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**Research Report**

## Impact assessment of clearing and settlement regulations: Final report

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**ZEW**

Zentrum für Europäische  
Wirtschaftsforschung GmbH

Centre for European  
Economic Research

Final Report

**„Impact Assessment of  
Clearing and Settlement Regulations“<sup>1</sup>**

Zentrum für Europäische Wirtschaftsforschung GmbH (ZEW)

(Centre for European Economic Research)

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## **Executive Summary**

The transaction of a security not only involves the execution of trades on an exchange or over-the-counter, but also different post-trade services which are relevant for the transfer of ownership or interest rights. Among these services are the clearing and settlement (hereafter C+S) of trades in financial instruments and / or securities. Since C+S systems were set up in the past mainly to clear and settle domestic transactions, a fragmented system of different C+S providers has evolved in Europe. These systems provide secure C+S services at relatively low cost for domestic transactions. Due to technical and legal differences between national C+S systems, cross-border transactions are more difficult to clear and settle than domestic transactions. These differences increase the number of intermediaries in the C+S process and therefore tend to lower the efficiency of clearing and settling cross-border transactions. One of the major objectives of the EU for this reason is to create a level playing field that gives European C+S providers including both CSDs and intermediaries the incentive to remove the existing barriers and to increase the efficiency of the C+S process of cross-border transactions.

### **Analysis of Potential Benefits of Regulation**

In order to assess the potential benefits of a better integrated market for C+S services, it is meaningful to analyse the excess costs of cross border transactions relative to domestic transactions. Here two distinctive approaches might be used. The *bottom-up approach* analyses the costs of clearing and settling transactions *directly* by comparing settlement fees for domestic transactions with those for cross-border transactions. The *top-down approach* measures the costs of clearing and settling transactions *indirectly* from balance sheet data. Although both approaches have their benefits, they are also accompanied by many problems that reduce the comparability between different C+S systems. Since the problems of the top-down approach seem to be more difficult to solve than the problems of the bottom-up approach, the latter seems to be preferable to estimate settlement costs of domestic and cross-border transactions.

To assess the benefits that might arise from the regulation of the C+S industry in Europe, the C+S costs of European providers are often compared to the C+S costs in the US. Due to legal and cultural differences, different accounting standards and netting procedures it is however problematic to use the centralized US C+S system as a cost benchmark for the fragmented equity-related C+S industry in Europe. For this reason, the C+S provider with the lowest total costs in Europe at present might serve as an additional and more realistic benchmark for the European C+S industry.

### **Analysis of Costs of Regulation**

Since regulations do not only bring benefits in terms of cost savings, but also impose additional costs on the C+S providers in Europe, a RIA also has to measure the costs that might be imposed on market participants by adapting to and complying with these regulations. To get a first assessment of the relative importance of regulation costs, they should be categorised into variable, fixed, one-off and permanent costs.

This categorisation provides a preliminary *hierarchy of different regulation costs*. To measure the likely extent of these costs the standard cost approach can be applied. Further information about the extent of costs might be obtained from event studies and surveys among market participants and regulators.

### **Analysis of the Distribution of Benefits**

Beside the analysis of potential benefits that might arise through the implementation of regulation, a RIA also has to evaluate the distribution of static and dynamic benefits among market participants. Since only in contestable markets regulatory benefits are likely to be passed on to the end-users, a suitable approach to estimate the likely distribution of regulation benefits is to evaluate the current degree of contestability of the C+S market. This can be done in line with the *European Commission Guidelines for the Assessment of Mergers* by assessing the *timeliness*, the *sufficiency* and the *likelihood of an entry*. Another method to measure the current degree of contestability is to analyse the dynamic efficiency of the incumbent providers of C+S services in Europe. Since regulations themselves influence the level of contestability, these should be categorized according to their impact on the level of contestability into high, medium and low impact regulatory measures. This categorisation indicates which regulations are necessary to increase the level of competition for and in the market and which likely impose more costs than benefits on most market participants.

### **Assessment of Second Round Effects**

The impact of regulatory measures is not only limited to direct transaction cost savings in the C+S process. Further effects on macroeconomic output and growth must also be taken into account. They can be measured by two distinctive approaches. The starting point of the *simple approach* is the calculation of cost savings for a given volume of securities transactions. If these savings are used to finance investment projects, the second-round effects can then be calculated by estimating the reaction of GDP to one unit of additional investment. This can be done, for example, with a *Vector Autoregressive Model (VAR)* which includes GDP and investment as dependent variables. To get a more realistic picture about the extent of second-round effects, an *elaborate approach* should be adopted. This approach is based on two steps. In the first step the impact of trading cost differences on the user costs of capital (UCC) has to be estimated. In the *second* step, the influence of UCC changes on GDP has then to be assessed. Finally, the calculated elasticity of GDP with respect to UCC has to be weighted with the elasticity of UCC with respect to transaction cost changes. This weighted elasticity can then be used to calculate the overall impact of transaction cost changes on GDP. This analysis of second-round effects can then be supplemented by a more differentiated analysis that asks particularly for the effect on GDP by type of expenditure and different sectors of the economy.

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# 1 Introduction

This paper contains an explorative study on a methodological approach for the assessment of regulatory impacts (RIA) on the clearing and settlement industry in Europe. The intention of the project is to develop a methodological guideline that is theoretically well founded as well as – with a view on data availability – practically applicable. This is the final report of a research project on regulatory impact assessments carried out by the Zentrum für Europäische Wirtschaftsforschung GmbH (ZEW) and supported by the Deutsche Börse AG, Frankfurt a.M.. Views and opinions stated in this report are in the sole responsibility of the authors and do not necessarily represent views and opinions of the Deutsche Börse AG.

The paper is subdivided into five parts:

- The first part gives a short overview on the institutions typically involved in the clearing and settlement transaction chain.
- The next part discusses the measurement of potential benefits of regulation in a static perspective by analysing potential cost savings. In particular the pros and cons of the top-down-approach and the bottom-up-approach are described and some proposals for future improvement are developed.
- The third part is concerned with potential costs of regulation. This part recommends a categorisation of regulation costs according to their economic significance and makes some suggestions concerning empirical methods for cost measurement.
- The fourth part of the paper discusses potential benefits of regulations on a broader base and discusses methods to analyse their likely distribution among market participants.
- The final fifth chapter is concerned with methods for estimating second round effects of regulations on user costs of capital and GDP.

## **2 The Process of Clearing and Settlement**

The transaction of a security not only involves the execution of trades on an exchange or over-the-counter, but also different post-trade services which are relevant for the transfer of ownership or interest rights i.e. for collateral purposes. Among these services are the clearing and settlement (hereafter C+S) of trades in financial instruments and / or securities

Clearing involves the calculation of mutual obligations through a service provider, usually a clearinghouse which often also functions as central counterparty (CCP) eliminating counterparty risk and market risk.

Settlement is the performance of securities transactions by transfer of title, i.e. ownership, or interest rights, either against or free of payment. For the majority of securities transactions between investors, settlement consists of the delivery of the security from the seller to the buyer and – closely connected - the payment of funds from the buyer to the seller in exchange for the securities delivered. Both services facilitate the efficient and legally sound performance and are in some cases necessary to finalise transactions in securities held with intermediaries or in form of a global note. Post-trade services furthermore include the custody and safekeeping of (physical) securities. Together these services form so called post-trade services that are fully or partly provided by C+S systems and to some extent by banks. Although these systems may in some cases not be very transparent or – depending on the custody or CSD model (two-tier or multi-tier model) chosen by a country – directly accessible for private investors, they are necessary for a well-functioning financial market and the stability of the financial system.

Since C+S systems were set up in the past mainly to clear and settle domestic transactions, a fragmented system of different C+S providers has evolved in Europe. These systems provide secure C+S services at relatively low cost for domestic transactions. Cross-border transactions are conversely more difficult to clear and settle than domestic transactions due to technical and legal differences between local C+S systems. These differences increase the number of intermediaries in the C+S process and lower the efficiency of clearing and settling cross-border transactions. These inefficiencies in turn are believed to increase the costs and the risk of C+S services in Europe. Since higher risks and costs reduce the willingness of investors

to conduct cross-border transactions, the fragmentation of the C+S industry poses a major barrier to the creation of an integrated European financial market.

The following paragraphs draw only a very simplified picture of the complex market for C+S services. Their main purpose is not to describe the market exhaustively, but to give a frame of terminological reference for the remainder of the paper and also an introduction to the inexperienced reader.

## **2.1 Clearing**

The clearing function provides the link between trading and settlement. *Clearing comprises the validation of trades and the preparation of the settlement process by determining exactly what the counterparties of a trade have to pay and to deliver.* These services are conducted by exchanges, clearinghouses, central securities depositories (CSD) and/or international central securities depositories (ICSD). The *counterparty clearing process* mainly consists of four distinct activities: matching, novation, netting and the issuance of instructions for the subsequent settlement process.

(I) *Matching*: The clearing of transactions begins with the matching of instructions. During this phase of the clearing process, trade instructions from the seller and the buyer to the broker are checked for consistency. In the case of *on-exchange* trades these instructions are automatically matched and transferred to the clearinghouse or the CSD through an automatic link. *Off-exchange* trades typically have to be matched manually by the counterparties by electronic means, by telefax or by specialised messaging services, if the clearinghouse or CSD does not provide matching services.



Figure 1: Institutions in the Clearing and Settlement Process of On-Exchange Trades

Trade		Clearing				Settlement	Custody
Order	Execution	Matching	Open Offer/ Novation	Netting	Settlement Instruction	Transfer of Cash  Transfer of Securities	Custody and Safekeeping
Investor	Exchange	Exchange/ Clearing House/ CSD		Clearing House/ CSD	Clearing House/ CSD	CSD Payment System	Custodian/ CSD

Source: ZEW (2005)

(II) *Open Offer/Novation*: After the matching of instructions, the clearinghouse often changes the bilateral contractual relationships between the trading participants. The process by which a *central counterparty* (CCP) is involved in the clearing process has two distinct legal concepts. The one is called open offer whilst the other is called novation. Open offer means that in the same (legal) instant a trade between two trading participants is matched and closed, the CCP enters the contractual relationship being buyer of the securities vis-à-vis the selling party and seller vis-à-vis the buying party. In addition, the respective contractual clearing relationships with the Clearing Members of the trading parties are established for that trade leading to specific obligations (e.g. margin payments). If the clearinghouse interposes itself legally between the buyer and the seller of the securities after matching and closing of the trade, with the legal ability to reject the clearing of particular trades, this process is called novation. Both processes require the central counterparty to act as a principal and assume *principal risk*. Open Offer or novation is hence not regarded as a post-trade function like the other services in the trade processing chain where the service provider acts as an *agent*. Beside the reduction of liquidity, the existence of a *central counterparty* (CCP) reduces the risk that counterparty defaults on payment or delivery and allows the buyer and seller to trade anonymously. Does the clearinghouse not become CCP to the original buyer and seller – in cash markets the participation of a CCP is optional - it functions as a facilitator that monitors the

transaction and provides risk management services by calculating future exposures, by validating the creditworthiness of the counterparty and by defining and enforcing default procedures to ensure that shortfalls are immediately detected and damage is minimised.

(III) *Netting*: After the entry by open offer or novation of transactions, the netting phase begins. During this phase the mutual obligations of the counterparties are calculated. This can either be done on a gross or a net basis. When clearing is done on a *gross basis*, the obligations of the counterparties to the trade are calculated successively for every trade (trade-by-trade). Clearing on a *net basis* takes place when all mutual obligations of buyers and sellers are offset yielding a single obligation between the counterparties. The offsetting may only significantly reduce the number of payment or securities transfers (so called settlement netting) or have a legal effect (i.e. novation of mutual claims) as well. In derivatives markets netting also means the offsetting of open long against open short positions in futures or options in order to determine the net long or net short position. In any case, clearing on a net basis hence significantly reduces the number of payment and securities transfers.

(IV) *Issuance of Settlement Instructions*: At the end of the netting phase, instructions about the counterparty obligations, the settlement date, the settlement venue and the securities identification codes are issued in preparation of the settlement process.

## **2.2 Settlement**

After the clearing of transactions, the settlement phase begins. *This phase involves the delivery of the securities and in case of “delivery versus payment” transactions the payment of funds between the buyer and the seller.* Before the transaction is settled and cash and payment exchanged, the settlement instructions are again netted. This netting is generally known as *settlement netting*.

The transfer of funds can take place takes place through the banking and payment system – either in form of central bank money or commercial bank money - and is also called *payment leg*. In some cases, as in France, the CSD also operates the cash accounts for securities transactions on behalf of the central bank (integrated

system). The delivery of securities is normally carried out by a CSD and is denoted as *securities leg*. This institution records the transfer of ownership by book entries on electronic accounts and is responsible for the safekeeping of securities. Depending on the type of transaction, the settlement is organised generally either as *delivery-versus-payment* (DVP) or as *free-of-payment* (FOP). If the transfer is linked to the payment of funds, the transfer of ownership cannot be legally effective without the cash payment and vice versa. This procedure is called DVP. If the transfer of ownership is conversely FOP, delivery and payment are not linked and the ownership of a security can effectively be transferred to the counterparty, although delivery and payment did not take place at the same time.

The settlement of transactions however does not necessarily have to involve a CSD. Even if safekeeping of a security is centralised at a CSD, transfer of ownership between two customers of the same custodian can take place without a CSD. The custodian then *internalises* the settlement by internal bookings from one customer account to another account. The difference between settling transactions internally and by a CSD is that the latter settles in central bank money, while the former settles in commercial bank money. Intermediaries like custodians furthermore provide liquidity through credit facilities or lend securities to their customers. These services are not offered by CSDs in performing their CSD function.

### **2.3 Custody**

After the transaction is settled, the securities have to be kept in custody. *Custody includes the safekeeping, account keeping and administration of securities*. In the custody chain, the ultimate safekeeping and administration of securities, i.e. in form of a global note, is undertaken by a CSD. The CSD is often aligned into an overall process chain from the exchange to increase the efficiency of the C+S process by automating the processing of trades, from the execution of trades at an exchange, to the settlement and safekeeping of securities at a CSD. This procedure is also called *straight-through processing*. Sometimes, the CSD and/or CCP is partly or fully owned by the exchange. The integration of different institutions along the trade processing chain into one single institution is denoted as *vertical integration* and the single provider of trading, clearing and settlement services as a *vertical silo*. An example for

a vertically integrated structure for exchange business has been created by the Deutsche Börse Group for the German market, since the trading function is conducted on the Frankfurt Stock Exchange, the clearing by Eurex Clearing (CCP) and the settlement by Clearstream Banking Frankfurt (CSD).<sup>2</sup> This model of consolidation has also been followed by the Borsa Italiana in Italy and the Bolsas y Mercados Espanoles Group (BME) in Spain. *Horizontal integration* takes place when the integration occurs on one stage of the trade processing chain between providers of similar services. The motivation for horizontal consolidation is the generation of economies of scale<sup>3</sup> whilst vertically integrated additionally is expected to create economies of scope. The Euronext Group with the merger of the French, Belgian, Dutch and Portuguese stock exchanges is usually characterised as a horizontally integrated structure.

The account keeping and administration of securities is, in addition to a CSD in the custody chain, done by intermediaries like *custodians*. The account services of these intermediaries include the collection of dividends and interests as well as further value-added services like proxy voting and tax services. However, the CSD also provides such services in the custody chain in many markets. The range of services that is provided depends upon the type of account that is held by the CSD. Accounts are either held by issuers, intermediaries or customers. In some countries, a so called *issuer account* is maintained by the CSD in the name of the issuer and is credited for each issue of dematerialised financial instruments. In other countries such as Germany for example such issuer accounts do not exist, instead the securities are credited on the issuer's bank's account with the CSD.

The home CSD of the issuer is also called issuer CSD. Since most European exchanges require C+S services to be conducted by one domestic CSD to automate the processing of the trade, customers use custodians as agents to intermediate transactions. These custodian banks apply for access and admission at the local CSD that is usually granted if certain criteria to protect the C+S system are fulfilled. Thus, they provide customers with *indirect* access to the CSD. Their accounts are

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<sup>2</sup> Eurex Clearing AG is not part of the Deutsche Börse Group but a 100% subsidiary of Eurex Deutschland AG, which is partly owned by Deutsche Börse.

<sup>3</sup> Due to the high level of fixed costs, average costs decrease as the number of settlements per institution increases.

credited for the amount of financial instruments that is either directly held by the intermediary or indirectly in the name of all of its customers. Sometimes, accounts are held by an intermediary on behalf of a single client only. They are credited for the quantity of financial instruments that is indirectly held by the client through an intermediary. This client does not necessarily have to be the final investor. Such accounts can also be held by further custodians, at which the final investor keeps his securities. The custodian that holds this account then functions as a sub-custodian of the custodian of the final investor. This chain of custodians and sub-custodians becomes particularly important in a cross-border context.

### **3 Regulation Benefits: Measuring Excess Costs of Clearing and Settlement in Cross-Border Transactions**

Several studies have been published in recent years that have analysed cost differences between domestic and cross-border transactions, in order to assess potential cost savings from further consolidation and harmonisation of European C+S systems. These costs include the safekeeping and transaction fees that are charged by national C+S systems as well as the costs the users of these systems (e.g. investors, issuers and intermediaries) incur for the maintenance of back-office facilities and interfaces that are necessary to ensure the compatibility of different IT platforms and communication networks. These costs rise further through the inefficient use of collateral, a higher incidence of failed trades and foregone business opportunities due to the complexity and cost of processing. Since not all costs are directly related to the C+S of transactions, they have to be classified into different cost categories. These cost categories are defined in line with the analysis conducted in the *Giovannini Report* (2001) as:

(I) *Direct Costs*: This cost category represents the costs associated with the provision of C+S services (e.g. safekeeping and transaction fees).

(II) *Indirect Costs*: These costs include the costs required to maintain back-office facilities and to ensure the compatibility of different IT platforms and communication networks.

(III) *Opportunity Costs*: This category represents the costs that arise through the inefficient use of collateral, a higher incidence of failed trades and foregone business opportunities due to the complexity and cost of clearing and settling transactions.

Direct and indirect costs determine the price of C+S services. Since these cost categories are difficult to measure, only estimates of the percentage share of direct and indirect costs relative to total post-trade costs exist. According to these estimates the direct costs account for 30 percent and the indirect costs for 70 percent of total settlement costs (including intermediary and accession costs).<sup>4</sup>

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<sup>4</sup> Clearstream (2001)

Although the direct costs of clearing and settling transactions only represent a small fraction of total settlement costs, the literature mainly concentrates on measuring these costs. They are calculated according to two different approaches: the bottom-up approach and the top-down approach. The first approach analyses the costs of clearing and settling transactions *directly* by comparing settlement fees for domestic transactions with those for cross-border transactions. It is also called *bottom-up approach*. The other approach calculates the additional costs of cross-border settlements by comparing the operating income of institutions that mainly clear and settle domestic transactions with that of institutions that mainly settle cross-border transactions. Since this approach measures the costs of clearing and settling transactions *indirectly* from balance sheet data, it is also called *top-down approach*. In the following, the methodology of these approaches and their problems are discussed in greater detail..

### **3.1 The Bottom-Up Approach**

An obvious approach to measure cost differences is to compare the fees for domestic and cross-border transactions of different providers of C+S services (clearinghouses and CSDs).

#### **3.1.1 Methodology and Results**

The bottom-up approach has been used by Lannoo and Levin (2001), the Giovannini Group (2001) and NERA (2004) to compare the cost structure of different C+S systems within Europe and between Europe and the US. *The additional costs of cross-border transactions are calculated as the difference between the costs for cross-border and domestic settlements.* A simple method to estimate these costs is to compare the fees of CSDs with ICSDs, assuming that the first mainly settle domestic and the latter primarily settle cross-border transactions. The comparison of settlement costs of these institutions is however problematic, since an ICSD mainly performs bond and not stock transactions and provides a higher level of services (e.g. custody and banking services) than a CSD. Furthermore, equity trades more often lead to higher economies of scale through a higher number of transactions when they are traded in small amounts, while bond transactions are often traded in

high volumes and the costs charged are probably small relative to the value of transactions. The costs of operating an ICSD are therefore innately different from the costs of operating a CSD. This might lead to an overestimation of the cross-border settlement costs. These costs however might have also been underestimated, if cross-border transactions are settled internally. This implies that in order to get accurate estimates of the additional costs of cross-border transactions, the settlement fees have to be divided into *internal* and *external settlement fees*. An internal settlement takes place if a securities transaction is settled by internal bookings on, for example, Clearstream Banking Luxembourg accounts, while Clearstream holds the securities for its client externally through its links to foreign settlement systems or agent banks. Then the fees for external cross-border settlements have to be compared with the fees for internally settling domestic securities to estimate the additional costs of cross-border settlements. Lannoo and Levin (2001) calculate the fees Euroclear and Clearstream charge for selected markets. They come to the conclusion that external (i.e. cross-border) transactions are more expensive to clear and settle than internal (domestic) transactions. Another approach is to calculate the fees a CSD charges for clearing and settling cross-border transactions and to compare these fees with the costs of settling domestic transactions. Since these transactions can only be settled by a link between the CSDs these transactions are comparable to an external settlement by Euroclear or Clearstream. NERA (2004) calculated the costs for these transactions for different European settlement systems using different model clients and transactions types. Their results are consistent with the findings of previous studies that it is more expensive to clear and settle cross-border than domestic transactions (NERA, 2004, p. 51).

### **3.1.2 Problems of the Bottom-Up Approach**

Although the bottom-up approach is a straightforward method to measure direct cost differences, it also raises problems of comparison and interpretation. The first problem is the limited data availability, since only very few comparable data about the fee schedules of C+S providers are available publicly. Problematic is furthermore that the fee structure is highly complex and depends on several parameters. Among these are the market where the security is traded, the financial instrument, the



volume of transaction, the payment method and the type of customer. The bottom-up analysis thus requires a number of assumptions to generate results that are comparable across institutions. These assumptions regard the characteristics of the investor (institutional or private investor) and the transaction type (volume, instrument, payment method). Acting on these assumptions however adds subjectivity to the analysis of cost differences, since the fees mainly depend on the choice of the *model client* and the type of transaction. Studies based on the bottom-up approach therefore analyse cost-differences only for a small number of particular types of transactions and particular model clients. The results drawn from this analysis might, for this reason, not necessarily be transferable to other model clients and transaction types.

Beyond this problem further practical problems make the analysis of cost differences based on the bottom-up approach difficult. These problems are:

(I) *Aggregation of prices for different services*: It is problematic that several services are often charged in a single tariff or generally provided as part of the business relationship. Thus particular problems arise when the services shall be compared across institutions and countries. The reason for aggregation of costs and services is the fact that the fixed costs of maintaining a C+S system are very high in comparison to the marginal costs of each transaction. The C+S providers therefore do not only charge a marginal fee, but also assign a part of the fixed costs to the price of each service bundle. This cost allocation may differ between C+S service providers and depend on the transaction type and the model client.

(II) *Different Fee Schedules*: The comparison of settlement fees is also problematic because the fee schedules of the C+S providers are different. Institutions involved in the settlement of transactions sometimes charge monthly or annual *standing fees*. Standing fees reflect the fixed costs of operating these institutions. Since these costs are spread over the total number of members, institutions with a smaller number of users are expected to charge higher standing charges than those with a large number of customers. Furthermore the level of standing fees is expected to vary with the level of technological endowment, because the implementation of electronic platforms involves high fixed costs. Beside these fixed costs C+S providers also

charge *variable fees*. The level of these costs also varies often with the fee schedules. Large volume users normally prefer a tariff consisting of a higher standing fee combined with a lower fee per transaction because average costs decrease as the number of transactions rises, while low volume users, on the other hand, prefer schedules with higher per unit fees (often a flat fee) and lower standing fees to reduce their total settlement costs. To what extent such tariffs are applied differs across the service providers.

(III) *Different Discounting Structures*: It is also problematic that C+S providers often grant discounts based on the volume or the revenue per settlement. These discounts reflect the increased bargaining power of customers – in case of agent banks - and the extent of economies of scale and scope – in case of CSDs - in providing C+S services. The extent of these scale effects varies with the level of technology and the transaction volume. Due to these effects the reasons for cost differences are difficult to interpret and have to be taken into account when the fee schedules of C+S providers with different levels of technology and number of transactions are compared.

(IV) *Different Terminologies*: The analysis of cost differences is also difficult due to differences in the terminology of services. Due to different service levels it is not possible to break up the C+S process into its single activities and to aggregate these activities according to the services that are included into the fee in order to increase the comparability of costs. It is also problematic that the C+S providers often use different terminologies to describe the activity chain of the C+S process. This reduces the comparability of different service providers, since identically named services, that are included in the settlement fee, might not necessarily be identical.

### **3.2 The Top-Down Approach**

Due to the lack of sufficient data and further problems like the aggregation of costs, different fee schedules and different discounting structures, the top-down approach has been developed to measure settlement cost. This approach divides total operating income by the number of transactions to get an estimate for the settlement costs per transaction.

### **3.2.1 Methodology and Results**

The top-down approach has the advantage that data on operating income are regularly published in the financial statements of the C+S providers and hence are sufficiently available for studying cost differences. Although this approach is not without problems either, it has been widely applied to measure cost differences between European C+S providers. The first study that has used this approach has been published by Lannoo and Levin (2001). At the same time, this study was basis for the first *Giovannini Report* (2001) that analysed the barriers to cross-border securities transactions and their effects on settlement costs in Europe. These studies calculate the additional costs of cross-border C+S as the difference between the operating income per settlement of a CSD and an ICSD, assuming that the first mainly settles domestic and the latter mostly cross-border transactions. This has recently been confirmed by a study of the Deutsche Börse Group (2005) comparing wholesale domestic and cross-border transaction costs. This study has, however, also revealed that cross-border transaction costs are less expensive than often alleged (Deutsche Börse Group, 2005, p. 25). All of these studies confirm the results of the bottom-up approach and indicate that cross-border settlement costs are considerably higher than domestic settlement costs.

### **3.2.2 Problems of the Top-Down Approach**

The advantage of the top-down approach over the bottom-up approach is that there are sufficient data available to analyse cost differences. By using the operating income as a proxy for the costs per transaction, however, other problems arise that make it difficult to compare and to interpret cost differences. The first problem concerns the measurement of settlement costs as the operating income per transaction. Although figures on the operating income and the number of transactions are readily available, they are accompanied by a number of inconsistencies and idiosyncrasies that make the comparison of costs problematic.

(I) *Different Services*: C+S providers often do not provide the same range of services. This affects their operating income and thus makes comparisons between C+S providers that offer a different spectrum of services difficult. The high level of aggregation hence does not allow excluding particular services from the study which do not directly relate to C+S services. Therefore the tariffs for each service cannot be calculated as long as the operating income earned by providing each service is not published separately. Hence as in the case of the bottom-up approach, the reasons for cost differences between C+S systems cannot be explained in detail by qualitative factors.

(II) *Different Accounting Standards*: Another problem that makes the analysis of cost differences difficult are different accounting standards. Since the financial statements are not always prepared according to the same accounting standards, the operating income per transaction may differ even though the services provided are identical. A further problem is that the C+S provider might be part of a larger company, since the operating income in this case not only includes the revenue and expenditures of the C+S company but also those which do not directly relate to C+S services. Another relevant problem is exchange rate fluctuations. This problem is of particular importance for cross-border comparisons between C+S providers, since the financial statements are mostly reported in the domestic currency. Although this problem is no longer relevant for comparisons between Euro-zone member countries, the problem remains important for a comparison between the costs of C+S providers, which are located in countries with different currencies like the US or the UK.

(III) *Different Netting Procedures*: Problematic is also the netting of transactions. Since the number of transactions enters the measurement figure in the denominator, it also determines the costs per transaction. To compare different C+S providers the operating per income per transaction has to be calculated either on pre- or on post-netting numbers. Since not all providers of C+S services report the same numbers, post-netting numbers either have to be converted into pre-netting numbers or pre-netting numbers have to be converted into post-netting numbers to be able to compare the costs per transaction between different C+S providers. Both approaches however raise further problems, since the use of post-netting numbers penalises C+S providers with a high netting efficiency through a higher operating income per

transaction. Furthermore, the conversion of pre-netting numbers into post-netting numbers and vice versa requires assumptions about netting efficiency. Since this efficiency varies considerably from provider to provider, calculating post-netting numbers from pre-netting numbers always raises the subjectivity of the analysis of cost differences. Pre-netting numbers, on the other hand, do not take into account differences in the netting efficiency and the savings of indirect and opportunity costs that arise through an efficient netting of transactions. This is particularly problematic for a comparison between C+S providers in Europe and the US, because the latter has a considerably higher netting efficiency in comparison to European C+S systems.

### ***3.3 Comparability of Settlement Systems***

Due to the high complexity and different national barriers to cross-border transactions, the picture emerges that a single C+S system best meets the needs for an integrated financial market in Europe. Since the Depository Trust & Clearing Corporation (DTCC) clears and settles all on-exchange equity transactions within the US and with foreign countries, it is often used as a cost benchmark for clearing and settling equity trades in the EU.<sup>5</sup> Although it is rational to compare the centralised US system for equities (and non-government bonds) with the fragmented equity-related C+S industry in Europe, in order to derive estimates about the potential costs savings that might arise through the removal of barriers to cross-border settlements and the centralisation of the C+S system, it has to be questioned if a comparison makes sense to estimate the cost savings that might arise due to the centralisation of C+S services in Europe. Several problems indicate that this comparison is not as straightforward as it may seem at first glance. These problems relate to:

(I) *Legal and Cultural Differences*: The major problems in implementing a single C+S provider in Europe are different national company laws, tax rules and cultures. The centralisation of C+S systems thus requires the full harmonisation of laws and rules. Since this interferes in the sovereignty of every member state and could not have

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<sup>5</sup> The DTCC was established in 1999 as a holding company for the National Securities Clearing Corporation (NSCC) and the Depository Trust Company (DTC). Beside the DTCC further players exist in the market that provide C+S services for other types of transactions (e.g., derivatives or bonds transactions).

been achieved during the past integration process, the centralisation of C+S services seems to be unlikely at least in the short to medium run. And even if legal and tax harmonisation is reached, cultural differences will remain that make a perfect integration almost impossible or at least less beneficial than in countries with almost homogenous cultures. But even in a homogenous security market like the US, the Securities Exchange Commission (SEC) and the US Congress had to enforce the centralisation of equities-related C+S services in 1976 in the light of a crisis which arguably does not exist in Europe.

(II) *Ownership Differences*: A second problem arises on account of ownership differences between Europe and the US. In Europe, C+S companies have been *demutualised* and are now *private-owned* institutions that are committed to increase the shareholder value by making profits. In the US, the DTCC is, in contrast, owned by the users of the system (major banks, brokers and dealers as well as other companies within the financial services industry), and its function is to provide efficient and low-cost C+S services on a *not-for-profit* basis. Due to these differences, European C+S providers might charge higher fees for comparable services than the US C+S system to increase the profit margin of their services. This argument however loses explanatory power for the interpretation of cost differences between Europe and the US, if one considers that the European C+S companies are still mostly owned by their users. And even the DTCC is not fully user-owned, since certain participants, such as small broker-dealers, have abstained from their right to purchase the shares to which they are entitled. These shares are held by their self-regulatory organisations in a representative capacity for their members. Furthermore, although the DTCC is a not-for-profit organisation, it has created for-profit ventures such as OMGEO (with Thomson Financial) to provide global straight-through processing for institutional trading. For these reasons, ownership differences between the US and the European settlement system are not regarded as an important driver of cost differences between Europe and the US.

(III) *Different Efficiency Optimums*: The C+S process exhibits significant economies of scale which vary with the size of the C+S provider. The US is often used as a benchmark, since the US C+S system operates on a near optimal scale according to Schmiedel et al. (2002), with respect to economies of scale and scope. Further

increases in the size of the output are therefore not likely to lead to significantly higher scale effects, while smaller C+S providers, like in Europe, operate still below the level that is needed to provide their services at their efficiency optimum. The level of output or the degree of centralisation in Europe however does not necessarily have to be identical to the US system to minimise average costs. Van Cayselle and Wuyts (2004), for example, argue that economies of scale are probably exhausted with a minimum efficient scale well below the overall size of a pan-European market. Consolidation between different service providers moreover lowers the level of competition. This might reduce the incentives to operate efficiently and might create adverse conditions for innovations, which in turn reduces dynamic efficiency and increases transaction costs.

(IV) *Different Settlement Environments*: The comparison between the European fragmented and the centralised US system is also difficult due to different settlement environments. While in the US, the number of transactions that is settled cross-border is relatively small, since most transactions are settled domestically, the number of cross-border settlements is considerably higher in Europe. Therefore the environment in the US is less demanding in terms of complexity and hence services can be offered at lower costs than in Europe (Lannoo and Levin, 2001). The US system is, for this reason, an appropriate model for a C+S system that efficiently operates domestic C+S services but less appropriate for an environment with a greater number of cross-border trades.

(V) *Different Discounting Structures*: It is also problematic that the US and European C+S system use different discounting structures. In Europe, the majority of C+S providers grant discounts based on the number of transactions before netting (ex-ante volume base discount), while in the US discounts are calculated based on the number of transactions after netting (ex-post volume based rebate) (NERA, 2004, p. 53).

### **3.4 Conclusions**

The explanation of the bottom-up and top-down approach has made clear that the measurement of settlement costs is not as easy as perhaps expected. Both

approaches mainly suffer from a lack of data and the aggregation of costs and services that make the interpretation of cost differences difficult. Although the top-down approach intends to solve the problem of data availability of the bottom-up approach, it has not completely solved these problems, but rather introduced further problems that relate to the use of operating income as a proxy for the settlement costs. Since these problems seem to be more difficult to solve than the problems of the bottom-up approach, we prefer the latter approach to estimate settlement costs of domestic and cross-border transactions. Moreover, the bottom-up approach has the advantage that the costs of C+S are directly estimated from the settlement fees. These fees are an important factor in the decision making process of an investor and hence for the integration of diversified European financial markets into one single market.

The main problems of the bottom-up approach arise due to the lack of comparable data on clearing and settlement fees. In the literature on C+S costs, settlement fees are often taken from the homepages of the C+S providers. This is problematic, because these fees are difficult to compare due to different service levels, different fee schedules, different discounting structures and different terminologies. The preferable approach to circumvent these problems is therefore to collect information about the fee schedules, not from homepages but to directly contact the provider of C+S services and to ask for comprehensive information about their fee schedules.

Since this information is likely not to remove all existing problems of the approach, further measures seem to be necessary to generate comparable results. The problem of cost aggregation can be solved by decomposing the C+S process into different phases. NERA (2004) has already used this approach to analyse cost differences and has broken up the C+S process in a matching, clearing (novation), netting and settlement phase. This decomposition makes sense, since it reflects the main stages along the trade processing chain. NERA (2004) however faced the problem that C+S providers often assigned different services to each phase. This problem is due to different terminologies that are used to describe the activity chain of C+S processes. To resolve this problem the activity chain has to be subdivided even further. An appropriate decomposition of the clearing process might be matching, novation and netting where feasible, the issuance of settlement



instructions, settlement netting and finally settlement as described in the second section. Furthermore this decomposition helps to reduce the extent of different service levels, since the fee schedule is more transparent and it is easier to get to comparable costs by aggregating fees on the same bundle of services.

Beside the decomposition of the trade processing chain it is also important to differentiate in standing and variable charges. This further increases the transparency of the fee schedule and makes it easier to compare settlement costs. This cost breakdown is of particular importance for the calculation of costs for different model clients, since large volume users are expected to pay higher standing charges on the one hand and lower variable fees on the other hand. Small volume customers are conversely expected to pay higher variable charges and lower standing charges to reduce total settlement costs. To reflect these differences in the fee schedule, it is necessary to collect the fees for different model clients (small, medium, large). Since these classifications are subjective, the model clients should be chosen to best present the average client or group of clients of actual settlements. A thorough analysis of cost differences furthermore necessitates collecting data on discounting structures. This data can then be aggregated with data about standing and variables fees to a single fee for a bundle of identical services, which can then be compared to the costs of other providers of C+S services for domestic and cross-border transactions.

Regarding the calculation of the additional costs of cross-border trades, the analysis above has shown that the comparison of fees for settlements in CSD and ICSDs is highly complex and requires the calculation of internal and external settlement fees. An easier approach to measure these costs is to subtract the fees CSDs charge for providing cross-border settlement services from fees charged for domestic settlements. All this however only looks at the direct costs explained before and therefore takes only the point of view of a direct participant. This analysis therefore would ignore 70 percent of the costs faced by the end-investor. When considering the comparison with other countries, it has to be kept in mind that the US C+S system is not perfectly transferable to Europe due to the differences mentioned above. The US system thus serves as a benchmark that probably cannot be achieved by European C+S providers. For this reason, the C+S provider with the

lowest total costs in Europe at present might serve as an additional and more realistic benchmark for the European clearing and settlement industry.

**Box 1: *Methodological Proposals for the Improvement of the Analysis of Clearing and Settlement Costs***

- Contacting C+S providers and asking for comprehensive information about the fee schedule and discounting structure for different representative model clients and transaction types.
- Dividing the C+S process in its constituent parts according to the trade processing chain.
- Separating settlement costs into standing and variables charges.
- Aggregating standing and variable charges and subtracting discounts to calculate settlement fees for a comparable bundle of services.
- Calculating the additional costs of cross-border settlements by measuring the difference between settlement for domestic and cross-border transactions settled by a CSD.
- Comparing these costs with the US C+S system and the most efficient European C+S system to get an estimate for the cost savings (benefits) due to technological improvements and the harmonisation of C+S structures.

## **4 Cost Analysis of Adaptation/Compliance to Regulation**

The preceding chapter has explained different methods to measure the additional costs that arise due to the complexity of cross-border settlements. The complexity of these settlements comes up from the existence of several barriers that make the clearing and settlement of cross-border trades more difficult and requires more intermediaries than the settlement of domestic transactions. To remove these barriers and to reduce the excess costs of cross-border transactions, the EU has proposed different regulatory measures. This chapter focuses on the costs that might be imposed on market participants by adapting to and complying with these regulations.<sup>6</sup>

### ***4.1 Regulatory Approach of the EU Commission***

The creation of an integrated and efficient European financial market is one of the most important projects on which the EU is currently working. One of the general conditions for the realisation of such a market are secure and efficient C+S systems. Although these systems are to a large extent untransparent to private investors, they are necessary for a well-functioning financial market and the stability of the financial system. Since C+S systems were set up in the past to mainly clear and settle domestic transactions, a fragmented system of different C+S providers has evolved. These systems provide secure C+S services at relatively low costs for domestic transactions. Cross-border transactions are conversely much more difficult to clear and settle than domestic transactions due to different C+S systems, which increase the number of intermediaries in the C+S process and lower the efficiency of clearing and settling cross-border transactions. These inefficiencies increase the costs and the risk of C+S services in Europe.

For this reason, one of the major objectives of the EU is *to create a level playing field* that gives European C+S providers the incentive to remove the existing barriers and to increase the efficiency of the C+S process of cross-border transactions. These

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<sup>6</sup> These proposals for regulations have been introduced by the European Commission. This section concentrates on this regulatory approach and does not reflect regulatory proposals of the Centre for European Economic Research (ZEW).

barriers have been identified by the Giovannini Group (2001) and have been categorised into (I) *technical barriers*, (II) *barriers relating to differences in tax procedures* and (III) *barriers relating to legal certainty*.

Barriers relating to differences in technical requirements and market practices, like different opening hours, are expected to be removed by a concerted action among market participants. The EU Commission, however, has not completely abstained from interventions in this respect, since EU legislation is supposed to serve as a mean to overcome national caveats (The Giovannini Group, 2001, p. 60). It might furthermore encourage the convergence of technical requirements and market practices by setting *uniform standards for communication systems and information platforms*. These standards are based upon principles which the *Securities Market Practice Group* (SMPG) has developed and which are facilitated by SWIFT. These standards together with ISO 15022 instruction standards should create harmonised market practices in Europe. The scope and framework of these standards has been outlined by SWIFT in a recent consultation paper titled *The Proposal for the Removal of Barrier 1 of the Giovannini Barriers* (2005).

While the technical barriers to cross-border C+S can be removed in principle by market participants themselves, the barriers relating to differences in tax procedures and legal uncertainty can only be abolished by government interventions. Barriers that are related to taxation mainly arise from differences in withholding taxes, capital gains taxes and transactions taxes within the EU. These barriers more generally impact the holding and the transfer of securities across borders rather than the C+S process. Barriers relating to legal certainty refer to restrictions on the location of C+S systems. These restrictions relate to different company laws and related areas such as insolvency law, since once an issuer has chosen a CSD based on the country where it wants to issue, the creation and maintenance of book-entry securities on the basis of information provided by the issuer or its agent cannot be split to more than one CSD without risking a high level of complexity. Hence they are regarded as a barrier to free market access and free choice of C+S locations thereby significantly reducing the level of competition in provision of cross-border C+S services. Competition however is an important determinant for higher efficiency and consequently lower settlement costs.

The regulatory approach of the EU commission however is not confined to the removal of legal and tax barriers and the establishment of technical standards. It also touches on regulatory and supervisory aspects. Different national regulatory and supervisory frameworks are seen as an important characteristic of the European C+S industry (EU Commission (2004a)). The regulatory frameworks were built to ensure investor protection and the functioning of national financial systems. Since C+S systems are an essential condition for the stability of these systems, national authorities would have to make sure that all foreign C+S systems, that are linked to a domestic system, are as properly regulated and supervised as the domestic systems are. Finally, the EU Commission's regulatory approach also extends to competition policies.

To create a level-playing field that is conducive to competition within the European C+S industry, the Commission has hence proposed the following measures and strategies to the Council and the European Parliament in its communication titled *Clearing and Settlement in the European Union – The Way Forward* (2004a).<sup>7</sup> The following paragraphs describe the regulatory approach of the EU Commission in more detail without discussing or evaluating it. In our context, the only purpose of the subsequent section is to outline the field of potential regulatory measures in order to derive appropriate methods for a cost analysis.

(I) *Liberalisation and Integration of Settlement Systems*

The liberalisation and integration of existing C+S systems requires the removal of the (technical) barriers identified in the *Giovannini Report* (2001) by joint action of the private and the public sector. Their elimination is regarded by the Commission (2004a) as a precondition for efficient competition between the providers of C+S services. Their argument in favour of regulations that are

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<sup>7</sup> The Commission has furthermore invited market participants to express their opinion about the measures and strategies considered in its communication. The list of contributions from these institutions are available on the homepage of the European Commission ([http://www.europa.eu.int/comm/internal\\_market/financial-markets/clearing/contributions\\_en.htm](http://www.europa.eu.int/comm/internal_market/financial-markets/clearing/contributions_en.htm)). The response of the Deutsche Börse Group on the measures and strategies considered in this communication is also available on this webpage.

aimed at liberalising and integrating settlement systems goes as follows:

As long as investors do not have the choice between different C+S providers in clearing and settling cross-border transactions, there is a lack of competition. This raises the costs of cross-border trades. Currently market participants have to interface with different C+S systems. This leads to a duplication of costs. The costs for domestic C+S systems to provide C+S services abroad further increase when it is necessary to establish presence in each country where a relevant system is located. The establishment of local entities is necessary to achieve parity with local providers. A *remote provider* might, for example, demand to use a local bank for cash settlement or to have an account at the local central bank, although access to such accounts is sometimes only available to domestic institutions. To guarantee that institutions have these options, comprehensive *rights of access and choice* have hence to be introduced. These rights, however, do not guarantee that the level of competition in cross-border trades increases. As long as the further barriers regarding technical requirements and market practices exist, domestic C+S providers have to incur additional costs that lower the competitiveness of domestic institutions in supplying C+S services abroad and thus considerably restrict technical access to foreign markets.

(II) *Competition Policies*

Beside the liberalisation and integration of C+S systems, it is seen necessary that the providers of C+S services adhere to competition law to prevent that the incumbent providers of C+S services do not misuse their market power by practicing discriminatory pricing policies as well as unfair denying of market access (Commission of the European Community, 2004a). The issue of competition policies is seen as becoming perhaps even more important in the future, since the consolidation within the C+S industry is supposed to raise the scope for using these practices to increase the market share and generate maximum profits. As far as competition authorities react to offences against competition law, measures and strategies to prevent anti-competitive policies

are called *ex-post* competition policies. *Ex-ante* competition policies, on the contrary, intend to prevent discriminatory policies in advance, e.g. by increasing cost and pricing transparency. Measures that have been proposed by the Commission (2004a) to increase transparency are *disclosure* and *unbundling requirements*.

### (III) *Supervision and Regulation*

In the view of the European Commission, the integration of the market for post-trade services also requires the integration of supervisory structures (Commission of the European Community, 2004a). Safe and efficient C+S services are only guaranteed when the risks incurred by C+S providers are appropriately monitored. Such risks could include credit and liquidity risk, custody risk, operational and legal risk. The realisation of these risks is more likely in a cross-border context, since the complexity of the C+S process and hence the number of sources for these risks increases. Clearinghouses functioning as CCP are subject to *credit* and *liquidity risk*, since they legally interpose themselves between the counterparties of the trade. If one of these counterparties fails to pay or to deliver the security, the CCP has to step in and pay or deliver the security. Agent banks or custodians also take credit and liquidity risks by providing ancillary banking services, like the provision of lending and/or credit facilities to ensure that the settlement process is not interrupted if one party defaults. They also face *custody risk*. This risk refers to the loss of securities held with a custodian as a result of insolvency, negligence or fraudulent action by the custodian. Custody risk should however normally not cause a loss of securities, since securities are in general kept in an account separate from other holdings of the custodian and therefore are separable in case of bankruptcy. CSDs, ICSDs and custodians are exposed to *operational risk*, which refers to the possibility of a breakdown of the hardware, the software or the communication systems required for the provision of post-trade services. All institutions are subject to *legal risk*, which relates to the unexpected application of a law or regulation or the possibility that a title or a contract cannot be enforced.

*Systemic risks* mainly result from credit and liquidity risk when the financial capacities are not sufficiently high to carry the financial burden of a failure of one institution in the C+S value chain. This failure might cause other institutions to fail and to destabilise the entire financial system (contagion). To prevent that systemic risks are realised, the Commission (2004a) has proposed to introduce *capital adequacy requirements* and requirements regarding the *risk management* of C+S providers. Since the market for C+S services is not transparent for the end-users of the system, information is regarded as asymmetrically distributed between the provider and the user of C+S systems. C+S providers might misuse these information asymmetries to make additional profits at the expense of their customers. To prevent that this happens, the Commission (2004a) postulates that supervisory authorities should put greater attention on an appropriate protection of investors as well. This protection should be higher in integrated markets than in isolated domestic markets, since information asymmetries rise in a cross-border context. Supervision and regulation of CSDs hence also has been strengthened in a cross-border context. Agent banks also have to be subject to these regulations, as long as the risks they are exposed to in clearing and settling transactions, are not appropriately addressed in banking supervision and regulation.

#### (IV) Governance Structures

Beside higher requirements regarding risk management and capital adequacy standards, introducing appropriate governance structures is also regarded as able to reduce risks and information asymmetries (Commission of the European Community, 2004a). Governance arrangements include the relationships between owners, the board of directors, the management and authorities that represent the public interest. Public authorities and users have a particular function in controlling the providers of C+S services, since they are interested in low-cost and safe C+S services. This might detain the management of C+S providers from maximising profits at the expense of



investments that are necessary to secure the well-functioning of the system. To fulfil their function efficiently, the market for C+S services has to be transparent. Transparency enables public authorities (e.g. financial supervision and competition authorities) and users to oversee the financial situation and the risk potential of C+S providers. It is furthermore seen as necessary for effective competition within the C+S industry (European Commission 2004a). The Commission therefore has proposed the introduction of disclosure and unbundling requirements to increase transparency. The latter requires that the non-core services of C+S providers be separated from core-services and priced as well as supplied unconnectedly to the core C+S services (functional unbundling). This is expected not only to increase transparency but also to prevent C+S providers from cross-subsidising non-profitable services by revenues from profitable services. To achieve this, the European Commission (2004) has proposed to separate revenues and costs generated by specific services (accounting separation) and to introduce independent auditing committees consisting of different independent accountants which oversee accounting issues.<sup>8</sup>

This section has outlined the measures and strategies of the Commission of the European Community. Among these only those regarding the liberalisation and integration of settlement systems are intended to remove the technical and legal barriers mentioned in the Giovannini Report (2001). Measures and strategies regarding barriers that relate to national differences in tax procedures and to issues of legal certainty, besides access rights to foreign C+S systems, have not yet been included in the Commission's proposal. Thus far the activities of the EU governments to remove these barriers have only been limited to the establishment of expert groups on legal uncertainty (Legal Expert Group) and taxation (Fiscal Compliance Expert

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<sup>8</sup> An alternative to the introduction of auditing committees and disclosure requirements is the introduction of governance standards that apply to all European providers of C+S services. Many listed companies have already applied governance standards in accordance with national corporate governance codes. In Germany, Deutsche Börse, for instance, applies corporate governance standards that fully comply with the German corporate governance code. To create a harmonised level of transparency and governance between service providers of C+S services these corporate governance provisions could be made mandatory for companies which are not listed publicly and have not adopted corporate governance codes.

Group). These groups have only recently started working on these issues, which makes it unlikely that all barriers defined in the Giovannini Report (2001) will be tackled parallel to the proposal of a framework directive. However, since these barriers are a main source for the complexity of cross-border settlements, inefficiencies in clearing and settling cross-border transactions are likely to persist even after the introduction of a C+S directive.

## **4.2 Regulation Costs**

The compliance with the regulatory measures outlined above imposes additional costs on the provider of C+S services. Since these costs might outweigh the expected benefits in terms of cost savings that arise from these regulatory measures and strategies, the costs of regulations also have to be analysed to assess the potential net benefit of regulations for market participants and the public. These costs arise inter alia according the measures and strategies laid out above due to:

### *(I) Liberalisation and Integration:*

- Provision of Technical and Legal Access
- Standardisation of Market Practices

### *(II) Competition Policies*

- Ex-ante Competition Policies
- Ex-post Competition Policies

### *(III) Supervision and Regulation:*

- Enhancement of Investor Protection
- Strengthened Capital Adequacy Requirements
- Intensified Risk Management

### *(IV) Governance Structure:*

- Disclosure requirements

- Unbundling of services
- Introduction of Auditing Committees

Liberalisation and integration concentrate on the barriers regarding technical requirements and differences in market practices identified in the *Giovannini Report* (2001). The other measures are intended to create a framework which is conducive to competition between different C+S providers and is supposed to ensure safe and efficient C+S services in Europe. Beside regulations regarding competition policies, the supervision and regulation as well as governance structures, regulations should also include the removal of the other Giovannini barriers relating to national differences in tax procedures and issues of legal certainty that may arise between national jurisdictions. These barriers also prevent that cross-border transactions are settled efficiently and can only be removed by government themselves.

Among these barriers, in particular, domestic withholding tax regulations that serve to disadvantage foreign intermediaries (barrier 11) and/or requirements that transaction taxes must be collected through a functionality integrated into a local settlement system (barrier 12) reduce the level of competition between C+S providers. Therefore, they have also been addressed by the EU governments. Corresponding regulatory reforms are also likely to impose additional costs and hence should be in the scope of a RIA.

#### **4.2.1 Categorisation of Regulation Costs**

To get a first assessment of the relative importance of regulation costs, they should be categorised into (I) variable, (II) fixed, (III) one-off and (IV) permanent costs. In particular, permanent costs and variable costs tend to pose a continuous additional burden, while one-off-costs and fixed costs would be of minor importance in the long run. In other words, this categorisation provides a preliminary *hierarchy of different regulation costs*, ranging from the most important cost categories – demanding intensive research – to minor cost positions – where rough assessments would be sufficient or even total neglect would be justified.

Figure 5 illustrates the different cost categories in a three-dimensional diagram with costs per transaction, time and the number of transactions on the axes. Table 1 furthermore provides an example for the structuring and ordering of regulation costs. In an actual RIA, this categorisation should be validated by feedback from market participants. Table 1 combines the categorisation of costs with a rough weighting approach (indicating by ++, that extraordinarily high costs in a certain category are likely to occur). This categorisation allows identifying the following different categories of costs with regard to their importance:

(I) *Category 1 Costs*: These costs include *permanent* and *variable costs*. Any RIA should concentrate, in a first step, on identifying those costs that occur permanently and are positive on the margin, meaning that they basically count in any current and future transaction.

Examples: Additional capital adequacy requirements or litigation costs.

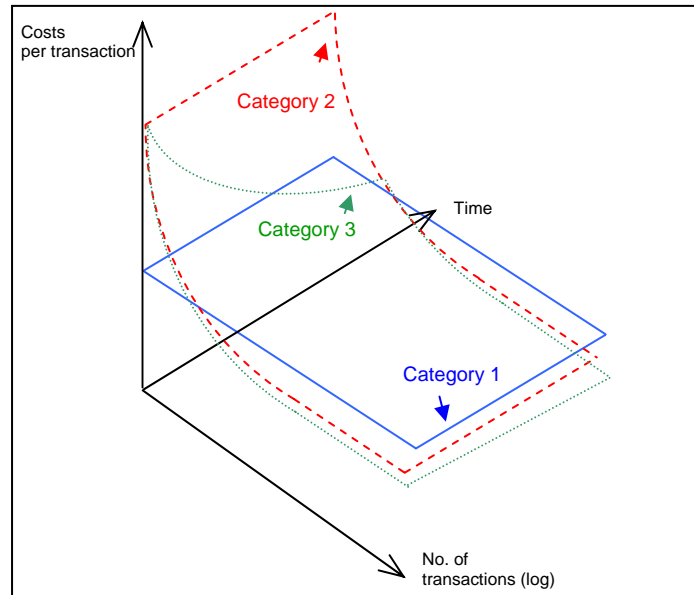
(II) *Category 2 Costs*: These costs occur periodically and are *permanent long run costs*, but are independent from the number of transactions (*fixed costs*). Therefore the average costs per transaction are subject to economies of scale and are in this respect systematically less important than costs in Category 1.

Examples: Periodically occurring reporting or auditing costs.

(III) *Category 3 Costs*: These costs are *one-off, fixed costs* that occur due to singular, non-repeated investments. The average costs of transaction are also subject to economies of scale, in the time dimension their average value per transaction converges to zero.

Examples: Basic interface/protocol standardisation of IT systems.

Figure 5: Cost Categories in Comparison



Source: ZEW (2005)

As any RIA itself is a costly and time-consuming measure, evaluation measures should be focused: The impact assessment should therefore devote its scarce resources primarily to the assessment of costs in Categories 1 and 2. Even if one-off-costs in Category 3 might be very high in the short run and therefore of primary concern to decision makers in the industry, they are inferior in the long run perspective and tend to converge to zero in a per transaction view.

Since the costs not only accrue to the individual providers of C+S services, but probably also to associations of providers (e.g. in the context of standardisation of IT protocols) and EU member states (e.g. for implementing new directives into national law and controlling the compliance of C+S providers), the direct incidence of these regulation costs has to be identified furthermore. It has to be warranted that basically all costs occurring on the side of the regulators as well as on the side of the market participants are taken into consideration.

Table 1: Example for structuring regulation costs

	Variable	Fixed	Permanent	One-off
Technical access (Standardisation of IT protocols)				
– Basic Interface standardisation		++		++
– Current adaptation/future development		+	+	
Legal access /market practices				
– Basic standardisation		++		++
– Current adaptation/future development		+	+	
Investor protection				
– Litigation costs	+		+	
– Extended Reporting		+	+	
– Extended Provider Liability	+		+	
Capital adequacy requirements				
– Capital costs	++		+	
– Overhead costs		+	+	
Intensified risk management				
– Technical/organisational infrastructure		+		+
– Overhead costs		+	+	
Disclosure requirements/ unbundling of services	+		+	
Introduction of auditing committees		+	+	

Source: ZEW (2005)

#### 4.3.2 Analysing Costs of Regulation

Having identified the most important cost categories and their incidence, the next step would be to appropriately measure the likely extent of these costs. The possible methodologies to measure the extent of these costs are:

- *Surveys among Regulators, Market Participants, and Technology Providers:*

Relying merely on surveys among regulators, market participants and/or technology providers would be only a rough measure of the costs of regulation, since answers could be biased and costs could be erroneously over- or underestimated. In particular, regulators might tend to underestimate their own costs – if they want regulation to be continued/to be intensified – and market participants might tend to overestimate their costs because they want to get rid of or to ease regulatory burdens. Technology providers might also not be regarded as an independent source of information for technology costs as they mainly – and understandably – pursue their own business interests. However, as a first approximation of regulatory costs a survey on expected costs among a representative number of market participants, technology providers and regulators could be used.

- *Event Studies:*

Complementary information on regulation costs could be gathered from event studies, for example from a detailed cost analysis of past mergers of clearing and settlement providers. This could provide particularly valuable insights into adaptation costs of IT hardware and software as well as in the costs of organisational reforms.

- *Detailed measurement of Administrative Burdens by Applying the Standard Cost Approach:*

The standard cost approach is a powerful, but rather costly and laborious tool for measuring the costs of compliance to regulatory obligations in detail.<sup>9</sup> The methodology originally refers to administrative burdens originating from regulatory reporting obligations. It disaggregates all work procedures connected to reporting tasks into standardised procedures and values these small, standardised parts of the work process with standardised average costs for a normally efficient business. Information on these average costs is obtained by conducting surveys. This analytic approach could basically be extended to cover other administrative obligations apart from reporting obligations.

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<sup>9</sup> See International Working Group on Administrative Burdens (2004).

**Box 2: *Methodological Proposals for the Improvement of the Analysis of Costs of Regulation***

- Ordering costs according to their character (fixed, variable, one-off, permanent)
- Identifying most important categories (creating cost hierarchy)
  - Category 1: variable, permanent costs
  - Category 2 fixed, permanent costs
  - Category 3 fixed, one-off costs
- Assigning costs to level of incidence (regulator/government, market participants)
- Analysing costs
  - Enquiries among market participants, regulators, technology providers



## **5 Distribution of Regulation Benefits**

A RIA requires the analysis of costs and benefits that arise through the use of regulations (cost-benefit analysis). The benefits of regulation have already been discussed in the second part of this study, as far as they are reflected in the cost savings that arise by removing barriers to cross-border trades. The preferred approach to measure these cost savings is to compare the transaction charges for settling domestic and cross-border transactions. Since regulations also involve costs, the fourth part of this study concentrated on the cost side of regulations. These costs might arise through the harmonisation of technical standards, increased reporting obligations and risk management as well as the standardisation of market practices. Due to these costs regulatory measures should only be implemented if the *net benefit* of regulation is positive.

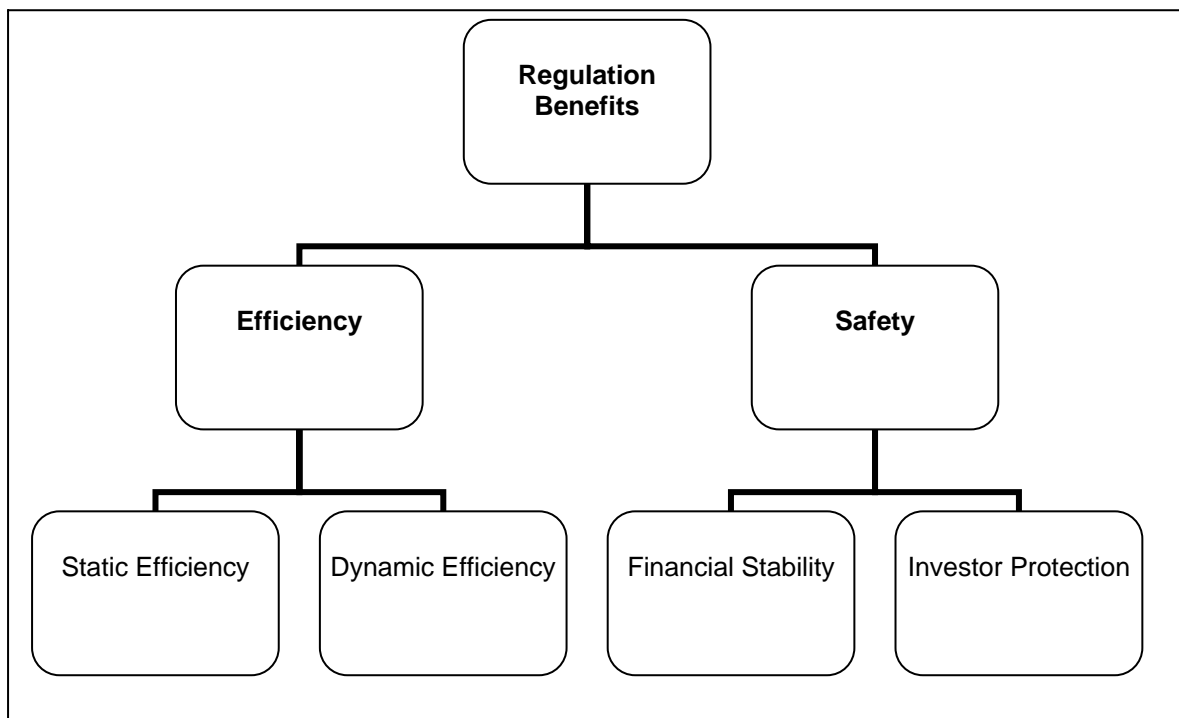
So far the analysis has been carried out on an aggregate level of benefits without discussing distributional aspects. A RIA, however, should also ask for the likely distribution of benefits of regulatory measures, in particular in oligopolistic or monopolistic markets. This topic is discussed in the following section. Before focusing on distributional aspects, however, it will be necessary to elaborate a bit more on potential regulatory benefits.

### **5.1 Regulation Benefits**

The second part of this study has already presented different concepts of measuring cost savings. These cost savings correspond to the benefits that arise through regulating the market for clearing and settling transactions and reflect static and dynamic efficiency gains. *Static efficiency* means that a certain activity is performed at the lowest possible cost. Static efficiency is therefore also commonly referred to as cost efficiency. Static efficiency gains arise in the C+S industry due to economies of scale and scope as well as network effects. Beside these static efficiency gains further benefits arise due to higher dynamic efficiency. *Dynamic efficiency* means that present structures and investments generate the highest discounted value of future benefits. Regarding the clearing and settling of transactions, C+S providers operate dynamically efficient if the present structure of the system and its investments

increases the cost efficiency of C+S services in future. That happens through quality improvements and innovation. Regulations might increase dynamic efficiency by increasing the level of competition between the providers of C+S services, since competition provides permanent incentives to improve and innovate. According to the degree of concentration, the present structure of the C+S industry in Europe yields only small dynamic efficiency gains, since the local markets are generally dominated by a single provider for C+S services. This conclusion however is misplaced if the market is contestable, since *contestability* forces even a single provider of C+S services to permanently innovate and improve the quality of his services. We will elaborate on the importance of contestability for static and dynamic efficiency in the following.

Figure 6: Regulation Benefits



Source: ZEW (2005)

Regulations also contribute to higher *safety* of the C+S process and the financial system. (I) Regulations that harmonise legal differences contribute to greater *legal certainty* about the ownership transfer or the taxation of dividend payments. (II) Regulations, like risk management or capital requirements, increase the safety of the C+S process by reducing *credit* and *liquidity risk*. (III) Furthermore standardisation of

IT protocols lowers the risk that cross-border transactions cannot be settled due to *operational risk*. This contributes to the functioning of the whole financial system and hence (IV) increases *financial stability*. (V) Regulations also increase *investor protection* through extended provider liability and extended reporting obligations.

## **5.2 Beneficiaries of Regulations**

The beneficiaries of regulations can be distinguished into the public, intermediary-users and end-users of C+S systems.

The *general public* benefits from greater stability of the financial system that arises through regulations even if the single individual is not directly involved in securities transactions.

The end-users are the *issuers of securities* and the *investors*. Issuers list their security on exchange to establish a secondary market in it. This increases the attractiveness of the security and the potential of the issuer to raise further capital in future. The settlement of securities and particularly the custody services following the clearing and settling of transactions is of concern for the issuer, since – depending on the characteristics of the security – investors have, e.g., to be invited to general meetings and informed about dividend payments. Investors are more interested in the price they have to pay for the security at an exchange and the safety of post-trade services.

The intermediary-users of C+S systems are *custodians* and other *local agents* that have access to the local C+S system. End-users get access to the local C+S system through intermediaries, since direct access to C+S systems involves significant costs and is hence impossible for private investors. Intermediaries might directly benefit from regulations that increase the level of competition in the C+S industry. This raises the concern that custodians do not pass on the regulation benefits to the end-users and instead use them to increase their operating income. This indicates that a proper regulation of providers of C+S services, in a narrow definition alone, is not sufficient to guarantee low costs for cross-border securities transactions. Regulations hence have to make sure that a competitive playing field is created between various

settlement providers ranging from CSDs, ICSDs to custodian banks and further agents. This requires the equal treatment of all firms involved in the settlement process in law, by competition and regulatory authorities. To increase the level of competition in the custody services industry one important measure might be to open the market for these services to local CSDs. Competition in the custody services market is deemed an essential element for reducing the costs of trading, clearing and settling securities besides a higher level of competition between C+S providers, since the costs for using intermediary services pose the major cost component of total trading and settlement costs.

### **5.3 Contestability of Clearing and Settlement Services**

As noted above, not the level of current competition (or rather the degree of concentration) is decisive for the volume of investments in quality improvements and innovations, but rather the level of contestability of the market. *The market for C+S services is contestable, if competitors can easily enter the market, set prices that are below the prices of the incumbent C+S provider and exit the market when the prices are back on competitive levels.* This strategy is also called “hit-and-run” strategy. It prevents incumbent providers to charge monopoly prices even if they are the only supplier of C+S services on the market, since they fear that other companies attracted by abnormal profits of the incumbents enter the market. The potential that new companies enter the market thus forces the incumbent C+S provider to behave competitively even in a monopolistic market and charge lower prices than in a monopoly. That reduces the operating profit of the incumbent provider and leads to a higher consumer surplus. *A high level of contestability and not a high level of actual competition is hence necessary for the pass-through of regulation benefits from the providers to the intermediary users and end-users of the system.* Furthermore contestability overcomes the trade-off between static and dynamic efficiency gains. Since static efficiency gains increase with the number of transactions settled, the largest cost savings are generated in a market with only one provider settling all transactions in a country. This provider however has only small incentives to innovate and to improve the C+S process, because he does not have to fear that his customers switch to a competitor. The dynamic efficiency gains are thus rather low in monopolistic markets. If the contestability of these markets is high, the monopolist

however has to fear possible entrants and is therefore forced to invest in the improvement of the C+S process. *Contestability thus overcomes the trade-off between static and dynamic efficiency gains and ensures maximum regulation benefits in form of cost savings by increasing both static and dynamic efficiency.*

Since only in contestable markets efficiency gains of harmonisation and consolidation (caused by regulations) are likely to be passed on to the end-users, a suitable approach to estimate the likely distribution of regulation benefits is to evaluate the impact of regulations on the contestability of a market. According to the *European Commission Guidelines for the Assessment of Mergers* (European Commission 2004b) to be sufficiently contestable the entrance of competitors in the market must be likely, timely and sufficient to defeat any potential anti-competitive policies of the incumbent. The *timeliness* depends upon the characteristics and dynamics of the market. *Timeliness* is normally considered a period of at most two years after the incumbent has achieved a dominant market position. *Sufficiency* means that the entry must have a sufficient scope and magnitude to deter anti-competitive behavior. The *likelihood of an entry* is measured inter alia based on the following criteria:

(I) *Barriers to Entry*: This criterion relates to the barriers which prevent that possible entrants enter the market or compete with the incumbent provider on the same level. The higher these barriers are, the less likely is the entrance of new competitors. Possible criteria to evaluate barriers to entry are:

- *Access Rights*: For a market to be contestable, potential entrants have to be legally free to enter and exit the market.
- *Open Standards*: Contestability also requires open and non-proprietary IT standards and communication protocols. *Open standards are defined as a set of rules and specifications that collectively describe the design or operating characteristics of a technology and are published and made available to the technical community* (CompTIA, 2005, p. 21). Criteria for openness are control, completeness, compliance and costs. (I) *Control* requires that the evolution of a system be set in a transparent process open to both the incumbent as well as potential entrants. (II) *Completeness* means that the technical requirements

should be specified in a way that guarantees interoperability. (III) *Compliance* relates to the adoption of standards that allow different interoperable implementations. (IV) The *costs* criterion will be met if the standards can be copied, used and distributed at no charge.

- *Symmetric Information*: A market is contestable, if the entrant has the same information about the way the market works as the incumbent. For having symmetric information, the disclosure of information and the transparency of costs and services are indispensable. Information disclosure means that the incumbent has to disclose all information necessary to evaluate his risk potential and cost structure. *Unbundling of costs* means that the costs of clearing and settling are decomposed according to their origin in the trade processing chain into individual cost components. These components indicate the efficiency of the incumbent provider in performing different functions in the trade processing chain. The unbundling of costs furthermore reveals the cross-subsidisation of different activities in the C+S process.
- *Common Supervisory Framework*: Contestability also requires a common regulatory and supervisory framework. Under the current framework, local supervisory authorities can deny the access of competitors to the local market when they are not convinced that financial stability is guaranteed. To prevent that the incumbent benefits from these policies, a common regulatory and supervisory framework has to be introduced that makes *mutual recognition* between supervisory authorities possible.

(II) *Sunk Costs*: Sunk costs are investments by potential *entrants* that cannot be recovered. Hit-and-run strategies are only profitable for firms when initial investments, which are necessary to operate on the market, can be recovered. The level of contestability hence decreases as the level of sunk costs increases. Sunk costs consist of:

- *Implementation Costs of Providers*: The implementation of parallel network systems to clear and settle transactions poses important costs for competitors and requires pricing above marginal costs in the future in order to recoup initial

losses. Since these costs are significant, competitors often adapt their system to the incumbent C+S system by standardising interfaces. These costs are however still significant and hence pose an important barrier to contestability.

- *Level of Technology:* The level of technology also poses an important barrier to competition, since implementation costs increase with the level of technology of the incumbent system. The entrant has to invest in new technologies in order to automate the processing of transactions. The automation of transactions is used to reduce the level of marginal costs and the risks involved in securities settlement. Investments in the level of technology are hence necessary to be able to compete with the incumbent provider. If this technology changes very fast, the entrant may find that he has committed himself to have spent funds on obsolete technologies and have to invest additional funds in new technologies. The level of sunk costs therefore depends both on the level of technology and the rate of technological change.
  
- *Penetration Pricing:* Given the same level of technology the incumbent firm still has lower marginal costs for clearing and settling due to economies of scale and scope. These effects increase with the size of the market. Hence the entrant has to engage in penetration pricing policies in order to establish his own network that allows him to reduce the level of marginal costs on the level of the incumbent provider. These policies also lead to significant costs that cannot be recovered. These costs further increase if the incumbent company has a *reputation* as a provider of efficient and safe C+S services. The users of the incumbent system are then more willing to pay higher fees for the clearing and settling of transactions and will be harder to convince to change to the entrant. Contestability therefore decreases as *user loyalty* increases. These advantages can only be compensated by further cost reductions or significant improvements of the efficiency and safety of the C+S process. This however necessitates higher investments in the level of technology than the incumbent provider, which further raises the level of sunk costs and thus lowers the likelihood of an entry.

(III) *Switching Costs:* Switching costs are costs that arise if users want to change from the incumbent provider of C+S services to the entrant. The higher these costs,

the more unlikely it is that users execute the switch. The users are then said to be “*locked-in*” to the incumbent. Switching costs can take different forms:

- *Membership Fees*: If the incumbent C+S provider charges a one-off admission fee for becoming member of a C+S system, users of the incumbent system will only switch to an entrant when his charges are significantly lower so that the user can recover the one-off fee within a limited period of time. That can happen either by reducing membership or per transaction fees. Since membership fees are used to finance investments in the technical infrastructure, lower one-off fees significantly reduce the capability of the entrant to invest in new technologies. This however reduces the possibilities of entrants to charge competitive prices and to attract new customers that are necessary for generating economies of scale and scope as well as network effects. The entrant is for this reason forced to charge a lower membership fee than the incumbent. To be able to finance a high level of technical infrastructure investment, the entrant therefore either has to run deficits or to pass on the higher level of fixed costs in the fee per transaction. Since possible entrants are interested in generating profits, the prospect of running deficits reduces the incentive to enter the market. If the entrant instead chooses to increase the level of variable fees, fewer customers switch to the entrant. The consequence is that the number of settlements is not sufficiently high to generate network effects. Annual fees for using the technical infrastructure have the same effect, since they are paid in advance and are not paid back, if a user executes a switch to the entrant. They reduce the incentive for users to switch to a new provider within a year. Membership fees consequently serve as an *exit barrier* and significantly reduce the contestability of a market.
  
- *Implementation Costs of Users*: The implementation of new C+S systems or the adaptation of current systems to the incumbent system cause high sunk costs for firms. Users also incur implementation costs when they have to set up communication links and undertake further measures to be able to use the services of a C+S system that are not included in the fee schedule and services of the incumbent C+S provider. Since these costs prevent users from switching to an entrant, they are regarded as switching costs. These costs increase with the



scale of *network externalities*. A single network system (incumbent network) enables one to settle all transactions within the same system. It thereby increases the utility of all users because no further links have to be established for clearing and settling transactions. Hence high switching costs due to user implementation costs pose another barrier to contestability.

Profound empirical research on the level of sunk costs as well as switching costs in the C+S industry is not available. However, contestability can be promoted if C+S provider apply certain strategies. C+S markets are contestable if potential entrants meet the following conditions (Serifsoy and Weiss, 2003, p. 8):

(I) Potential entrants must provide significantly better services for both intermediary users and end-users. This could be realised by a high level of investment in technologies that ensures a reliable and efficient functioning of the settlement process thereby lowering settlement risks.

(II) Potential entrants must charge lower settlement fees so that intermediary users and end-users benefit from cost savings when executing the switch from the incumbent to the entrant.

(III) Potential entrants must offer new products or services, which have not been supplied before and therefore are not monopolised by an incumbent provider.

The fulfilment of these conditions becomes easier through the harmonisation of platforms by setting uniform standards for IT protocols and communication systems which are open for potential entrants. This is the reason why many market participants regard the introduction of uniform standards as the most important condition besides the right to access for efficient competition between different C+S providers.

## **5.4 Assessment of the Influence of Regulations on the Degree of Contestability**

The theoretical arguments have made clear that the impact of regulations on the distribution of benefits is difficult to measure. *The key parameter for the distribution of regulation benefits is the level of contestability, which is defined as the easiness with which competitors can enter the market, set competitive prices and exit the market.* The higher the degree of contestability is, the more likely it is that benefits of regulations are distributed among all market participants. In this context, a RIA has to address two key points in order to find out the likely impact of regulations on the distribution of regulation benefits. It, first, has to measure the current degree of contestability to get information on the likelihood that regulatory benefits will be passed on to the end-users and, second, it has to assess the impact of regulations on contestability itself.

### **5.4.1 Measuring Current Contestability**

The measurement of current contestability is an important part of analysing the likely distribution of regulation benefits, since the degree of contestability of a market gives information about the likelihood that regulatory benefits will be passed on to the end-users of C+S systems.

In the economic literature, the level of competition is often measured by calculating concentration ratios like the sum of the market share of the largest providers or the *Herfindahl index*. This index measures the degree of concentration of a market based on the sum of squared market shares. Since most local markets for C+S services are dominated by one single provider, these measures would indicate that the level of competition is rather low in the C+S industry. The problem of these measures is however that they do not measure the degree of *competition for the market*, but rather the level of *competition in the market*. Traditional measures to assess the degree of actual competition are thus inappropriate to measure the degree of contestability of the C+S industry. Furthermore it is problematic that an appropriate indicator, that measures the degree of contestability, has not been presented to date. Even the EU competition authority does not measure the contestability of a market by calculating indices that measure the degree of contestability, but rather relies on a

rough assessment of the timeliness, the sufficiency and the likelihood of an entry in their assessment of mergers in the EU.

Due to these limitations, it seems to be reasonable to measure the contestability of a market *indirectly* by analysing the dynamic efficiency of the current providers for C+S services. The idea behind this indicator is that dynamic efficiency is expected to be higher in contestable markets, since the incentives to improve and to innovate are higher when incumbents fear that potential entrants could enter the market. Key parameters that are used to measure dynamic efficiency are (I) the rate of technological innovation and (II) the propensity of institutions to invest and (III) the total sum of investments.

- The *rate of technological innovation* measures the time that is necessary to bring an innovation on the market. *An innovation is defined as the introduction of something new that significantly improves technical products or processes.* One indicator for the rate of technological innovation or the rate of technological change is the number of patents in a given period of time. It is however problematic that not all innovations are patented and all patents do not have the same value. The number of patents is thus believed to be biased. Another measure that is closely related to the number of patents are the expenditures on research and development (R&D) activities. The higher the expenditures, the higher the number of innovations is expected to be in future. A problem with these measures is that they possibly might not be perfectly transferable to measure the rate of innovation in the C+S industry.
  
- The *propensity of institutions to invest* corresponds to the volume of funds providers tend to invest in their technical infrastructure. Since a detailed analysis of the propensity of institutions to invest requires a comprehensive analysis of balance sheet data, it is out of the scope of an impact assessment. Balance sheet data however can be used to give an indication how the C+S providers invested in the past. The *ratio of net-investments over depreciations*, for example, indicates the past investment behaviour of a company. If this ratio is equal to one, the provider conducted only replacement investment in the past. If this ratio is greater than one the provider has conversely done additional investment, while in

case of a ratio that is less than one a company consumes its substance. Regarding investments in technical infrastructure, a ratio of greater than one thus indicates that a provider has invested in new technologies to improve the C+S process, whereas in case of a ratio of less than one the technical infrastructure becomes obsolete. Although this measure only roughly indicates the propensity of a company to invest in its infrastructure, it has the advantage that data is readily available from published balance sheet data.

If these parameters indicate that incumbent providers invest a lot of funds into the research and development of new technologies, the contestability of a market seems to be rather high. Since this indicates the fear of potential entrants, we might infer from that the incumbent passes on much of his static and dynamic cost savings to the end-users of the system.

#### **5.4.2 Measuring the Impact of Regulations on Contestability**

Since regulations themselves influence the degree of contestability, it is consequential to analyse the likelihood that regulatory action will reduce or eliminate barriers to contestability. Hence the focus of this section of a RIA is to estimate the likely impact of regulations on the degree of contestability in the C+S industry. The greater this impact the more likely it is that benefits from further integration and consolidation are passed on to the end-users of the system. The focus of the next part is to give an example for the categorisation of regulations with respect to their impact on contestability into (I) high impact, (II) medium impact and (III) low impact regulatory measures. An example how regulations can be classified into these categories is presented in the following:

(I) *High Impact*: High impact regulations are those which are *indispensable* for a market to be contestable. One example for such regulations is *access rights*, since a market is only contestable if competitors have the right to enter the market of the incumbent. Access rights hence provide legal access. Another example is *uniform and open standards for IT protocols and communication systems*. Open standards are an indispensable condition for technical access to the market of the incumbent.

Examples: Access rights (legal access), uniform and open standards for IT protocols and communication systems (technical access)

(II) *Medium Impact:* Medium impact regulations are an *improving*, but *not* an indispensable condition for a market to be contestable. Regulations which are improving facilitate the entrance of potential competitors to the market of the incumbent. They however are not a sufficient condition for contestability, since even with these regulations a market is not automatically contestable. Examples of these regulations include *disclosure requirements* and the *unbundling of costs and services*. These regulations belong to ex-ante competition policies. They aim at increasing the pricing and cost transparency and make it easier to detect possible abuses of market power and cross-subsidisations. Furthermore they lower information asymmetries between incumbents and potential entrants thereby contributing to higher contestability of the C+S industry. As stated before, to what extent such measures improve the level of contestability is not clear. A further regulation with a medium impact on the degree of contestability is the introduction of a *common regulatory and supervisory framework*. It could be argued that a common supervisory framework is a further condition for contestability, since different regulatory and supervisory frameworks discriminate potential entrants against the incumbent, if the entrant is subject to higher requirements regarding regulation and supervision than the incumbent. Given that Europe has already gained experience with cross-border supervision of C+S providers via multilateral Memorandum of Understanding (MoU), to exchange relevant information between supervisory authorities, it is unclear whether a common supervisory framework would increase contestability to a relevant extent.

Examples: Ex-ante competition policies (disclosure requirements, unbundling of costs and services), common regulatory and supervisory framework

(III) *Low Impact:* Low impact regulations are neither an improving nor an indispensable condition for contestability. Examples for regulations, which might have a low impact on the degree of contestability, regard competition policies (in terms of market structure policies). These policies are applied to prevent that incumbent providers use discriminatory pricing policies to maximise their profits. These policies

are however not adequate in perfectly contestable markets as we have explained above, since monopolists fear that competitors enter the market. In a perfectly contestable market, competition authorities are neither an indispensable nor an improving condition for contestability.

Examples: Ex-post competition policies

## **5.5 Conclusions**

This section has concentrated on the distribution of regulation benefits. The underlying hypothesis was that only in contestable markets dynamic efficiency is warranted and efficiency gains will be shifted to the end users of the system. The first methodology that intends to measure the degree of contestability of a market is a rough assessment of the timeliness, sufficiency and likelihood of an entry. This approach is in accordance with the *EU Guidelines on Mergers and Acquisitions* (2004). Furthermore it is possible to measure the (current) degree of contestability of a market indirectly by analysing the likely effects of contestability on quality improvement and innovation. Since regulations themselves influence the level of contestability, we have presented a categorisation schedule to assess the impact of different regulations on the level of contestability. This categorisation indicates which regulations are necessary to increase the level of competition for and in the market and which likely impose more costs than benefits on market participants. In an actual RIA, this approach should be accompanied by surveys among regulators and market participants.

**Box 3: Methodological Proposal for Measuring the Distribution of Regulation Benefits**

▪ *Measuring the Current Degree of Contestability:*

(I) Assessment of the timeliness, sufficiency and likelihood of an entry. The likelihood is measured based on the following criteria:

- Barriers to entry: e.g., legal access rights, open IT standards, symmetric information, supervisory framework
- Sunk costs: e.g., implementation costs, level of technology
- Switching costs: e.g., membership fees, adaptation costs of users

(II) Measuring contestability based on the expected effect of contestability on dynamic efficiency:

- Rate of technological innovation
- Propensity of institutions to invest

▪ *Measuring the Impact of Regulations on the Degree of Contestability*

- Categorisation of regulations according to their likely impact on the degree of contestability according to their sufficiency and necessity into:
  1. High impact regulations (indispensable)
  2. Medium impact regulations (improving)
  3. Low impact regulations (not necessary)

## 6 Second Round Effects of Regulatory Measures

### 6.1 Introduction

The impact of regulatory measures is not limited to direct transaction cost savings in the C+S process. Further effects on macroeconomic output and growth must also be taken into account. These “*second round effects*” emerge primarily when saved resources are devoted to additional corporate investment, hence broadening and deepening the capital stock of an economy. *However, in the assessment of second round effects it is very important to first separate macroeconomic efficiency gains from pure redistribution of profits.* Efficiency gains and distributional effects are reflected in similar symptoms, i.e. in lower prices of C+S services. However, price reductions that originate from efficiency gains are likely to induce stronger second round effects on GDP than those that merely reflect the erosion of profits of some market participants in favour of others.

- *Primarily distributional effects* can be ascribed to the *static effects* of increased competition, leading to the erosion of market power. Equivalent to this static effect of competition are maximum price regulations which shift profits from intermediary market participants to the end-users of C+S systems. However, this shift does not automatically reduce production costs in a macroeconomic sense, since the overall added value basically remains the same. But even in this case the reallocation of resources likely improves efficiency and might therefore induce positive effects on GDP.
- Stronger second round effects likely originate from efficiency gains that can be traced back to the *dynamic effects* of competition as well as to economies of scale and scope. Increased competition tends to spur organisational and technical progress. Consolidation and integration in the C+S industry are likely to lead to lower average costs per transaction.

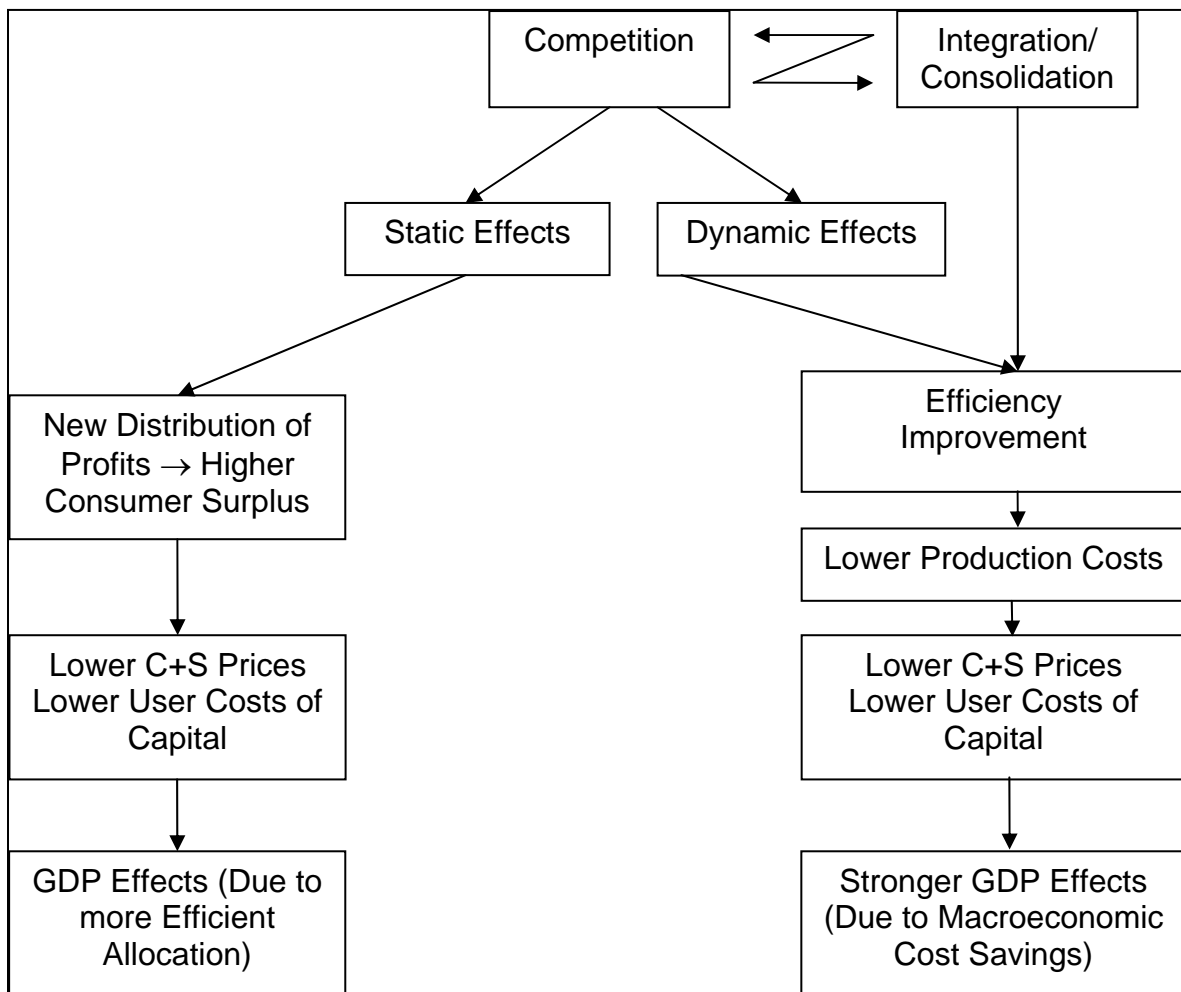
In a theoretical view it is therefore important to identify the origin of expected cost reductions in the practical *ex-ante* assessment of regulatory impacts. Maximum price regulations for intermediary services, as in the telecom industry or electricity providers, would have to be assessed differently in comparison to regulatory



measures enhancing contestability or fostering reorganisation and consolidation of the industry, for example.

In an *ex-post* empirical assessment of the impact of past cost reductions on GDP, it is almost impossible to account for the origin of past cost reductions. However, due to this uncertainty, effects of past transaction cost reductions should not uncritically be extrapolated into the future.

Figure 7: Origin of Price Reductions and GDP Effects



Source: ZEW (2005)

## 6.2 Assessing Second Round Effects on GDP in Practice

In a practical RIA, second round effects would have to be estimated using observations of past developments. The following proposals are based on a

distinction between a *simple* approach and an *elaborate* approach. In the simple approach, the volume of cost savings is calculated and it is assumed that all saved costs will be invested. In other words, gross investment (defined here as the sum of all securities investments including transaction costs) remains the same whereas net investment (the sum of all securities investments excluding transaction costs) increases due to transaction cost savings. This approach does not rely on any assumptions (or empirical estimates) concerning the elasticity of capital supply or capital demand. It simply assumes that the supply of capital is completely inelastic to transaction cost changes and that all resources that are saved through transaction cost reductions would be absorbed immediately by additional investment.

In the elaborate approach, the effects of the *empirical elasticities* of capital demand and supply with respect to capital costs are additionally taken into account. Both approaches presume that transactions cost changes are properly measured and considered, as described in the previous chapters, i.e. that all cost components (explicit cost = fees, commissions, provisions; implicit costs = market impact) are taken into account. Both approaches are explained in greater detail in the following:

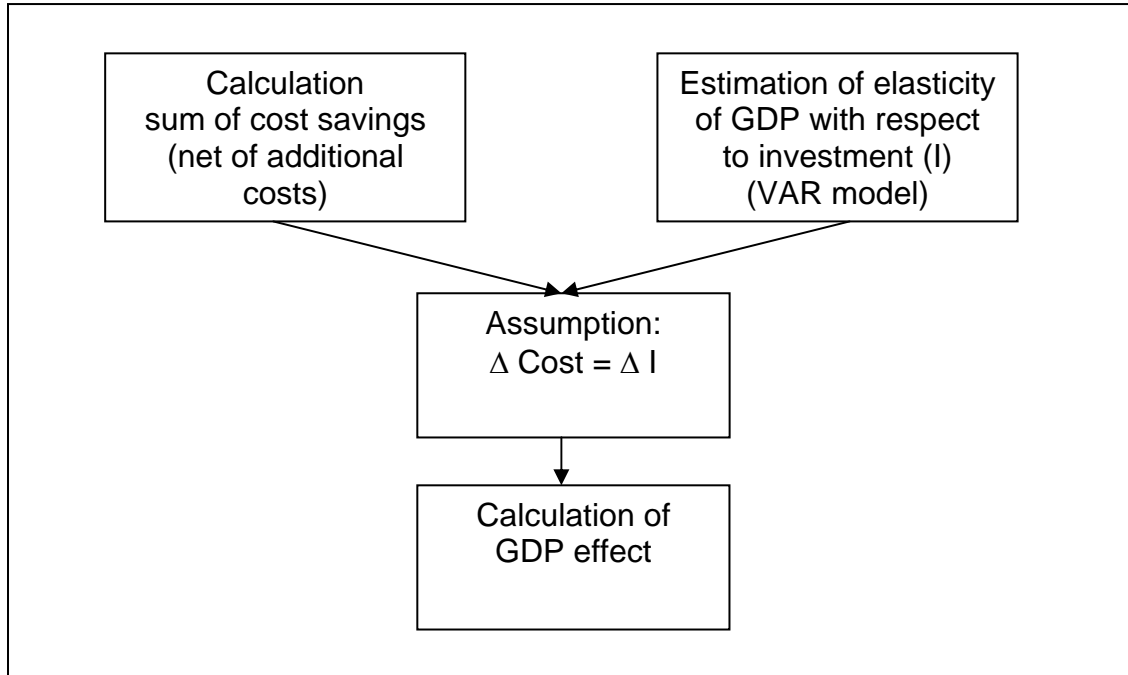
*(I) Simple Approach: Calculating Second Round Effects for a Given Volume of Gross Savings*

The starting point of the assessment of the magnitude of second round effects is the calculation of cost savings for a given volume of securities transactions. This input variable, calculated from the respective cost reductions in cross border and domestic transactions, is the outcome of the benefit calculation described in Section 3 and the cost calculation described in Section 4 of this report.

*Given the assumption that all of these cost savings originate from efficiency gains (i.e. from genuine cost reductions), and that all of these savings will be invested in the capital stock, the second round effects can be calculated by estimating the reaction of GDP to one unit of additional investment. This can be done, for example, with a rather simple econometric *Vector Autoregressive Model* (VAR) which includes GDP and investment as dependent variables. A VAR allows the estimation of an empirically valid multiplier of additional investment on GDP, by calculating cumulative*

responses to initial *impulses* of investment.<sup>10</sup> Cost savings multiplied with this estimated factor gives a rough though fairly optimistic estimate of the second round effects on GDP.

Figure 8: Overview Simple Approach



Source: ZEW (2005)

*(II) Elaborate Approach: Calculating Second Round Effects including Capital Demand and Supply Effects*

The approach discussed above is only a simple heuristic to get a first impression of the magnitude of second round effects. It assumes – inter alia - a constant trading volume, an unchanged capital supply and a frictionless absorption of freed resources by corporate investment.

To get a more realistic picture, the transmission mechanism of transaction cost changes to GDP effects has to be analysed in more detail. The stylised transmission mechanism runs as follows: Typically reduced transaction costs decrease the user costs of capital, because they lead to higher expected returns for a given volume of

<sup>10</sup> Methodically a Cholesky decomposition should be applied that attributes common shocks in the system to investment.

investment. This positive effect on the user costs of capital induces additional investment, leading in turn to positive GDP effects.

Consequently, in the first step the impact of trading cost differences on the user costs of capital (UCC) has to be estimated. This analysis should be carried out on a micro-econometric level, relating company specific costs of capital to transaction costs in trading the company's shares. A suitable database might be the Elkins/McSherry database containing transaction cost data (commissions, fees and market impact) for 208 exchanges in 42 markets and a broad universe of equities, based on trades of institutional investors.<sup>11</sup> While these data do not account for the transaction costs faced by retail investors they might provide an appropriate basis for the costs of (the quantitatively far more important) institutional trading.<sup>12</sup>

These transaction cost data should be regressed on the user costs of capital: In a suitable definition, the user costs of capital are calculated as a price-earnings-ratio, i.e. (in the case of shares) as the ratio of (expected) dividends to share prices (see, e.g. Domowitz, Steil (2002, 318)).<sup>13</sup> The impact can be calculated in a single equation model, including trading costs as explanatory variables, and most likely adding further explanatory variables (e.g., turnover) to account for other potential influences (for previous results see Domowitz, Steil (2002)).

In the *second* step, the influence of UCC changes on GDP has to be assessed. A potential difficulty here is that the UCC are not independent from GDP because expectations on economic growth are often reflected in share prices. Therefore the econometric approach should control for this distorting influence. This can be done e.g., by using a proxy variable for UCC that is less or not endogenous: A capital cost proxy could for example be long term interest rates. A suitable approach would be to estimate the interest rate elasticity of GDP, divided by the share of debt financed

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<sup>11</sup> See [www.elkins-mcsherry.com](http://www.elkins-mcsherry.com)

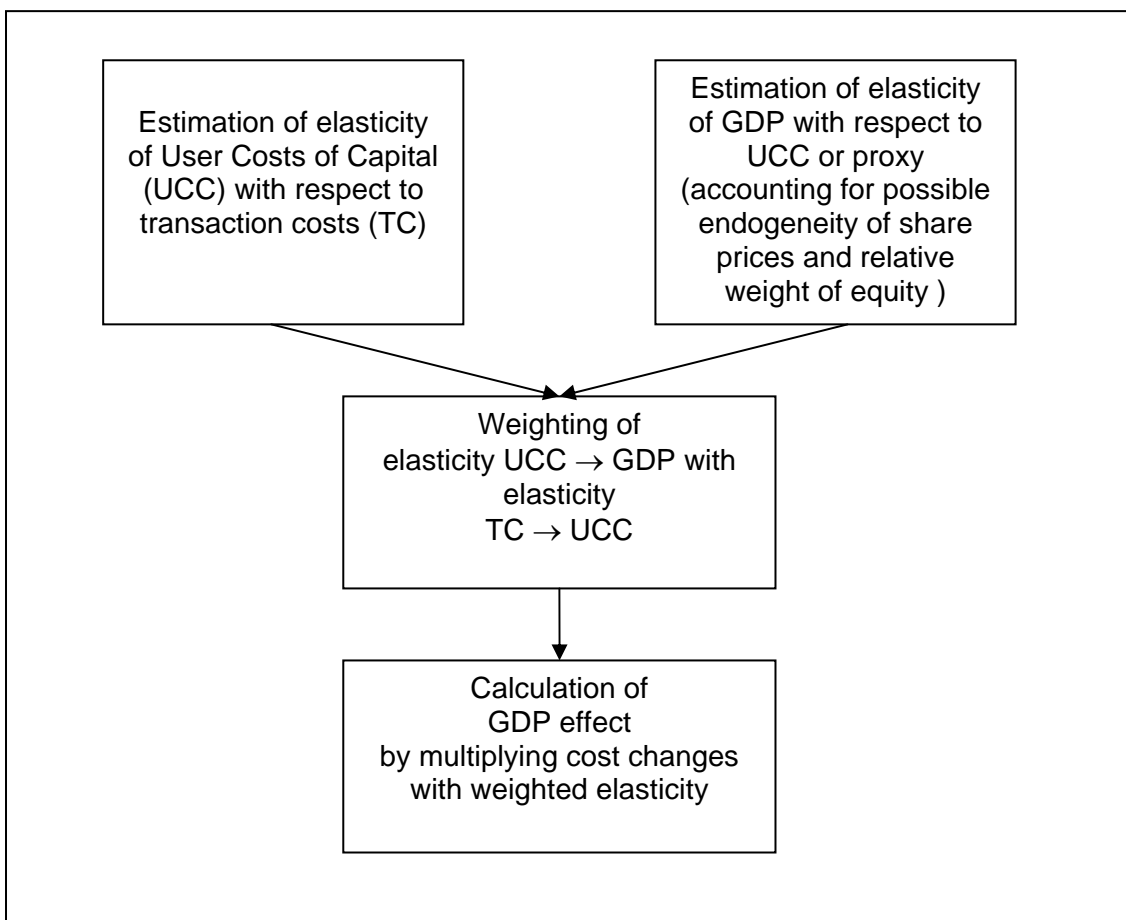
<sup>12</sup> These data have also been used by Domowitz and Steil (2002), for a more detailed description refer to Domowitz/Glen/Madhavan (2001).

<sup>13</sup> Another frequently applied definition (see for example Chatelain et al. (2001), von Kalkreuth (2001)), is the relation of the prices of investment goods to output prices, discounted by opportunity costs of equity which are specified as long term interest rates. This definition seems to be inapplicable in the context of an analysis that is concerned with the impact of transaction costs, because here we should not refer to opportunity costs.

investment, and to apply this elasticity to the change in UCC in our definition, weighted by the share of securities financed investments (annual amount of share and corporate bond issues in relation to total investment).

Finally, the calculated elasticity of GDP with respect to UCC has to be weighted with the elasticity of UCC with respect to transaction cost changes. This weighted elasticity can then be used to calculate the overall impact of transaction cost changes on GDP.

Figure 7: Overview Elaborate Approach



Source: ZEW (2005)

### **6.3 Second Round Effects in a more Differentiated Analysis**

The assessment of second round effects is not necessarily limited to global effects on the level of GDP. In a more refined analysis one might also ask for effects on:

- GDP by type of expenditure and
- different sectors of the economy.

#### *(I) GDP by Type of Expenditure*

The estimation approaches described yield results mainly for the impact of C+S cost reductions on investment and total GDP. The impact on other aggregates of GDP (particularly consumption) should be estimated by using long term elasticities of these aggregates with respect to GDP. This can be done using *Error-Correction-Models*, which account for the short and long run dynamics of co-integrated variables.

#### *(II) Large Companies and Small and Medium Size Companies*

A highly interesting topic is the question whether the impact of lower financing costs will be limited mainly to securities financed companies. Particularly in Germany, mainly bank financed small and medium sized companies (hereafter SME) play an important role and contribute a great share to the overall gross value added. In the first instance a decrease in the costs of clearing and settlement services would lower the costs of capital of securities financed companies and increase the net return of securities investors. However, in competitive markets usually interdependencies between different segments of the capital markets exist: therefore the price development on bank credit markets is not independent from the development of corporate bond markets and even on stock markets. The extent of this dependency is an empirical question, which can be tackled by estimating the correlations and long run relationships (co-integration) between credit market prices (bank loan rates for different products) and costs of securitised capital. A high and positive simultaneous correlation of bank rates with the costs of capital on securities markets would imply that bank financed SMEs indirectly profit from transaction cost reductions in clearing and settlement. A low correlation would indicate that positive effects of lower financing costs are limited to - mainly large – securities financed companies and an

indirect influence is only exerted on the demand side (i.e. through increased demand of large companies for goods and services delivered by SMEs.)

### **6.3.1 Data Requirements**

The analyses described above can be carried out using

- national accounts data on total GDP, investment, consumption, available at OECD, Eurostat, national statistical offices
- dividend yields and share prices/corporate bond yields and bond prices for broad aggregates/broad indices of shares/bonds to calculate costs of capital, provided i.e. by Thomson Financial Datastream, EcoWin, Reuters
- bank loan rates for corporate loans, provided by the ECB
- data on transaction cost saving in C+S (see discussion of top-down/bottom-up approach above)
- data on explicit and implicit transaction costs, as provided by Elkins/McSherry Inc.

**Box 4: Methodological Proposals for the Analysis of Second Round Effects**

- *Simple Approach:*
  - Transaction cost savings = Investment
  - Estimation of empirical multiplier
  
- *Elaborate Approach:*
  - Estimation of elasticity of costs of capital
  - Estimation of GDP elasticity
  
- *GDP components:*
  - Estimation of elasticities with respect to GDP changes
  
- *Incidence on SME:*
  - Estimation of elasticity of bank loan rates with respect to securities costs of capital



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