EUROPEAN CENTRAL BANK
EUROSYSTEM

TARGET2-SECURITIES

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T2S ECONOMIC IMPACT ANALYSIS

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Executive Summary

The methodology for an analysis of the economic impact of TARGET2-Securities (T2S) presented in this note proposes two indicators to evaluate the potential benefits of T2S for market participants and the European economy. The first indicator is the average cost per settlement instruction. The aim of this indicator is to focus on a direct comparison between the cost per settlement instruction with T2S and the current market conditions without T2S. Hence, the indicator is calculated as if T2S was already in operation in 2007.

The second indicator consists of an impact analysis assessing the costs and benefits of T2S for its stakeholders and the social welfare implications of T2S in general. As reality is inevitably more complex than any one single methodology can address, this indicator includes several quantitative approaches. The comparison of the different results should provide a comprehensive overview, enabling an assessment of the potential impact of T2S on market participants and social welfare.

Introduction

On 8 March 2007, the Governing Council of the European Central Bank (ECB) concluded that it is feasible to implement TARGET2-Securities (T2S) and therefore decided to go ahead with the next phase of the project, namely the definition of user requirements based on market contributions. As part of this phase of the project, T2S Project Team at the ECB prepared the proposed economic impact analysis methodology in this document. It has been reviewed, first, by the Advisory Group (AG) created by the Governing Council on 26 April 2007 and, second, by the Eurosystem's Payment and Securities Settlement Committee (PSSC). The AG and the PSSC consider it opportune to release the methodology to the general public for consultation in parallel to the T2S User Requirements Document (URD). The T2S project team will request relevant data from central banks and market participants and apply the methodology, once final, in order to update the initial economic feasibility analysis[1].

The purpose of this note is to define two indicators to evaluate the benefits of T2S:

1) the average cost per settlement instruction (chapter 1);

2) the impact analysis assessing the cost-benefit and the social welfare (chapter 2).

In particular, this document defines in formulae (but not yet in figures) the cost to the Eurosystem in introducing T2S and the additional costs/savings for central securities depositories (CSDs) and for T2S Users[2] because of the introduction of T2S.

An objective of T2S is to promote harmonisation of post-trading in Europe. The URD outlines a considerable degree of harmonisation, but T2S should facilitate further harmonisation in the future.

[1]European Central Bank, TARGET2-Securities – Economic Feasibility, March 2007.

[2] T2S Users include mostly banks (custodian banks, investment banks, …), but also central counterparties (CCPs), for example.

Although it is acknowledged that harmonisation involves some costs, significant net benefits from further harmonisation are expected. At the present, the degree of further harmonisation is unknown. Hence, this study focuses on the change in technical infrastructure caused by the introduction of T2S and does not include the effects of further harmonisation.

1. Average cost per settlement instruction

This chapter sets out a methodology to calculate the average cost per settlement instruction. The total cost of settlement instructions that will be ultimately recovered by the CSDs include the T2S costs (C_{T2S}) and additional costs incurred by the CSDs (C_{CSD}). In order to facilitate a comparison with current settlement solutions, the methodology converts these costs into an average cost per settlement instruction (AvC_{total}) (the average T2S costs per settlement instruction (AvC_{T2S}) plus the additional average costs incurred by the CSDs per settlement instruction (AvC_{CSD})) by dividing the total costs by the number of settlement instructions N:

$$AvC_{total} = \frac{C_{T2S} + C_{CSD}}{N} = AvC_{T2S} + AvC_{CSD} \quad (1)$$

Full cost recovery is a principle of T2S. Therefore, the average T2S cost per settlement instruction is also an estimate of the average fee charged by T2S.[3]

Section 1.1 discusses the calculation of N, section 1.2 defines formulae for the estimation of C_{T2S} and section 1.3 describes the methodology for the estimation of C_{CSD}.

1.1 Estimated volume of settlement instructions

One purpose of the analysis is to provide a direct comparison between the cost per settlement instruction with T2S and the current market conditions without T2S. Therefore, the total average cost per settlement instruction is calculated **as if T2S had started to operate on 1 January 2007** rather than in 2013 as planned. In other words, the calculation uses the number of instructions recorded in 2007 instead of an estimate for 2013 where the number of instructions is assumed greater.

The market may evolve and volumes may increase (e.g. more trading activity) or decrease (e.g. an increase in internalisation of settlement at the level of custodian banks). Such evolutions would affect the market independently of the introduction of T2S and do not affect the business case of T2S as they do not affect the relative prices for settlement with/without T2S. For this reason, they are not taken into account in this analysis. Therefore, for the purpose of simplification, this chapter takes current market conditions as a benchmark. As a result, this analysis aims at comparing the fees charged today by the CSDs, and the settlement costs that would be charged to the market if T2S existed today. It does not aim at anticipating

[3] The actual fee schedule of T2S will be discussed at a later stage. All income for T2S is assumed in this paper to come from settlement (DVP and FOP).

the fees that T2S will charge the CSDs in the future.

T2S will settle instructions generated from trading, transfers and collateral activities. Some markets do not represent volumes as settlement instructions, but as settlement transactions. The latter refers to the simultaneous exchange of assets between deliverers and receivers, while the former refers to the settlement of the unilateral instruction sent by one of the parties. The determination of the number of settlement instructions requires the multiplication of the number of settlement transactions by two.

In addition, T2S will receive settlement instructions resulting from corporate events (e.g. spin-offs stock splits and conversions). The underlying assumption is that this number is negligible except for the direct holding markets. This volume is not included in this analysis in order to remain conservative.

Since the analysis is conducted as if T2S had started to operate in 2007, the calculations are based on the volumes for 2006 as documented in the ECB Blue Book 2007. These figures will be adjusted for 2007, based on direct input from some CSDs.

An objective of T2S is to create a platform, open to all users in the euro area (and beyond) if they choose to. The basic assumption of this study is that all CSDs settling in euro in the euro area will have an interest to participate in T2S and, therefore, the aggregated volume of all CSDs settling in euro in the euro area is the underlying figure for the analysis. However, it may be possible that T2S will not reach a market share of 100% for several reasons. For example, some CSDs in the euro area may decide not to participate.[4] Therefore, the study provides a sensitivity analysis with calculations of AvC_{total} for different volume scenarios (90%, 80%…market share).[5]

T2S will provide for the possibility to settle non-euro transactions if non-euro markets have a business interest to do so and if the relevant central bank accepts to outsource its cash accounts to the single platform, TARGET2. However, the analysis does not take into account the volume of non-euro settlement instructions in T2S in order to remain conservative.

1.2 T2S costs

This section applies a top-down approach to describe the cost items that determine the total T2S costs. The four national central banks (3CB+) that will develop the system will provide the initial estimates of the figures for their respective items and the T2S Project Team will provide estimates for any additional resources.

1.2.1 Project duration and amortisation period

The TARGET and TARGET2 projects both took approximately five years to deliver and provide a basis

[4] In case a CSD decides not to participate, the loss of customers for T2S will probably be lower than the market share of this CSD because the customers of that CSD may decide to participate anyway to T2S, using other channels.

[5] Note that different volumes may not only affect N, but also the costs C_{T2S} and C_{CSD} (for example, lower volume would require less IT capacity). However, as a conservative assumption, this point is not taken into account.

for comparison estimating the duration of the T2S project. The delivery of T2S is expected to take six years due to the additional technical complexity and a more demanding consultation process (given the higher number of entities involved in its governance). The amortisation period for T2S and other investment costs is also set at six years[6], which is comparable to the period used for TARGET2. This results in a reference period for the development phase between April 2007 and April 2013; and for the maintenance and running phase from April 2013 to April 2019. For notational simplicity, this analysis will refer to the development phase as the six years from 2007 to 2012 and to the maintenance and running phase as the six years from 2013 to 2018 in this document.

1.2.2 Calculation of T2S costs

The methodology will treat T2S as an asset purchased from the 3CB+, who will provide cost estimates based on the URD. For the purpose of this analysis, it is assumed that T2S is not subject to any taxes (VAT etc.). In line with other Eurosystem infrastructure projects, the study excludes costs for the governance of the T2S project.

In order to enable a direct comparison of T2S with current market conditions without T2S, the total costs are converted into annualised costs for 2007 ($AnC_{T2S,2007}$) as a first step. Subsection 1.2.3 specifies the annualised T2S investment costs for 2007, while subsection 1.2.4 defines the annual T2S running costs for 2007.

$$AnC_{T2S,2007} = \text{Annualised T2S Investment Costs}_{2007} + \text{Annual T2S Running Costs}_{2007} \quad (2)$$

1.2.3 Annualised T2S investment costs (=annual depreciation of the investment)

The costs of implementing T2S are the compounded annual cost of developing T2S by the 3CB+. The following Table 1 provides an overview of the costs to be included in the total investment:

Table 1: Overview of T2S investment costs during development phase

Personnel costs	Other direct related costs and allocated costs	Overhead	Dedicated project investments
Staff cost including consultants	Allocated costs for use of common/dedicated infrastructure (offices, IT, Telecom etc), business travels and other direct costs	Legal, technical and analytical documentation and other overheads	Hardware and Software investment including all costs necessary for the back up and recovery functions

The sum of the cost items, listed in Table 1, documents the T2S investment costs for the respective year.

[6] European Commission, Guide to Cost-Benefit Analysis of Investment Projects, DG Regional Policy, 2002.

This analysis assumes an annual cost of capital of six per cent for all T2S investment costs. The study will provide a sensitivity analysis of the results with respect to different values for the cost of capital. All investment costs are multiplied with the appropriate capital cost factor[7] and then the total investment costs are spread linearly over the amortisation period of six years in order to estimate the annual depreciation. According to the following formula, this results in the annualised costs, where *t* refers to the respective year when the cash flow occurs:

$$\text{Annualised T2S Investment Costs}_{2007} = \frac{1}{6} \cdot \left(\sum_{t=2007}^{2012} \frac{\text{T2S Investment Costs}_t}{(1+0.06)^{t-2007-6}} \right) \quad (3)$$

The template presented in Table 2 illustrates the total cost of investment. The study will provide figures for each box, labelled with an "x", further in the document.

Table 2: Template for the cash flows of T2S investment costs

year	2007	2008	2009	2010	2011	2012	
T2S investment costs cash flow	x	x	x	x	x	x	
Capital cost factor	1.419	1.338	1.262	1.191	1.124	1.060	Total investment costs:
Investment cost	x	x	x	x	x	x	x
							Annualised investment costs:
							x

1.2.4 T2S Running Costs

The recurring annual costs to operate and maintain T2S consist of fixed costs and variable costs, where the latter depend on the volume of settlement instructions in T2S. The annual running costs for T2S during the maintenance and running phase are summarised in Table 3:

Table 3: Overview of T2S running costs during maintenance and running phase

Personnel costs	Other direct related costs and allocated costs	Overhead	Maintenance of project investments
Staff cost including consultants	Cost of IT operations and business operations (see text for details)		Maintenance of hardware and software investment i.e. expenses for corrective measures, upgrading supported functions, etc

[7] For example, an investment that will take place in 2009, i.e. four years prior to the expected start of operation in 2013, is multiplied with $(1.06)^4$=1.262.

The personnel costs include costs for the account managers and business experts. To the extent that they are not already included in personnel costs, the cost of IT Operations include:

a) Running costs according to Service Level Agreement with 3CB+;

b) Eurosystem Technical Help Desk (for at least CSDs);

c) Communication (All messages between T2S and CSDs that are part of the integrated settlement process will be included[8]. Messages between the directly connected T2S Users and T2S as well as messages between indirectly connected T2S Users and their respective CSD will not be included, in line with current market practices).

The cost of business operations include:

a) Allocated costs for infrastructure (offices, IT, telecom, etc);

b) Other direct costs (travel expenses, etc.)

The development of additional functionalities in the future is not included in the maintenance of project investments since these are not foreseeable today.

The running costs are calculated for 2007 for the entire year as if T2S had started to operate on 1 January 2007.

1.2.5 Average T2S cost per settlement instruction

The final step for a direct cost comparison of T2S with current market conditions without T2S consists of the calculation of the average T2S cost per settlement instruction (AvC_{T2S}) based on the full cost recovery principle that underlies T2S. The calculation of AvC_{T2S} for 2007 is:

$$AvC_{T2S,2007} = \frac{AnC_{T2S,2007}}{N_{2007}}. \quad (4)$$

If the settlement volume remained flat in the future, the average T2S cost per settlement instruction would have to increase in the future, as running costs should increase with inflation. However, since volume should increase by more than the running costs[9], the average T2S cost per settlement instructions in future years should be lower than $AvC_{T2S,2007}$.

1.3 Additional CSD costs

In analogy with the T2S costs in the previous section, the analysis follows a top-down approach to

[8] These may not be very volume sensitive since they will be likely to be carried via dedicated channels.

[9] Recent volume growth in settlement instructions in the euro area has exceeded 10% per annum.

tabulate the additional costs to CSDs that they have to recover from their Users for settlement. All euro-area CSDs, settling in euro, shall provide the figures for the respective items, which the T2S Project Team will aggregate to ensure confidentiality of each CSD's data.

1.3.1 Calculation of additional CSD costs

The cost components do not include any add-ons for national specificities, which would be charged additionally. Furthermore, this analysis does not take into account the costs or the benefits from further harmonisation that go beyond the level achieved in the URD. It focuses solely on T2S and the necessary components to make the system operational.

In order to enable a direct comparison of the additional costs of CSDs with current market conditions without T2S, the analysis converts their total additional costs into annualised additional costs for 2007 ($AnC_{CSD,2007}$) as the first step. Subsection 1.3.2 specifies the annualised CSD additional investment costs for 2007, while subsection 1.3.3 defines the CSD running costs for 2007.

$$AnC_{CSD,2007} = \text{Annualised CSD Investment Costs}_{2007} + \text{Annual CSD Running Costs}_{2007} \quad (5)$$

1.3.2 Annualised additional CSD investment costs

The additional investment costs for CSDs are composed of two elements: investment costs for achieving interoperability with T2S and non-recovered past investments.

The investment costs of CSDs for achieving interoperability with T2S are[10]:

1) Adaptation costs for software, documentation, contracts and operations (estimated in full time equivalents (FTE) and in EUR);
    a) Analysis
    b) Development
    c) Testing
    d) Production of documentation and contracts
2) T2S training for own staff[11] (estimated in FTE and EUR);
3) T2S migration for CSD only (estimated in FTE and EUR).

As in the previous section, the analysis assumes an annual cost of capital of six per cent for the additional CSD investment costs.

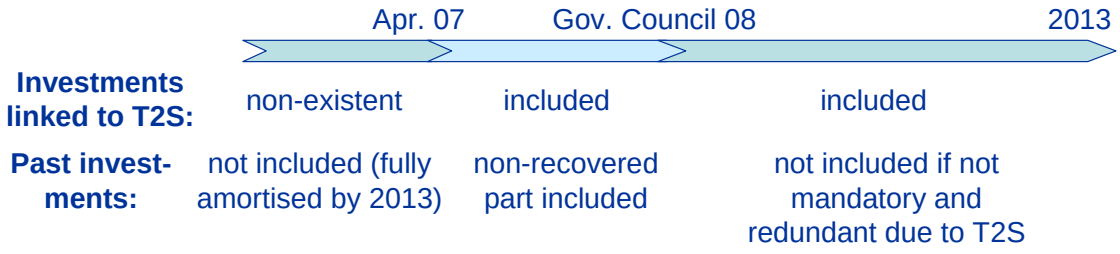
Since the analysis assumes a six-year amortisation period for investments and that the system will open

[10] CSDs might need to set up message converters for indirectly connected T2S Users. In that case, there will be two different results for additional investment costs of CSDs, one for directly connected T2S Users and one for indirectly connected T2S Users, because these costs will only be charged to indirectly connected T2S Users.

[11] CSDs are expected to assume they recover client training costs by charging, so that a consistent approach is taken across all CSDs and T2S Users to this cost element.

six years after the decision of the Governing Council in April 2007, all investment costs spent before April 2007 are deemed recoverable before the system opens and are not counted. The analysis deems investments decided after mid 2008 and not necessary for settlement in T2S as unrelated to T2S. The methodology will include unrecovered investments by CSDs in mandatory legal and regulatory requirements that are attributable to settlement. Besides, the only past investments to be considered are the non-recovered part of the investments which were / will be decided between April 2007 and June 2008. In case these investments are to serve several types of transactions (e.g. commercial bank money or non-euro currencies) or services (e.g. asset servicing, custody), a pro-rata based for example on transaction volumes will be made. Figure 1 summarises the treatment of CSD investment costs.

Figure 1: Treatment of CSD investment costs



All investment costs are multiplied by the appropriate capital cost factor as in section 1.2.3. The total investment costs are allocated linearly over the amortisation period of six years. According to the following formula, this results in the annualised costs, where *t* refers to the respective year when the cash flow occurs:

$$\text{Annualised CSD Investment Costs}_{2007} = \frac{1}{6} \cdot \left(\sum_{t=2007}^{2012} \frac{\text{CSD Investment Costs}_t}{(1+0.06)^{t-2007-6}} \right) \quad (6)$$

Table 4 presents a template to illustrate the additional CSD investment costs:

Table 4: Template for the cash flows of additional CSD investment costs for linking to T2S:

year	2007	2008	2009	2010	2011	2012	
Additional CSD investment costs							
1) Adaptation costs	x	x	x	x	x	x	
2) T2S training costs	x	x	x	x	x	x	
3) T2S migration costs	x	x	x	x	x	x	
4) Past investment costs	x	x					
Total cash flow	x	x	x	x	x	x	
Capital cost factor	1.419	1.338	1.262	1.191	1.124	1.060	Total investment costs:
Investment cost	x	x	x	x	x	x	x
							Annualised investment costs:
							x

Matching is an essential part of settlement and its costs are included in the T2S costs of section 1.2.

Additional matching at CSD level is an additional service outside the scope of the T2S core service and such services are not included in the economic impact analysis.

1.3.3 CSD running costs

CSD running costs include the:

- costs for monitoring settlement in T2S;
- regular maintenance of the investment costs, excluding new functionalities;
- CSD helpdesk functions with their customers (evaluated in FTE and EUR).

The details of the separation of tasks between the CSD helpdesks and the T2S helpdesk will be decided in the future. For the purpose of this analysis, it is assumed that the helpdesk remains the responsibility of CSDs. CSDs need to ensure in their cost estimates that they include only the costs for their helpdesk that are attributable to core settlement services and exclude the costs associated with other services (corporate actions, etc.).

1.3.4 Average additional CSD cost per settlement instruction

To provide a figure that is comparable to the T2S average cost per settlement instruction AvC_{T2S}, the annualised additional CSD costs for 2007 are converted into an average CSD cost per settlement instruction (AvC_{CSD}) according to the following formula:

$$AvC_{CSD,2007} = \frac{AnC_{CSD,2007}}{N_{2007}}. \quad (7)$$

Since the running costs and possibly the investment costs of CSDs will differ for directly and indirectly connected T2S Users (see section 1.3.2 and 1.3.3), the analysis contains two values for $AvC_{CSD,2007}$: one for directly connected T2S Users and one for indirectly connected ones.

1.4 Total average costs per settlement instruction

The total average cost per settlement instruction (AvC_{total}) that CSDs will ultimately recover has two values. The first value is the average T2S cost per settlement instruction (AvC_{T2S}), and the second value is one of the two additional average cost values incurred by the CSDs (AvC_{CSD}), depending on the chosen connectivity mode of T2S Users.

$$AvC_{total} = AvC_{T2S,2007} + AvC_{CSD,2007}. \quad (8)$$

These total costs cover the entire Delivery-versus-Payment (DvP) settlement process, including the cash settlement.

2. Impact analysis

Different methodologies have measured the impact of the integration of the European post-trading market infrastructure on market participants and social welfare[12]. These methodologies differ both in the set of underlying assumptions, and in the scope of the securities, geographical markets and parts of the value chain covered. This chapter reflects the consensus of the T2S Advisory Group that the cost-benefit and the social welfare analysis should include several quantitative approaches since reality is inevitably more complex than any one single methodology currently addresses. The comparison of the different results will provide a comprehensive overview for assessing the potential impact of T2S on market participants and social welfare.

Section 2.1 describes a disaggregated approach that aims at looking at the costs and benefits for each market participant/stakeholder separately. Section 2.2 uses two existing studies to extrapolate the cost impact of T2S. All these quantitative methodologies focus on cost savings. T2S, however, will not only bring cost savings, but will also offer a number of new opportunities to market participants. Since these are very difficult to quantify, section 2.3 first details the non-quantifiable benefits of T2S. The second section refers to a methodology developed by the European Commission to estimate the total benefits of the system. While this methodology may be less precise, it in principle includes certain dynamic welfare effects of T2S missing in the other estimates.

2.1 Cost-benefit analysis

One approach to calculating the overall impact of T2S on the economy is to look at the costs and benefits for each market participant/stakeholder separately and sum the net impacts. These stakeholders include the Eurosystem, CSDs, T2S Users (various types of intermediaries), issuers and investors.

2.1.1 Impact on the Eurosystem

As the Eurosystem will operate T2S on a cost-recovery basis, the direct impact for the Eurosystem will be neutral. There are, however, a number of indirect benefits. These include

- an increase in back-office efficiency, as the management of Eurosystem credit operations collateral will be facilitated by simpler interactions with the market infrastructure (e.g. single settlement interface);
- better accessibility to cross-border collateral;
- and reduced systemic risk, owing to extended use of Real-Time Gross Settlement for DvP transactions.

This methodology does not quantitatively consider these aspects. Nevertheless, they increase the desirability of the project.

[12] See e.g. European Commission, Draft Working Document on Post-Trading Activities, May 2006, and the references in Annex I therein.

However, on the negative side, this project involves non-quantifiable risks for the Eurosystem. These include the financial risk that the Eurosystem is taking in its commitment to cost-recovery, and the potential risk to reputation, e.g. in the case of a substantial delay of the project or a major operational problem in production.

Furthermore, some of the cash transactions, currently processed on TARGET2, may move to T2S. The T2S Project Team will investigate the potential impact of this behaviour change of market participants.

Overall and in the absence of a quantification of the benefits and risks, this analysis assumes that T2S is neutral for the Eurosystem.

2.1.2 Impact on CSDs

Section 1.3 compiles the additional costs for CSDs that they will recover from T2S Users. The assumption is that CSDs will transfer the benefits of T2S to the T2S Users. As a result, the analysis assumes that the costs and benefits are neutral for the CSDs to avoid double counting.

2.1.3 Impact on T2S Users

Savings for T2S Users due to T2S

The methodology groups the benefits for intermediaries into three categories.

1) Transaction costs savings - the difference between the average fee charged by settlement service providers (CSDs or custodian banks) for core settlement services today and the average T2S fee[13] as calculated in chapter 1 of this note.

2) Collateral savings - T2S will overcome market fragmentation and create a single pool of assets and T2S Users will be able to centralise liquidity in a single central bank cash account. These features will benefit T2S Users in managing collateral, optimising their funding costs and avoiding failed deliveries.

3) Net back-office savings - in a single process for settlement, intermediaries will no longer need to maintain many different settlement interfaces with several CSDs and/or other intermediaries for settlement purposes.

Revenues from additional/new services, stemming from new business opportunities, are not included.

Additional costs for T2S Users due to T2S

The methodology assumes that the additional investment costs for T2S Users may vary, depending on whether they are directly or indirectly connected T2S Users. For example, the changes in settlement procedure may affect T2S Users in both cases, but indirectly connected T2S Users may require fewer changes, because they will continue to use the existing interface to their CSD.

[13] The average T2S fee is equal to the average T2S cost per settlement instruction due to the full cost recovery principle.

If T2S Users face additional investment costs, the amortisation period of six years will also apply for them. Additional investment costs, in particular for directly connected T2S Users during the development phase of T2S include:

1) Adaptation (investment) costs (e.g. restructuring costs, interface converters) (estimated in FTE and EUR);
   a) Analysis
   b) Development
   c) Testing
2) T2S training costs (estimated in FTE and EUR);
3) T2S migration (estimated in FTE and EUR).

The methodology considers messaging costs between T2S Users and T2S (directly connected) / CSDs (indirectly connected) equivalent to current costs and, therefore, does not include them.[14]

Costs for additional/new services, stemming from new business opportunities, are not included.

The methodology will require T2S Users to evaluate both their savings and their costs based on their likely business strategy regarding T2S (e.g. the choice of their connectivity mode, etc).

Data collection and aggregation of survey results

During the meeting of the AG in October 2007, it became evident that it would be difficult to evaluate these costs and benefits on a macro level because of the various business models of the institutions. Therefore, the T2S Project Team proposes to ask directly the most active Users [in particular those who participate in the AG and in the TGs ("active group")] to evaluate these costs and benefits independently.

The NCBs will also interview a sample of less active banks across the euro area ("less active group") in order to complement the study. The methodology will extrapolate the impact on the "less active group" from the results of the sample.

The T2S Project Team will then calculate the total impact of T2S on T2S Users as the sum of 1) the individual impacts on all active institutions, 2) and the estimated impact on institutions not included in the active group.

This method will ensure that an overrepresentation of multi-country institutions in the sample will not bias the result of the T2S impact on T2S Users.

2.1.4 Impact on other stakeholders

The methodology only calculates the costs and benefits of CSDs and T2S Users for practical reasons. Therefore, it is clear, that the disaggregated approach minimises the benefits of T2S for society because it

[14] Communication between T2S and CSDs for indirectly connected T2S Users is included in the average cost per settlement instruction in chapter 1.

compiles only the measurable and identifiable figures. This approach does not consider the quantitative impacts on other stakeholders, such as issuers and investors, and the indirect (dynamic) effects (but are part of the social welfare analysis in section 2.3).

In terms of qualitative analysis, the enlarged market will be the primary benefit of T2S for issuers. T2S creates the possibility to turn current domestic issuance into euro area issuance at potentially no additional cost, while remaining under local legal and tax regimes.

For pan-European issues, T2S will greatly facilitate the settlement of the primary market, which essentially will become domestic in T2S. T2S will increase attractiveness of local debt instruments, as more investors will be able to access them easily at a reduced cost. In particular, their use in general collateral operations could create better pricing.

Over time, this may lead to a reduction of the current valuation gap between securities in the US Dollar and the euro markets. The dynamic aggregate analysis, proposed in section 2.3, provides a methodology to quantify these effects.

The benefits from T2S will differ in scale among the categories of investors. T2S will primarily facilitate easier access to non-local securities for retail investors, an under-developed market segment today owing to the prohibitive cost and high complexity of cross-border settlement. Economic theory suggests gains from portfolio diversification. However, the impact from cheaper domestic settlement might be small (but worthwhile) as the cost of settlement infrastructure is a small component of the cost of a retail transaction.

T2S generates benefits both for domestic and for non-local securities for institutional investors. As for retail, it is assumed that savings at the settlement infrastructure level will be passed on to the final investor, given a sufficient degree of competition at all levels.

2.2 Extrapolation from existing studies on the cost of European post-trading market fragmentation

2.2.1 The Clearstream approach

Clearstream[15] estimates the 'total incremental costs of cross-border equity cash trading and cross-border holdings in Europe [defined as EU-15]' relative to domestic trading to be EUR 4.3bn, of which EUR 2bn refer to post-trading activities. From this, Clearstream estimates higher cross-border CSD and settlement agent costs relative to domestic costs to be EUR 1bn in 2001; the remaining EUR 1bn is attributable to higher custody costs. According to Clearstream, harmonisation of market practices and consolidation could eliminate 50% of the EUR 1bn extra settlement costs. The public sector in the EU could contribute a further 30% by harmonising different legal and tax systems and regulatory environments, whereas 20% reflected other non-changeable costs, such as different languages and home bias in investment decisions.

A closer look at Clearstream's methodology reveals that it focuses on direct transaction costs for cross-

[15] Clearstream International, Cross-Border Equity Trading, Clearing & Settlement in Europe, White Paper, 2002.

border trades. Hence, it seems to exclude other additional cross-border costs such as potential cost savings from pooling of collateral. Bonds are also not included.

In order to move from the Clearstream figure of EUR 500m, attributable to the harmonisation of market practices and consolidation, to the impact of T2S, the analysis will take into account:

- A geographical factor to account for settlement in euro in the euro area rather than to cover the EU-15;
- An adjustment factor for the integration already achieved since 2001[16];
- A scope factor to include bonds;
- Additional benefits from section 2.1 not covered in the Clearstream study (the collateral impact).

2.2.2 The Euroclear approach

Euroclear has published several estimates of the potential savings from the integration of the European post-trading market infrastructure in recent years. The first Euroclear estimate in 2003 of the excess costs of European market fragmentation amounted to EUR 5bn per year.[17] Euroclear clarified in the AG meeting on 23-24 October 2007 that it calculated this figure after a very broad assessment of the extra costs of cross-border trading, clearing, settlement and custody for equities and bonds.

Later, Euroclear published potential annual savings of EUR 300m from the implementation of their Single Platform in its five domestic markets (Belgium, France, Ireland, Netherlands, UK) and the international market covered by Euroclear Bank. This figure would rise to EUR 700-800m if the Single Platform would expand across Europe.[18] The estimated savings, focusing on equities, consist of transaction cost and back-office savings for Euroclear clients as well as Euroclear's internal savings. It does not include liquidity and collateral savings. The Euroclear results cover a broader scope than T2S in terms of the value chain since they include not only settlement but also corporate actions and safekeeping. T2S Project Team discussions with Euroclear show that about one third of these savings is attributable to settlement. In order to move from the Euroclear figure of EUR 700-800m to the impact of T2S, the analysis will to take into account:

- A geographical factor to account for settlement in euro in the euro area rather than to cover 'Europe' as defined by Euroclear;
- an adjustment factor for benefits already achieved by Euroclear in the euro-area;

[16] This factor recognises that some improvements since 2001 have already been made. The AG requested this factor to be mentioned. The ECB welcomes ideas on how to evaluate it.

[17] Euroclear, Delivering low-cost cross-border settlement, January. 2003, p. 7.

[18] See, e.g., Euroclear, The view from the CEO of Euroclear, Apr. 2006, p. 3.

- an adjustment factor to include bonds;
- a scope factor to adjust for the smaller coverage of the value chain by T2S;
- and additional benefits from section 2.1 that are not covered in the Euroclear study (the collateral impact).

2.3 Social welfare - Dynamic effects of T2S

All quantitative methodologies in this chapter have in common that they focus on cost savings. T2S, however, will not only bring cost savings, but will also offer a number of new opportunities to market participants. Since these are very difficult to quantify, this section provides first a qualitative description of the direction and the ambition of the T2S project.

Overview of the economic benefits of T2S

Designing a common settlement platform is in itself a driver in promoting harmonisation. The impact of T2S on harmonisation is already being felt, building on valuable work by CSDs. For example, T2S will lead to greater cost transparency with respect to national specificities and may thus induce a reduction in divergences of practices across market segments. It will also further increase the pressure for speedy action to harmonise practices (especially in relation to corporate actions), taxes, law and regulation.

As noted in the previous sections, the adoption of borderless T2S will reduce pure settlement costs – particularly for what are today cross-border trades. In turn, this shift to borderless markets will deliver significant benefits to end-users, especially in smaller countries. Issuers will have access to more liquid markets for fund-raising without the need to consider issuing in other countries; and investors will be able to benefit from portfolio diversification at lower cost. These benefits will require little or no adjustment by intermediaries, specifically on the capital raising side.

T2S will also create a single pool of assets – substantially all the securities held by participating CSDs – exchangeable for each other via central bank money at low cost, in real-time, and in an extremely reliable settlement system. Market participants will also be able to centralise liquidity in a single central bank cash account. Together, these features will create valuable new options for commercial and investment banks in managing collateral, optimising their funding costs and avoiding settlement fails. The gains will include the benefits of enhanced competition among third party collateral managers and liquidity providers, since such services will be more capable of being unbundled from custody provision. The reduction in costs, from indications given by market participants, is likely to be very substantial. This will feed through to reduced trading spreads and lower service prices, thus improving welfare.

There will be other effects on, and gains through, enhanced competition, inter alia in the areas of custody and securities trading. Cheaper trading might imply an increase in trading volume and thus more liquid markets, resulting in lower spreads. T2S will also contribute – in addition to other initiatives such as the Code of Conduct – to fostering competition between CSDs that so far operate largely in national

monopolies.

These short-, medium- and long-term economic benefits have to be compared with the initial investment costs associated with the building of the T2S platform.

The EU Commission's approach

The European Commission[19] has tried to quantify parts of these dynamic effects. The Commission estimated that the complete integration of the European post-trading market infrastructure could result in a potential annual cost reduction of EUR 2bn - 5bn, and thus create an increase in GDP of 0.2-0.6% during the subsequent 10 years. T2S is a step towards complete integration: the question is therefore how much it could contribute to this total.

The Commission study proceeds in three major steps:

1. Estimation of the excess cost of cross-border post-trading in EU (static cost of fragmented market);
2. Transfer of transaction cost reduction into an estimate of capital cost reduction;
3. Transfer of capital cost reduction into an estimate of the welfare effect, measured as a GDP increase.

Hence, the underlying assumption of the methodology is that a reduction in transaction cost serves as the driving force for the positive welfare impact of market integration. The European Commission uses the results of the Clearstream and Euroclear studies described above for the first step of their analysis. The second and third steps represent a method for quantifying the dynamic welfare effects of market integration. Their basis is the empirical estimations of: 1) elasticities of cost of capital to trading turnover and transaction costs and; 2) the elasticity of capital stock to the cost of capital. Moreover, a standard production function is used to estimate the GDP impact of changes in capital costs.

As T2S has a different scope from the one assumed in the original Clearstream and Euroclear studies, the cost impact of T2S as estimated in the previous sections also differs. Nevertheless, it is possible to follow the second and third steps of the methodology to quantify the dynamic welfare effects of T2S under the assumption that sufficient competition at all levels of the value chain will cause a pass-through of net savings towards investors and issuers.

In the second step, the Commission computes the relative change of trading turnover, which is the product of the change in trading costs and their estimated elasticity of turnover to trading costs. It then computes the change in the cost of capital as the sum of the product of the change in trading costs and the estimated elasticity of the cost of capital with respect to trading costs and the product of the change in trading turnover and the estimated elasticity of the cost of capital with respect to a change in trading

[19] European Commission, Draft Working Document on Post-Trading Activities, May 2006. This document builds on a previous study by London Economics, Quantification of the Macro-Economic Impact of Integration of EU Financial Markets, Final Report to the EU Commission, 2002.

turnover.

In the third step, the Commission transfers the change in the cost of capital into an estimated change of the capital stock, based on a simple production function with capital and labour as inputs. Based on the empirical shares of capital as an input factor in the economy and of the relevant financing sources, the Commission finally transfers the change in the capital stock into an estimate of the GDP effect of market harmonisation.

All quantitative results, derived in the previous sections, can be used for this exercise as a measure of the static cost impact of T2S. Table 5 provides an overview of the results:

Table 5: Overview of quantifications of the social welfare impact of T2S

	Static cost impact	Dynamic GDP effect
Disaggregated approach	x	x
Clearstream	x	x
Euroclear	x	x

However, this quantification does not include all possible dynamic effects that T2S may cause and that the above describes. In particular, it does not take into account the possible changes in behaviour of various market participants as they adapt to the new environment or the possible impact on total factor productivity, caused by an improved risk-return relationship on investments. The EU Commission (2006) calls these effects “second-order dynamic effects” and concludes that the methodology applied above very likely underestimates the potential increase in GDP.

3. Timetable

Based on this draft methodology, the T2S Project Team will request figures from institutions on an individual basis. Two staff members of the T2S Project Team will compile the information received under a confidentiality regime. The feedback received through the public consultation may result in an amendment of this methodology. The T2S Project Team will present aggregated results to the AG meeting in May 2008 together with the estimates on the cost of implementation of the 3CB+.