the transfer of securities. This could start an evolutionary process and may spur the consolidation of the European settlement systems, because the CSSI could help national institutions to agree on uniform standards for securities settlement, rules, and regulations for automated securities lending and borrowing. The CSSI would also meet requirements risk management, governance, and competition in its concept (Werner 2003). It would solve the unnecessary complex bilateral links between all CSDs and thus help to align their work. The institute would also add another service layer to the settlement process of cross-border-transactions. The CSSI would achieve integration by providing interoperability to continue the whole system of different national CSDs. The first step to achieve interoperability is to agree on standards, communication protocols, common operation methods, and practices. The CSSI would act as a catalyst for the desired standardisation.

### **2.3.2. TARGET2-Securities**

On 7th July 2006, the European Central Bank issued a press release, stating that the Eurosystem<sup>ii</sup> was evaluating opportunities to provide efficient settlement services for securities transactions in central bank money, leading to the processing of both securities and cash settlement on a single platform through common procedures. The platform, called T2S, is the proposal to the CSDs to transfer their securities accounts to a common technical platform. The main benefits of this platform would be the reduction of settlement engines and therefore the reduction of costs for CSD-infrastructure and for custodians' back offices. Background of T2S is the technical debate about the best way to synchronise the delivery of securities with the cash payment. There is general agreement that the most efficient approach for both security and cash movements is to be managed by the same platform. In some countries this

## Schaper

process is managed by the SSS, which determines when settlement takes place. As a result, the CSD effectively controls some payments across the books of the central bank: when the CSD determines that a transaction has settled, this causes the money to move on the books of the central bank. In other countries the central bank is unwilling to outsource control of central bank payments to another organisation. To maintain an integrated system, if the CSD cannot manage the money, the central bank has to manage the securities. Then T2S is the only way to reach the integration of the settlement of cash and securities (Bourse Consult 2006). The settlement of securities and cash would be realised within a single integrated platform. At the start of every day, participating CSDs would transfer their securities balances and outstanding transactions to T2S. During the day, T2S would settle these transactions and report to the CSDs at the end of the day. One consequence of T2S would be the separation of operation of settlement from the other functions performed by CSDs, such as asset servicing, asset financing, and provision of collateral. These other functions require access to real-time, intraday information on the securities balances held by participants in the systems, and the ability to control those balances. To realise this, a sophisticated linkage between T2S and the systems from the CSDs is required (European Central Bank 2006).

In January 2007, the ECB presented details on the economic, technical, operational, and legal feasibility of T2S. According to the economic feasibility study of the ECB, T2S could reduce the average costs for securities settlement to €0.28 per transaction (European Central Bank 2007). According to this study, costs for settlement in Europe range between €0.45 and €2.30 (European Central Bank 2007). For the success of T2S the participation of all relevant CSDs is essential. The economic feasibility report assumes that all CSDs in the Euro area participate. If the participation in T2S is not mandatory, the number of transactions could be significantly lower and the costs per transaction would increase significantly (Schaper 2008).

T2S-Securities was presented to the Financial Services Committee. The settlement platform had the same number of supporters as opponents. There are a number of details to be clarified, like supervision of the platform, governance, questions on competition, the effects on the private enterprise infrastructure, and alternatives to integrate the different national infrastructures (Frühauf 2007; LIBA, ESF, and ICMA 2007). On 8<sup>th</sup> March 2007, the Governing Council of the ECB has concluded that it is feasible to implement T2S and therefore decided to go ahead with the next phase of the project, namely the definition of user requirements on the basis of market contributions. A final decision on the implementation is expected in summer 2008.

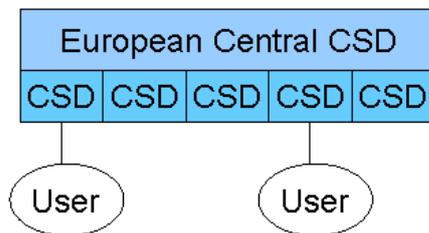
### 2.4. Central European CSD

The Central European CSD is an integrated model to improve efficiency of the European securities settlement. The Central European CSD would be the only CSD providing settlement services for the European market. Also other

## Schaper

operations performed by CSDs would be performed by a single CSD. It would lead to costs reduction, because only one integrated SSS would remain. Also costs reductions in back office would be the result. The Central European CSD would also lead to an integrated and harmonised securities settlement, because all transaction would be managed within one single system. It must be considered that a central CSD could reduce competition in the settlement industry and could therefore also have adverse effects on market efficiency (Tapping 2007).

**Fig. 3.** Central European CSD



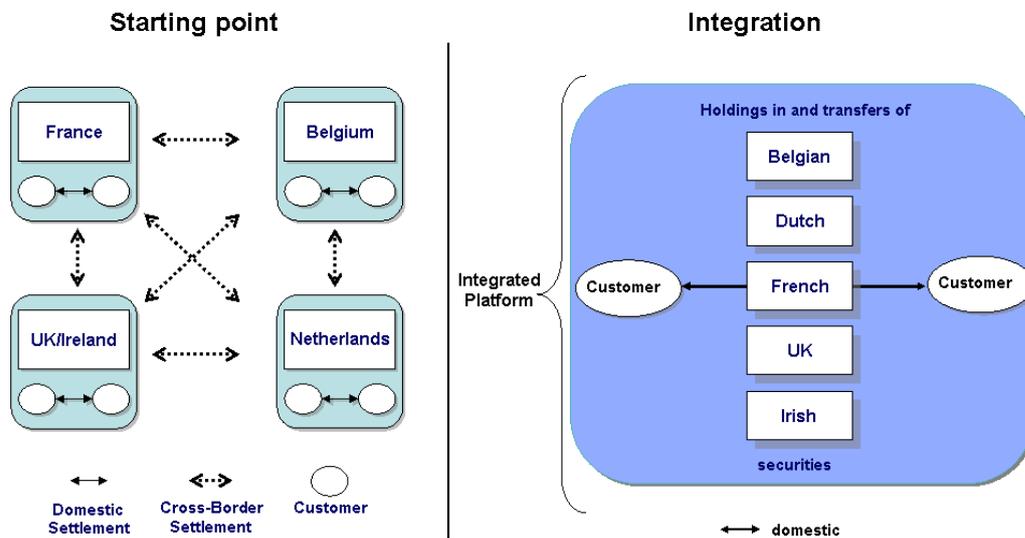
A well-known example for a Central CSD is the Depository Trust Company (DTC) in the United States. The DTC is providing settlement services for different US markets. In the following, the SSE of the Euroclear Group is introduced as an example of an approach similar to a Central European CSD.

### 2.4.1. Single Settlement Engine

The Euroclear Group is forcing an integrated approach. Instead of achieving interoperability of the different national systems in Belgium, France, the Netherlands, Ireland, and the UK, Euroclear is implementing an integrated platform for securities settlement. As Fig. 4 shows, the SSE is a practical harmonisation project not only providing integrated cash and securities settlement, but also an incorporated system for different European countries (Euroclear 2002; Cox, Simpson, and Jones 2005).

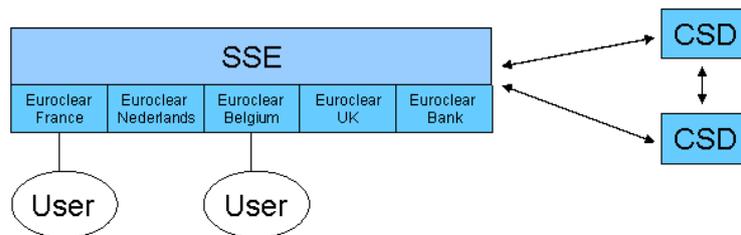
## Schaper

**Fig. 4.** Integration of markets of the Euroclear Group



The SSE is the first major milestone in accomplishing Euroclear's objective to harmonise services on a consolidated processing platform, merging the five Euroclear Group settlement platforms into one. Euroclear plans to save €300 million per year with the consolidation of the different settlement platforms, by market practise harmonisation, and by removing the barriers in the markets served by the Euroclear Group (Euroclear 2002). The users of the SSE operate as if they would act in a domestic market (see figure 5).

**Fig. 5.** Integration with the Single Settlement Engine



The next step in Euroclear's migration to a single platform is the launch of Euroclear Settlement for Euronext-zone Securities (ESES). Using the SSE as its foundation, ESES will serve as a single processing solution to process both domestic and cross-border fixed-income and equity transactions in the Belgian, Dutch, and French markets as if they were a single market. ESES was launched in France at the end of 2007, and will be launched in Belgium and the Netherlands in the second quarter of 2008. The final consolidation of the platforms is aimed for 2010 (Euroclear 2007).

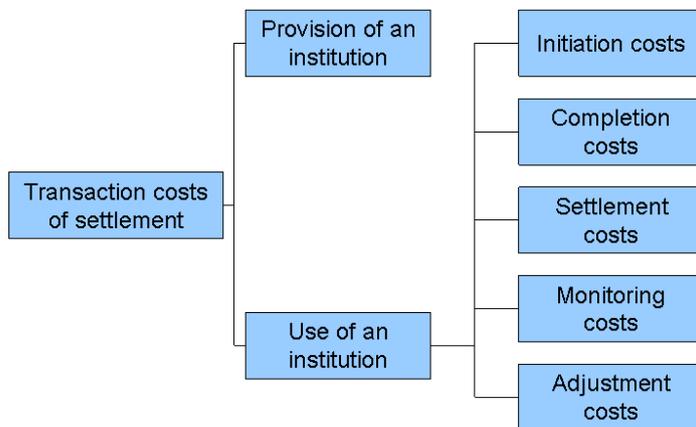
### 3. Evaluation of Models for Integration

The total costs for settlement services are difficult to determine, because of the large number of factors, fees, risks etc. The costs of the SSSs consist of the total costs of ownership and the processing costs (Neumann and Lattemann 2002). Due to the large number of European CSDs the costs for the redundant SSSs are high. Furthermore, the processing costs of a transaction crossing different system are respectively higher than for an inner-system transaction. International technical standards can increase the interoperability of SSSs and thus reduce the costs of cross-border and cross-system transaction (Kröpfl 2003).

Transaction costs form a very important criterion for the evaluation of the presented models and approaches. However in evaluation of efficiency of securities settlement, transaction costs and settlement risks are often not considered properly. Major parts of the transaction risk have nearly been eliminated by the introduction of DVP-mechanisms, but risk still remains (Kröpfl 2003).

Transaction costs can either arise from the provision or the usage of an institution (see Fig. 6). The first needs to be considered if institutional arrangements are changed. The focus of the following evaluation lies on these costs. The latter costs consist of the costs of the usage of the institution (for details see Kröpfl 2003).

Fig. 6. Transaction costs of securities settlement (Kröpfl 2003)

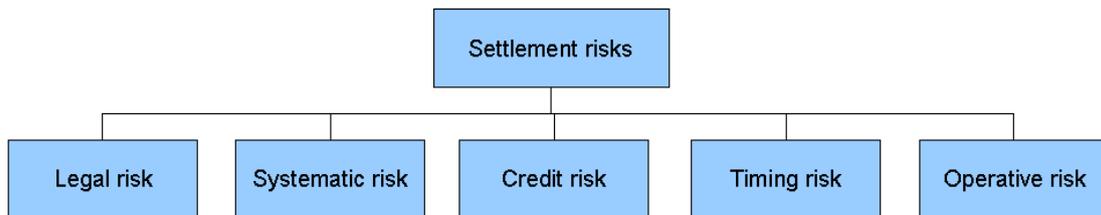


Beside transaction costs the risk needs to be considered for the evaluation.

Fig. 7 shows the related risks. Risk is often not considered since the respective risks rarely arise (Neumann and Lattemann 2002). At least it is obvious that these risks need to be considered since the crash in October 1987 (Bernanke 1990).

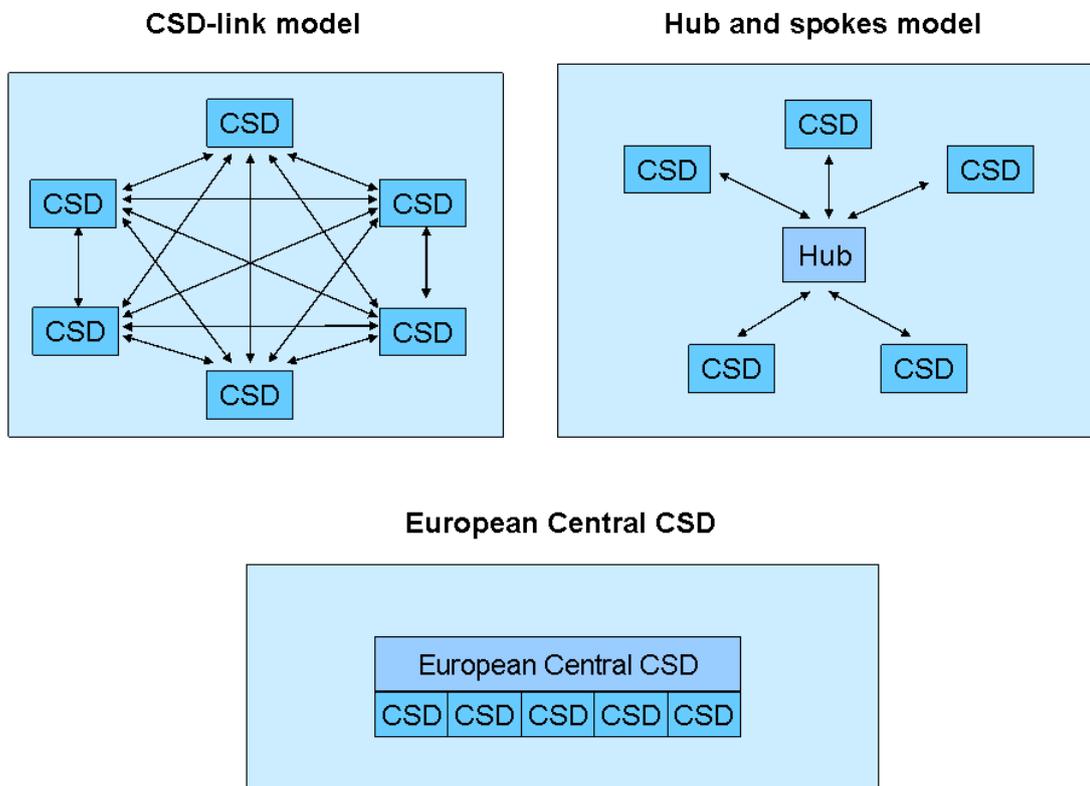
# Schaper

**Fig. 7.** Settlement risks (Kröpfl 2003)



For the evaluation of the discussed models and approaches, the risk and the settlement costs need to be considered. Furthermore, the time for the implementation, the integration of the settlement process, the integration of other post-trade services, and the technical integration have to be taken into consideration. Fig. 8 visualises the discussed models of integration by showing the main difference, the interlinkage of the CSDs.

**Fig. 8.** Models for integration of European securities settlement



## Schaper

The models and current approaches differ essentially. They have in common that they improve the interoperability of SSSs and thus reduce the costs for development, support, mapping, and maintenance of communication.

The hub and spokes model reaches integration and reduces the number of CSD-links, but does not reduce the number of national systems. T2S shows a further integration of the settlement process by integrating the cash settlement in the IT-platform. For market participants these two models mean one more intermediary in the process of cross-border settlement. But the approaches T2S or CSSI could mean a first step towards further consolidation and integration.

The model of the Central European CSD is more comprehensive. By integrating different SSSs into one central platform it aims to reduce the number of SSSs and thus achieves a harmonisation of settlement and custody services. The aim of this model is the creation of a domestic settlement process within Europe.

The approaches of T2S and European Central CSD have in common that they make fundamental investments in central IT-platforms necessary and that the implementation of such complex projects takes a long time. But such a centralised platform could perform an integrated infrastructure and support the process of a harmonised and integrated European securities settlement.

Table 1 shows the key findings of the comparison of the different models and approaches. The comparison is made by giving a score for the single criteria from a macro-economic perspective. The scores range from ++ (very good) to -- (very bad).

**Table 1.** Different models and approaches to improve securities settlement in Europe

	<i>CSD-link model</i>	<i>CSSI</i>	<i>T2S</i>	<i>Central European CSD</i>
<i>Settlement risk (1)</i>	0	0	++	++
<i>Settlement costs (2)</i>	--	-	+	+
<i>Implementation time (3)</i>	+	++	-	--
<i>Technical integration (4)</i>	0	0	++	++
<i>Integration of cross-border settlement (5)</i>	-	-	+	++
<i>Integration of other post-services (6)</i>	++	++	-	++
<i>Integration of cash Settlement (7)</i>	-	-	++	+

++ very good    + good    0 neutral    - bad    -- very bad

Due to the settlement within one single integrated platform the settlement risk on T2S and the Central European CSD would be significantly lower than in the other approaches.

The CSD-link model assures interoperability by the interlinkage of the CSDs. The all-in savings are low, because the redundant infrastructure remains in place. The hub and spokes model and the recently discussed approaches T2S and

## Schaper

CSSI reach further integration, but do not reduce the number of national systems for settlement. For market participants these concepts mean one more intermediary in the process of cross-border settlement.

The interlinkage of all CSDs is fastest to realise with the CSSI. For T2S or the Central European CSD the development of a new platform would be necessary. The best technical integration would be achieved by the introduction of one single platform. The integration of cross-border settlement can be achieved best within one platform. Integration of other post-trade services can be achieved best if settlement and related custody services are not separated. The only approach that separates settlement from the other post-trade services is T2S.

T2S would integrate cash and securities settlement on one platform. A Central European CSD could also integrate cash settlement (if the central banks are willing to). The integration would reduce the settlement risk essentially. The CSD-link model assures interoperability by the interlinkage of the CSDs. The all-in savings are low, because the redundant infrastructure remains in place. The hub and spokes model and the recently discussed approaches T2S and CSSI reach further integration, but do not reduce the number of national systems for settlement. For market participants these concepts mean one more intermediary in the process of cross-border settlement.

A different approach is the Central European CSD which could provide an integrated European securities settlement in one central SSS. The aim of such system is the creation of a domestic settlement and custody process for the markets of the European markets. The presented models show that by improving the interoperability of SSSs a reduction of costs can be achieved. Centralised approaches, as T2S and Central European CSD, share that they make fundamental investments in a central IT-platform necessary and that the implementation of such complex projects takes a long time. Still such a centralised platform could perform an integrated infrastructure and support the process of a harmonised and integrated European securities settlement.

## 4. Conclusion

In the last years integration and consolidation has taken place, but the European settlement is still a fragmented industry, which shows inefficiencies in cross-border clearing and settlement of securities. Standards for improving the interoperability can only be a first step for improving the integration. The interlinkage of the different SSSs represents a challenge in achieving an efficient and integrated European financial market.

The CSD-link model assures interoperability by the interlinkage of the CSDs. The all-in savings are low, because the redundant infrastructure remains in place. The hub and spokes model and the recently discussed approaches T2S and CSSI reach further integration, but do not reduce the number of national systems

## Schaper

for settlement. For market participants these concepts mean one more intermediary in the process of cross-border settlement. Yet these platforms could mean a first step towards further consolidation and integration. A different approach was chosen by the Euroclear Group with the SSE, integrating different SSSs into one central platform. The advantage of this approach is the reduction of SSSs and the harmonisation of settlement services within the group. The aim of this platform is the creation of a domestic settlement and custody process for the markets of the Euroclear Group. The main disadvantage of this approach is that it is only limited to selected markets within Europe. The extension to other markets is difficult due to the heterogeneous settlement industry.

The presented models show that by improving the interoperability of SSSs a reduction of costs can be achieved. Centralised approaches, as T2S and Central European CSD, share that they make fundamental investments in a central IT-platform necessary and that the implementation of such complex projects takes a long time. But such a centralised platform could perform an integrated infrastructure and support the process of a harmonised and integrated European securities settlement.

**Acknowledgments.** The author gratefully acknowledge the support of the E-Finance Lab, Frankfurt, for this work.

## References

- Bank of International Settlement, 2001. Recommendations for Securities Settlement Systems. Consultative Report (January, 2001).
- Bernanke, B.S., 1990. Clearing and Settlement during the Crash. *The Review of Financial Studies* (1990), 133-151.
- Bourse Consult. The ECB steps in, 2006. London: Bourse Consult.
- Cox, P., Simpson, H. And Jones, L., 2005. The Future of Clearing and Settlement in Europe. Corporation of London City Research Series, 2005, No. 7
- Euroclear Group, 2002: Delivering domestic market for Europe. Brussels: Euroclear Group.
- Euroclear Group, 2007. <http://www.euroclear.com>, accessed (December 10, 2007).
- European Central Bank, 2006. TARGET2-Securities. Frankfurt: European Central Bank.
- European Central Bank, 2007. TARGET2-Securities – Economic Feasibility Study. In: 2nd TARGET2-Securities meeting with market participants.
- Frühauf, M., 2007. EZB ist bei Abwicklungsplattform im Zugzwang. *Börsen-Zeitung* (January 25, 2007) 8.
- Hallam, N., Idelson, N., 2003. Breaking the Barriers – A Technological Study of the Obstacles to Pan-European Best Execution in Equities. Tradeserve Ltd., Study 2003.
- Kröpfl, S., 2003. Effizienz in der Abwicklung von Wertpapiergeschäften. Wissenschaftlicher Verlag, Berlin.

## Schaper

- LIBA, ESF AND ICMA, 2007. [Letter to the ECB on Securities Sector Representation in T2S Committees](http://www.icma-group.org/market_practice/Advocacy/clearing_and_settlement/target2-securities.html). [http://www.icma-group.org/market\\_practice/Advocacy/clearing\\_and\\_settlement/target2-securities.html](http://www.icma-group.org/market_practice/Advocacy/clearing_and_settlement/target2-securities.html), accessed (April 27, 2007).
- Neumann, D., Lattemann, C., 2002. Clearing and Settlement im Wandel – Eine Perspektive für den europäischen Wertpapierhandel. Zeitschrift für die gesamte Kreditwirtschaft (2002).
- Schaper, T., 2008. Trends in European Cross-Border Securities Settlement – TARGET2-Securities and the Code of Conduct. In: FinanceCom 2007 LNBIP 4, Ed: Veit, D.J., 50-65. Berlin: Springer.
- Schwartz, R., Francioni, R., 2004. Equitiy Markets in Action. John Wiley & Sons, New Jersey.
- Tapking, J., 2007. Pricing of Settlement Link Services and Mergers of Central Securities Depositories. European Central Bank Working Paper Series No 710.
- Van Cayseele, P., Wuys, C., 2007. Cost Efficiency in the European Securities Settlement and Depository Industry. Journal of Banking and Finance 31 (2007), 3058-3079.
- Werner, S., 2003. Interoperability and interlinking: the way forward for the C&S industry. Frankfurt Voice January 10, 2003.

---

i The costs for a DVP-link were calculated with \$500.000 by Euroclear UK (Kröpfl 2003). 600 DVP-links would need to be established. An investment from over \$300.000.000 would be necessary to establish the network.

ii Consisting of the European Central Bank (ECB) and the national central banks