Oxera

Celebrating 25 years

Methodology for monitoring prices, costs and volumes of trading and post-trading activities

(MARKT/2006/14/G)

Prepared for European Commission DG Internal Market and Services

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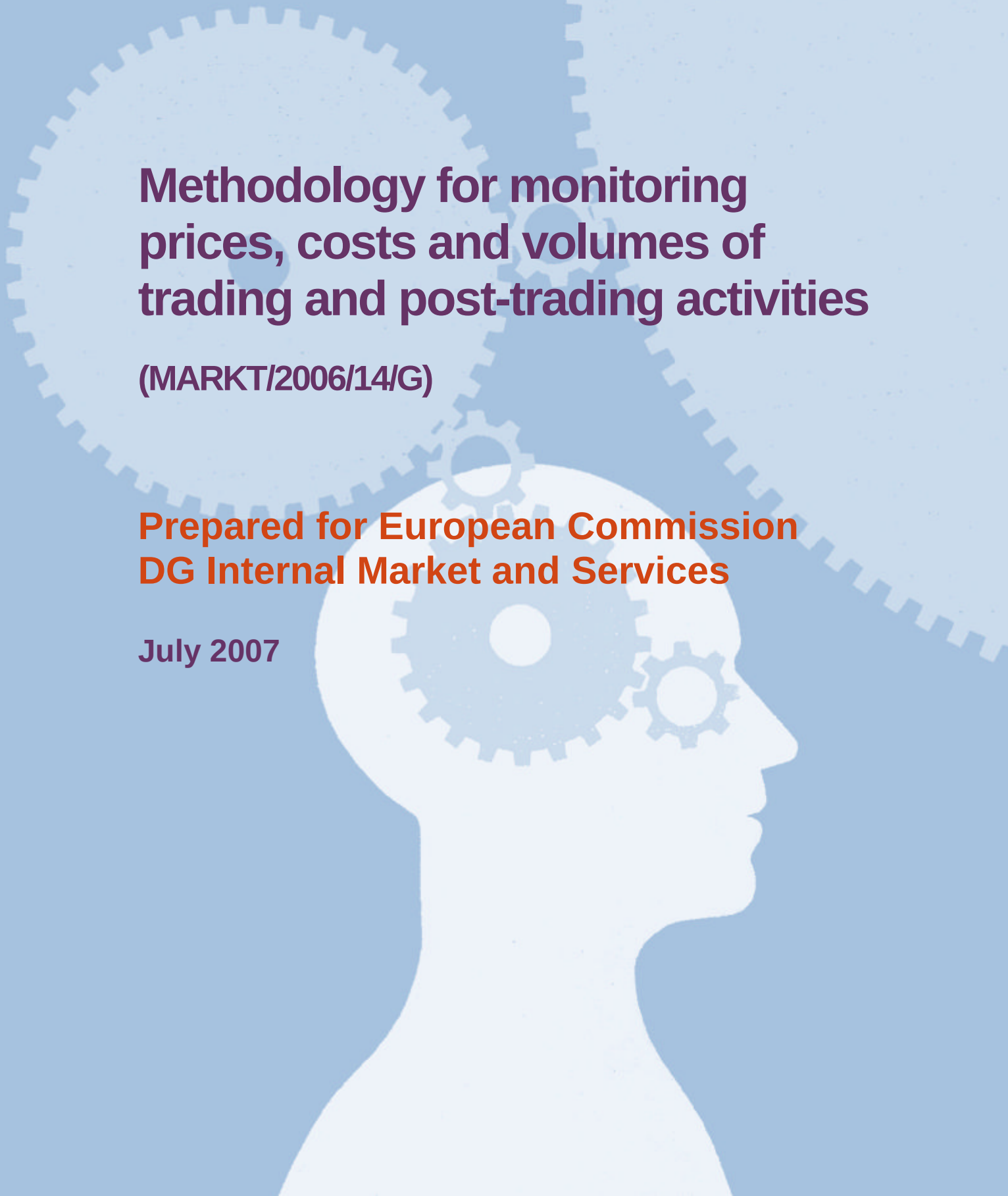

Executive summary

Background

Oxera has been commissioned by the European Commission DG Internal Market and Services to develop a methodology to monitor changes over time in prices, costs and volumes of equities and bonds trading and post-trading activities (MARKT/2006/14/G).

The methodology developed aims to allow for the monitoring of the end-to-end costs of equities and bonds trading and post-trading activities to investors, and also the separate costs of individual trading and post-trading services provided by different types of agent in the value chain, covering infrastructure providers such as stock exchanges and central securities depositories (CSDs), and intermediaries such as brokerage firms and custodians.

In line with principles of better regulation, public policy intervention should rely on sound analysis and a thorough understanding of the market. The application of this methodology will provide the Commission with an understanding of the overall trading and post-trading value chain, and offer valuable data on the evolution of prices, costs and volumes, enabling the Commission to assess some of the effects of its policies and industry initiatives.

It is the Commission's intention to apply the methodology to transactions in equities and bonds, in dematerialised or immobilised form, in 18 financial centres in the EU (and Switzerland) in the next three years. The methodology will be applied for the first time in the second half of 2007.

The methodology has been developed in cooperation with representatives from infrastructure providers, intermediaries, investors, industry associations and the services of the European Commission.

Scope of this study

In line with the requirements specified by the Commission, the methodology covers domestic transactions within the following financial centres:

- **major financial centres**—France, Germany, Italy, Spain, Switzerland, and the UK;
- **secondary financial centres**—Belgium, Luxembourg, the Netherlands, Norway, Poland, and Sweden;
- **other financial centres**—Austria, Czech Republic, Denmark, Greece, Ireland and Portugal.

In addition to domestic transactions, the methodology covers bilateral cross-border transactions between all the major financial centres, and between each of the secondary financial centres and at least two of the major financial centres. Transactions with other major financial centres in the world (outside the EU) are not covered by this methodology.

The objective of the methodology is to monitor prices, costs and volumes of trading and post-trading activities over time. Although the methodology will be applied to a large number of financial centres, it is not the purpose of this study to provide a comparison of the prices of services across financial centres. Indeed, using the output of this methodology for these purposes may well produce misleading comparisons. Rather than comparing prices and costs across financial centres, prices of transactions (both domestic and cross-border) will be compared over time—in other words, the methodology focuses on identifying trends in the

prices and costs of transactions in securities. As such, the methodology does not aim to gather sufficient information to allow full comparability of prices of trading and post-trading services across capital markets.

Main building blocks of the methodology

– **Description of the value chain and channels of transactions**. A key component of the methodology is a description of the main value chains that can be observed in different countries for domestic and cross-border trades. This building block identifies and describes the relevant activities that are provided in the value chain for trading and post-trading services, and the different channels through which these activities can be provided. The provision of these activities can vary, both between financial centres and between securities. In order to capture these variations, some of the distinctions between market structures, securities and financial centres are highlighted.

– **Identification of relevant services/activities, prices and costs in the value chain**. The trading and post-trading costs incurred by an investor are generally contained within the fees that they pay to the brokerage firms and custodians. These fees often combine a number of elements of trading and post-trading activities (such as clearing, settlement and trading in the case of a commission rate paid to brokerage firms), and/or contain a range of other non-trading or post-trading services, such as research, and value-added services (eg, in the case of fees paid to brokerage firms and/or custodians). The methodology identifies the range of relevant activities undertaken by the agents in the value chain and the relevant services the agents purchase from each other, and also describes the pricing structure for these services. Furthermore, it proposes different approaches to measuring prices of individual services.

  Domestic and cross-border transactions can be executed, cleared and settled in different ways. For example, one investor may instruct a broker to execute and clear a trade and use a custodian for settlement, while another investor (eg, a hedge fund) may use direct market access to a trading platform and also have direct access to a CSD. For cross-border transactions in particular, there may be wide range of channels through which the transactions can be executed, cleared and settled. These channels are captured by estimating the prices and volumes of trading, clearing and settlement services at different levels in the value chain.

– **Design of user profiles**. Different investors use the trading and post-trading services in different ways, and prices for these services are usually subject to negotiation. There is therefore no single set of activities that represents the typical transaction that feeds into the average measure of the end-to-end costs of trading and post-trading from an investor's point of view. Changes in the overall average costs may therefore not represent changes in the prices of the various services, but rather changes in the uses of those services. In addition, changes in overall average costs may not capture changes in the distribution of costs between different types of user—for example, the distribution of costs between users of different sizes. To capture these changes, the methodology introduces a number of user profiles representing typical investors and typical intermediaries. The methodology then allows for the tracking of prices (and volumes) over time for users with these typical profiles.

Indicators

These building blocks provide the basis for measuring the evolution of prices, costs and volumes over time and result in three sets of indicators.

– **End-to-end costs**. The end-to-end costs consist of the commission rate paid for brokerage services plus the fees paid for custody and settlement services.

– **Costs broken down into relevant components**. The end-to-end costs can be broken down into trading, clearing, settlement and custody cost components at different levels in the value chain, such as trading costs at the level of brokerage firms and trading platforms, and settlement costs at the level of custodians and CSDs. The monitoring of prices and volumes at different levels in the value chain provides the *drivers* of the changes in the end-to-end costs.

– **Supporting indicators**. There are a number of additional indicators that will assist in understanding some of the drivers of the changes in prices and volumes over time. For example, one additional indicator is the number of transactions per trade order that may affect the settlement costs per order. Splitting up the order into more transactions in order to reduce market impact costs may result in higher clearing and settlement costs, since more transactions per order will have to be settled.

The methodology is designed to measure the indicators along a number of dimensions:

– the type of security (equity or fixed income);
– the typical user profiles of the various agents in the value chain;
– the level in the value chain at which the (trading or post-trading) activity is undertaken;
– the channels through which trades are executed, cleared and settled;
– the financial centre.

Application of methodology

The methodology's application results in certain data requirements for investors, intermediaries, and infrastructure providers. The methodology measures prices and volumes from an upstream and downstream perspective—for example, prices and volumes related to trade execution services provided by brokers are measured from the perspective of both the fund management firms and the brokerage firms. Similarly, prices and volumes of settlement and custody services provided by CSDs are measured from the perspective of both the CSD and the custodians and brokerage firms. This means that all users (ie, investors, brokerage firms, and custodians) provide prices and volumes related to the services they purchase and sell, while infrastructure providers provide data on the services they sell.

The methodology is designed to measure a large number of indicators. The range of indicators is a reflection of both the complexity of the industry and the scope of the methodology as defined by the European Commission. The complexity of the industry means that, in order to understand the changes in the end-to-end costs incurred by investors over time, measurement of user profiles as well as indicators of prices and volumes at different layers in the value chain are required. The scope of the methodology implies that it is designed to be applied to a large number of financial centres and cross-border relationships.

Although the methodology is broad in scope, there are a number of factors that limit it, ensure that its application is manageable and, as far as possible, limit the burden on infrastructure providers and intermediaries. For example, it is limited in the sense that it does not measure costs (ie, costs incurred internally by providers of services, which are, in general, more difficult to measure), but focuses instead on prices (which are by their very nature available and measurable). The application can be kept manageable without affecting the quality of the analysis by, for example, focusing only on the main channels through which transactions are traded, cleared and settled. These can be identified and measured in terms of the number of transactions traded, cleared and settled at the beginning of the implementation of the methodology stage.

The application of the methodology requires the following steps:

– more detailed analysis of the value chains for trading and post-trading activities in the selected financial centres;
– design of detailed questionnaires to collect data on user profiles for different agents in the value chain, and on prices, costs, volumes and other indicators;
– selection of participants for questionnaires in relevant financial centres;
– sending out questionnaires, data analysis, interpretation of results, and follow-up interviews with survey participants.

Finally, it should be noted that price data from intermediaries collected at the implementation stage of the study is likely to be confidential and commercially sensitive. For these entities, the sample should be sufficiently large to be able to present data on prices in aggregated format in a public domain report without making it possible to identify the prices and volumes of individual providers of services.

If the sample is not sufficiently large—for example, for certain specific activities or certain channels—other options will be considered. First, where appropriate, the prices and volumes may be added to those of other services or channels for which data from more agents is available. Second, the prices and volumes may simply not be published, and may be confidential. If, in the application of the methodology at future points in time, data from more intermediaries becomes available, the prices and volumes may then be published.

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1 Introduction

1.1 Objectives and remit

Oxera has been commissioned by the European Commission DG Internal Market and Services to develop a methodology to monitor changes over time in prices, costs and volumes of equities and bonds trading and post-trading activities (MARKT/2006/14/G).

The methodology developed allows for the monitoring of the end-to-end costs of equities and bonds trading and post-trading activities to investors, and also the separate costs of individual trading and post-trading services provided by different types of agent in the value chain, covering infrastructure providers such as stock exchanges and central securities depositories (CSDs), and intermediaries such as brokerage firms and custodians.

It is the Commission's intention to apply the methodology to transactions in equities and bonds, in dematerialised or immobilised form, in 18 financial centres in the EU (and Switzerland) in the next three years. The methodology will be applied for the first time in the second half of 2007.

1.2 Background to this study

1.2.1 Creating a single market for trading and post-trading activities

Securities trading and post-trading services play an important role in the overall functioning of financial markets. Safe (ie, transactions without failures) and efficient trading and post-trading arrangements are therefore essential. Research indicates that the full emergence of such arrangements at the European level is impeded by a number of obstacles.[1]

Purely domestic post-trading activities in the EU are considered to be relatively cost-effective and to involve few risks, while cross-border arrangements are regarded as complex and fragmented, possibly resulting in much higher costs, risks and inefficiencies. Two reports presented by the Giovannini Group identified 15 barriers as the main causes of fragmentation and inefficiencies.[2] The 'Giovannini barriers' are divided into technical or market practice barriers, barriers related to tax procedures, and legal barriers. The reports concluded that, unless these barriers are eliminated, the EU clearing and settlement environment would continue to comprise domestic, non-integrated markets.

In 2002 the European Commission published a consultative Communication,[3] which was followed by a more policy-oriented Communication in April 2004, 'Clearing and Settlement in the European Union: The Way Forward', in which it stated that its main objective is to foster an EU-wide securities clearing and settlement environment which is efficient and safe, and which ensures a level playing field for the various clearing and settlement service providers.

[1] See the Giovannini Group (2001), 'Cross-Border Clearing and Settlement Arrangements in the European Union', November; and the Giovannini Group (2003), 'Second Report on EU Clearing and Settlement Arrangements', April.
[2] Ibid.
[3] European Commission (2002), 'Clearing and Settlement in the European Union: Main Policy Issues and Future Challenges', May.

In May 2006 the Commission published a Draft Working Document on Post-trading which summarises its overall policy objectives and approach to post-trading activities.[4]

The Commission has launched a number of policy initiatives, ranging from specific measures to remove the Giovannini barriers to the recently introduced industry code of conduct (see below).[5] The methodology set out in this report was commissioned as a complement to the Commission's policy initiatives. It will assist the Commission in evaluating the impact of industry- and government-led changes in prices, costs and volumes of trading and post-trading activities.

In line with principles of better regulation, public policy intervention should be based on sound analysis and a thorough understanding of the market. The application of this methodology will provide the Commission with a solid understanding of the overall trading and post-trading value chain, and offer valuable data on the evolution of prices, costs and volumes, enabling the Commission to assess the effects of its policies and industry initiatives.

1.2.2 Industry code of conduct

In 2006, the Federation of European Securities Exchanges (FESE), European Association of Central Counterparty Clearing Houses (EACH) and European Central Securities Depositories Association (ECSDA) prepared a code of conduct on clearing and settlement activities that was signed by all their members.[6] The measures detailed in the Code address three main areas.

– **The transparency of prices and services**. The objectives are to enable customers to understand the services they are provided, and the prices paid for these services, including discount schemes; to facilitate the comparison of prices and services; and to enable customers to reconcile the ex post billing of their business flow against the published prices and the services provided.

– **Access and interoperability**. The objective is to allow organisations from a Member State to access organisations in the same or another Member State—for example, central counterparties (CCPs) should be able to access CSDs and other CCPs, and CSDs should be able to access other CSDs, etc. The code sets out the conditions and procedures for access;

– **Unbundling of services and accounting separation**. The objectives are to make the relationship between revenues and costs of different services transparent in order to facilitate competition; to make potential cross-subsidies between the different services transparent; and to provide users with choice regarding the services available.

The code sets a specific deadline for implementing each group of measures:

– price transparency: end of 2006;
– access and interoperability: end of June 2007;
– unbundling of services and accounting separation: January 1st 2008.

A monitoring mechanism has been set up to ensure that all the measures are implemented properly and on time. This mechanism is built on two pillars. The first is the Monitoring Group of the Code of Conduct (MOG). It is chaired by DG Internal Market and Services and comprises representatives from DG Competition, DG Economic and Financial Affairs

[4] European Commission (2006), ' Draft Working Document on Post-trading Activities', May.

[5] FESE, EACH, ECSDA (2006), 'European Code of Conduct for Clearing and Settlement', November.

[6] European Commission (2006), 'Clearing and Settlement: Commissioner McCreevy Welcomes Industry's New Code of Conduct', IP/06/1517, press release, November.

(ECFIN), the Committee of European Securities Regulators (CESR), and the European Central Bank. The second is the monitoring exercised by external auditors, who will be appointed by the organisations that have signed the Code.7

Initially, the Code will apply exclusively to cash equities; however, the Commission expects its scope to be extended gradually to include other financial instruments, such as bonds and derivatives.

The industry initiative to create greater transparency and unbundle services is likely to facilitate the application of Oxera's methodology, since data on prices for individual services will be more readily available. Indeed, the code of conduct states that the associations are committed to contributing to the success of this study and will actively cooperate and support it.

1.2.3 Previous studies on clearing and settlement

The methodology (and its application) is broader in scope than previous studies on the costs of clearing and settlement, since it involves broad coverage in terms of different types of costs and in terms of intermediaries and financial centres.[8]

Most previous studies have focused solely on the costs incurred (or prices charged) by clearing and settlement providers.[9] In contrast, the methodology developed here allows for the end-to-end costs of trading and post-trading activities to investors to be monitored. It includes all costs related to trading and post-trading activities incurred by relevant agents in the value chain—ie, fund management firms, brokerage firms, stock exchanges, providers of custody services, clearing houses and CSDs.

One previous study has covered different layers in the value chain, but was more limited in terms of the number of intermediaries and financial centres. The study measured the prices of trading and post-trading services in France, based on a survey of a relatively small sample of fund management firms.[10] The methodology developed here, however, allows for the application to a representative sample of investors and intermediaries in a large number of financial centres.

1.3 Scope of this study

1.3.1 Comparison of prices, costs and volumes over time

The objective of the methodology is to monitor prices, costs and volumes of trading and post-trading activities over time. Although the methodology will be applied to a large number of financial centres, it is not the purpose of this study to provide a comparison of prices across financial centres. Indeed, using the output of this methodology for these purposes might well produce misleading comparisons. Rather than comparing prices and costs across financial centres, prices of transactions (both domestic and cross-border) will be compared over time—in other words, the methodology focuses on identifying trends in the prices and costs of transactions in securities.

[7] Progress on the implementation of the code of conduct can be monitored on the DG Internal Market and Services website and the website of the relevant associations: FESE, ECSDA, and EACH.

[8] EC DG Internal Market and Services (2006), 'Draft Working Document on Post-trading', May; Commission Services Working Document on Definition of Post-trading Activities, CESAME Sub-Group on Definitions, Working document/ MARKT/SLG/G2(2005)D15283.

[9] Oxera and London Stock Exchange (2002), 'Clearing and Settlement in Europe: Response to the First Report of the Giovannini Group', February; Lannoo, K. and Levin, M. (2001), 'The Securities Settlement Industry in the EU: Structure, Costs and the Way Forward', CEPS Research Report, January; the Giovannini Group (2001), op. cit.; the Giovannini Group (2003), op. cit.; and NERA (2004), 'The Direct Costs of Clearing and Settlement: An EU–US Comparison', Corporation of London, June.

[10] Association Française des professionals des Titres (AFTI/Eurogroup) (2002), 'Analyse du Comparative du Coût des Operations des Titres en Europe et aux USA, et Perspective d'évolution'.

A comparison of prices across financial centres would result in different requirements for the methodology. For example, it would require complete consistency in the definitions of services, whereas there is currently a large degree of inconsistency—across financial centres, different services are offered under similar names, and vice versa.

The methodology therefore does not attempt to harmonise the definition of services. However, a degree of consistency is provided by taking into account work undertaken regarding the definition of services—for example, by the Commission.[11] The task forces set up by FESE and ECSDA have also made efforts to improve the comparability of services across different financial centres.

This report refers to both prices and costs of trading and post-trading activities. Prices generally refers to the prices paid for individual services, while costs refer to the total costs incurred by users—ie, volumes of services used multiplied by their individual prices. In other words, unless explicitly stated, costs refer to costs from a purchaser's perspective and do not refer to the internal costs incurred by a supplier.

1.3.2 Methodology (Lot 1) and application (Lot 2)

The European Commission's tender documents refer to the methodology as Lot 1, and to its application as Lot 2. This study contains the methodology and describes the data requirements. Lot 2 will consist of the following activities (among others):

- more detailed analysis of the value chains for trading and post-trading activities in the selected financial centres;
- design of detailed questionnaires to collect data on user profiles for different agents in the value chain, and on prices, costs, volumes and other indicators;
- selection of participants for questionnaires in relevant financial centres;
- sending out questionnaires, data analysis, interpretation of results, and follow-up interviews with survey participants.

1.3.3 Type of securities

The methodology allows for the measurement of the costs of trading and post-trading activities for transactions in equities and bonds in dematerialised or immobilised form; other securities, such as derivatives, are not included within the scope of this study.[12]

1.3.4 Financial centres

The Commission requested a classification of three different types of financial centre: major, secondary, and other. The methodology covers domestic transactions within the following financial centres:

- **major financial centres**—France, Germany, Italy, Spain, Switzerland, and the UK;
- **secondary financial centres**—Belgium, Luxembourg, the Netherlands, Norway, Poland, and Sweden;
- **other financial centres**—Austria, Czech Republic, Denmark, Greece, Ireland and Portugal.

In addition to domestic transactions, the methodology covers bilateral cross-border transactions between all the major financial centres, and between each of the secondary

[11] European Commission (2006), ' Draft Working Document on Post-trading Activities', May.

[12] The methodology is designed to measure explicit costs of trading and post-trading activities. In the case of trading costs, this means that the commission rates paid to brokerage houses and stock exchanges and other trading platforms are measured. Measuring implicit costs such as the market impact is beyond the scope of this study. There is no uniform way of measuring market impact costs. Furthermore, market impact is not an unambiguous cost to the class of investors as a whole. However, indications of changes in market impact over time based on analysis by infrastructure providers, intermediaries, investors or other parties may require an assessment of the significance of these changes in the applications of the methodology.

financial centres and at least two of the major financial centres. The selection of these financial centres is described in section 3.

1.4 Industry consultation

The methodology has been developed in cooperation with representatives from infrastructure providers, intermediaries, industry associations and the services of the European Commission.

The conceptual methodology was presented and discussed in meetings with FESE, ECSDA, EACH, the European Credit Sector Associations' Users Task Force, and an industry workshop organised by Oxera, which was attended by representatives of infrastructure providers and intermediaries. In addition, separate meetings were held with a number of infrastructure providers, intermediaries and other market participants, and investors.

The industry was consulted on the following components of the methodology.

– **Description of the value chain (section 4)**. A number of infrastructure providers and intermediaries from different financial centres were consulted on Oxera's description of the value chain of trading and post-trading activities, and provided input for the description of the differences in the value chain and market structure across financial centres.

– **Identification of services and pricing structures (section 5)**. Exchanges, CSDs, CCPs in the selected financial centres and a number of intermediaries provided input on the identification of services they offer and purchase in the value chain of trading and post-trading, and on the pricing structures of their services. Their input was obtained by means of a questionnaire. The data obtained through the questionnaires is confidential and is presented in aggregated form in this report.

– **Design of user profiles (section 6)**. The same questionnaire also asked for data on users of infrastructure providers, which allowed Oxera to assess the feasibility of its approach to the design of user profiles.

1.5 Structure of report

The remainder of this report is structured as follows.

– Section 2 set outs, at a high level, which indicators the methodology aims to measure, and explains the methodological issues that must be addressed to make measurement possible. It provides an overview of the main building blocks of the methodology.

– Section 3 describes the selection of financial centres and types of domestic and cross-border transaction to which the methodology is designed to be applied.

– Section 4 provides a description of the value chain of trading and post-trading activities, and identifies the relevant agents and the channels that can be employed for the execution, clearing and settlement of domestic and cross-border transactions. This section examines some of the main differences between the structures of markets in the financial centres selected in section 3.

– Section 5 describes the range of activities undertaken by the various agents in the value chain for trading and post-trading services, and the services the agents purchase from each other. Trading, clearing and settlement services are often provided in a bundle with

other services. This section identifies the relevant trading and post-trading activities, and their pricing structures.

– Section 6 describes the approach to the construction of user profiles for typical agents at each level of the value chain. These profiles are used to estimate the costs incurred by investors, brokers, fund managers and other agents in the value chain in executing, clearing and settling trades. Practical approaches to collecting and analysing data on prices, costs and volumes are discussed.

– Section 7 summarises the indicators used to monitor the prices and costs of trading and post-trading activities and the data-gathering requirements for application of the methodology.

– Appendix 1 provides a glossary.

2 What to measure and how?

This section sets out, at a high level, the indicators that the methodology aims to measure, and explains the methodological issues that need to be addressed to make such measurement possible. By doing so, it provides an overview of the main building blocks for the methodology, and a context for the remainder of this report.

2.1 What does the methodology aim to measure?

The objectives of the methodology are to measure the end-to-end costs incurred by an investor in executing, clearing and settling a trade; to monitor changes in these costs and activities over time; and to understand the drivers behind these changes. There are therefore two main outputs.

– **Measurement of the aggregate costs/prices and volumes from an investor perspective**. This captures the all-inclusive trade and post-trade costs facing end-investors for domestic and cross-border trades, and total transaction volumes for domestic and cross-border trades.

– **Measurement of the key drivers of changes in costs/prices and volumes**. This captures the underlying factors that explain changes in prices facing end-investors and total volumes observed in different markets. Changes in the costs can be caused by a number of factors, such as changes in the prices of the underlying individual activities; the way investors and agents in the value chain use trading and post-trading services; the channels used by typical agents; and in the activities undertaken by the agents.

This means that the methodology will measure the costs incurred not only by typical end-investors, but also by the other agents in the value chain, such as brokers, clearing houses, custody services providers, CCPs, CSDs and exchanges. For all these agents, the cost of using trading and post-trading services will be measured. This approach is designed to measure, for example, the fees charged by brokers to investors for the execution of trades; the fees charged by exchanges to brokers for the execution of trades; the fees charged by CSDs to custodians for settlement and custody services; and the fees charged by custody services providers to brokers and investors, etc.

2.2 What are the relevant market characteristics?

The market for trading and post-trading activities is complex. There is a wide range of services provided by various agents in the value chain, offering investors and intermediaries different ways for executing, trading, clearing and settling transactions in equities and bonds. Designing a robust methodology that can monitor the prices and costs of trading and post-trading activities and capture the complexity of the market requires identification of the relevant characteristics of the market. These characteristics determine the requirements for the methodology.

– **Bundling of services**. The totality of costs incurred by an investor is generally contained within the fees that it pays to the fund management firms, brokerage firms and

custody services providers.[13] These fees often combine a number of elements of trading and post-trading activities (such as clearing, settlement and trading in the case of a commission rate paid to brokerage firms), and/or a range of other non-trading or post-trading services, such as asset allocation analysis, research, and value-added services (eg, in the case of fees paid to fund management firms and/or custodians). This requires a number of practical approaches to break down the fees into the relevant components, removing the elements not related to trading and post-trading activities.

– **Different types of user**. Different investors use the trading and post-trading services in different ways, and prices for these services are normally subject to negotiation. There is therefore no single set of activities that represents the typical transaction that feeds into the average measure of the end-to-end costs of trading and post-trading from an investor's point of view. Changes in the overall average costs may therefore not represent changes in the prices of the various services, but rather changes in the uses of those services. In addition, changes in overall average costs may not capture changes in the distribution of costs between different types of user—for example, the distribution of costs between users of different sizes. To capture these changes, the methodology requires the construction of a number of user profiles representing typical investors and typical intermediaries.

– **Use of different channels for execution, clearing and settling transactions**. Domestic and cross-border transactions can be executed, cleared and settled in different ways. For example, one investor may instruct a broker to execute and clear a trade and use a custodian for settlement, while another investor (eg, a hedge fund) may use direct market access (DMA) to a trading platform and also have direct access to a CSD. For cross-border transactions in particular, there may be wide range of channels through which the transactions can be executed, cleared and settled. As explained below, the methodology captures these channels through the construction of user profiles.

– **Differences across financial centres**. The way in which trades are executed, cleared and settled may vary by country, and the prices paid may depend on the channel used for both domestic and cross-border transactions. The methodology therefore requires the selection of a number of financial centres where the prices of trading and post-trading activities can be measured and monitored.

– **Range of different agents in the value chain**. The trading and post-trading services are offered by a number of agents in the value chain, with some agents providing services to each other. For example, brokerage firms may purchase services from CCPs, exchanges, custodians and CSDs. The methodology requires identification of the trading and post-trading services that are purchased from other market participants in the value chain in order to understand the extent to which changes in, for example, commission rates are driven by changes in the prices of post-trading services and in the division of labour in the value chain. Over time, certain agents may expand while others may reduce their scope of services.

– **Direct and indirect costs**. The costs incurred by investors in trading and post-trading consist not only of the prices paid for these services, but also of a number of types of indirect cost. Indirect costs include, for example, the costs incurred by middle and back offices of brokerage firms. These offices maintain the relationships with other agents in the value chain and deal with exemptions (eg, failed transactions).

[13] The trustees of the fund (eg, the pension fund trustee) may incur certain administrative and management costs. These costs are likely to be small compared with the costs of other trading and post-trading activities, and are therefore not taken into account in this study.

– **Changes in services and price structures over time**. The market is subject to changes over time. The methodology needs to offer sufficient flexibility so that new developments can be taken into account, such as changes in price structures and in the activities undertaken by agents in the value chain.

2.3 Main building blocks for the methodology

To meet the requirements outlined above, the proposed methodology consists of the following building blocks.

1. **Identification of financial centres**. The European Commission has requested a selection of six major, six secondary and six other financial centres. Section 3 selects financial centres and cross-border relationships on the basis of their importance, measured by proxies such as the number of transactions traded and market capitalisation.

2. **Description of the value chain and channels of transactions**. A key component of the methodology is a description of the main value chains that can be observed in different countries for domestic and cross-border trades. Section 4 provides a high-level description of the value chain and the channels of transactions defined in terms of a set of relationships between agents along the value chain that are required to execute, clear and settle a trade.

3. **Identification of relevant services/activities, prices and costs in the value chain**. Trading, clearing and settlement services are often provided in a bundle with other services. Section 5 identifies the relevant trading and post-trading activities offered and purchased by infrastructure providers, intermediaries and investors, and their pricing structure.

4. **Design of user profiles**. The methodology requires typical user profiles to be constructed at each level of the value chain (eg, the characteristics of typical investors or fund management firms buying brokerage services, and typical brokers buying services from the exchange). Section 6 describes the construction of a set of typical agents in terms of the characteristics that are relevant for determining the average prices and costs facing agents, and of cross-sectional differences between agents in terms of their characteristics and channels of transaction adopted. Furthermore, it provides practical approaches to measuring prices, costs and volumes for trading and post-trading services.

These four building blocks provide a basis for measuring the evolution of prices, costs and volumes over time and result in price and volume indicators. These indicators are summarised in section 7. By including user profiles, the methodology offers flexibility and allows new developments, such as the use of new services, to be taken into account.

2.4 Measurement by relevant indicators

2.4.1 Indicators

The building blocks result in a large number of indicators measuring different aspects of trading and post-trading activities. Table 2.1 distinguishes between a number of types of indicator.

Main set of indicators

These main indicators capture trends in end-to-end prices and volumes from an investor perspective. This includes costs incurred by typical investors in trading, clearing and settling trades, as well as those observed for the market as a whole. The costs incurred by typical

investors are measured using user profiles for a retail investor, small and large institutional investors and a hedge fund. This data would be obtained through a detailed survey of all infrastructure providers and a representative sample of intermediaries and investors.

Furthermore, to identify the factors driving changes in aggregate prices and volumes, the methodology develops a set of more detailed indicators. These capture the costs of trading and post-trading activities incurred by the different agents in the value chain, as well as the volume of transactions.

– The first type of indicator capturing changes in constituent prices focuses on prices charged by various financial intermediaries and market infrastructures along the value chain of transactions. These prices include the exchange trade execution fee, brokerage execution fee, CCP clearing fee, custodian's settlement fee, custodian's custody fee, CSD settlement fee, and CSD custody fee. To capture the heterogeneity of actual prices, depending on the type of activity of a buyer of a given set of services, these indicators are designed to encapsulate both the average price in the market and the prices faced by various types of representative agent (ie, buyers of services). Moreover, these indicators are measured separately for domestic activity, as well as activity in selected foreign markets.

– The second type of indicator captures changes in the level of activity through different channels of transaction of different types of agent, as well as for the market as a whole. These indicators are designed for activities at different levels of the value chain, both domestic and in selected foreign markets. For example, at the trade execution level, these indicators capture the relative activity in foreign markets that occurs as a result of the direct participation of domestic brokers in foreign exchanges, direct access by investors to foreign exchanges, and the use of third-party foreign brokers by domestic brokers.

– The third type of indicator captures changes in the relevant characteristics of typical agents, and the levels of activity by different typical agents. These indicators are implemented for agents at different levels of the value chain, both for domestic activity and activity in selected foreign markets. For example, these indicators capture the level of settlement and custody services in a given market purchased from the CSD by different types of custodian.

Supporting indicators

This set captures other indirect factors that may affect the overall all-in costs faced by investors and total transaction volumes. These indicators include, for example, a measure of the number of transaction failures that occur along the value chain (eg, settlement failure), and a measure of the level of internalisation of different agents (eg, trade internalisation by brokers).

Table 2.1 Indicators

	Type of indicator	Indicators
Main indicators	Indicators capturing changes in all-inclusive prices	Average all-inclusive price facing different types of investor Average all-inclusive price for the market as a whole Total prices (costs) and volume for the market as a whole
	Indicators capturing changes in prices of different services in the value chain	Average price facing different types of agent Average price for the (sub-)market as a whole
	Indicators capturing changes in activity through different channels of transaction	Level of activity of different types of agent through different channels of transaction Level of activity through different channels of transaction for the market as a whole
	Indicators capturing changes in characteristics of typical agents	Characteristics of typical agents Relative level of activity by different typical agents
Supporting indicators	Other indicators	For example, indirect costs arising due to transaction failures, and degree of netting

Source: Oxera.

2.4.2 Defining cross-border transactions

The overall definitions of domestic and cross-border transactions and holdings are based on the location of the owner and the jurisdiction of the security. 'Domestic' is defined as the respective location and jurisdiction being the same, and 'cross-border' when the two are different. These definitions are independent of the location of the transaction and the location of the holdings. However, much of the available information is based on the location of the activity being undertaken (trading or holding), not the location of the investor, although the jurisdiction of the security may also be known. To create the appropriate measures of domestic and cross-border activity, information from both the location of activities and the location of investors will need to be combined.

For the purposes of the methodology, it is also necessary to define the investor, since it is possible that the final beneficiaries of the ownership of the securities are at least one stage removed from the apparent owner of the security. This is particularly the case where the final beneficiaries' ownership of the security is achieved through some kind of collective arrangement (eg, through participation in a pension fund or through purchase of units in a collective investment scheme). For the purposes of this methodology, the total transaction and holding costs for domestic and cross-border equities and bonds are those faced by the apparent owner of the equity or bond. In the case of collective investment vehicles, therefore, the investor is the vehicle, not the subsequent investors in that vehicle. The UCITS (Undertakings for Collective Investments in Transferable Securities) becomes the jurisdiction of the investor. For occupational pension funds, the jurisdiction of the pension is, strictly speaking, the location of the investor, but to simplify the data collection, the jurisdiction of the manager of the fund(s) will be used as a proxy. Where the investor owns the security directly, it is the location of the investor that determines the domestic or cross-border nature of the trading and holding.

2.4.3 Treatment of different channels for domestic and cross-border transactions

Domestic and cross-border transactions can be executed in several ways. For example, one investor may instruct a broker to execute and clear a trade and use a custodian for settlement, while another investor (eg, a hedge fund) may use DMA to a trading platform and also have direct access to a CSD. In particular, for the cross-border transactions, there may

be a wide range of channels through which the transactions can be executed, cleared and settled; this is discussed in section 4.

As noted above, the methodology will cover domestic transactions in a large number of financial centres (18) and an even larger number of types of cross-border transaction (at least 54).[14]

In principle, from a conceptual methodological point of view, there is no difference between measuring the prices of domestic transactions (executed, cleared and settled through channels) and those of cross-border transactions.[15] A cross-border transaction is simply another channel through which transactions can be executed, cleared and settled. However, in practice, measuring prices for cross-border activities may result in some additional challenges, including the following.

– The execution, clearing and settlement of cross-border transactions normally require a number of additional activities in the value chain. This means that there is a wider range of channels for cross-border transactions than for domestic transactions. For example, an investor may use a local broker in the foreign country directly, or indirectly by using a global broker. Similarly, the CSD in the foreign country may be accessed in one of a number of ways. These different channels may result in different prices, all of which need to be measured separately.

– Certain channels for cross-border transactions may have lower volumes than domestic transactions, and may be subject to more changes—for example, as a result of the introduction of alternative services, more efficient channels and the removal of barriers. This requires careful monitoring to make sure that relevant changes are taken into account.

The use of these channels will be integrated into the construction of the user profiles. As typical agents have preferences for certain channels, each agent will tend to use only a limited number of channels. For example, a small investor may typically use a global broker for foreign trade, while a large institutional investor may use either a global broker or a local broker directly.

2.5 Output of the application of the methodology

The output of the application of the methodology is a series of prices and costs for both the complete services of trading, clearing and settlement, and holding services, individual prices and costs for the constituent parts of those services. The methodology will track the changes (evolution) of the prices through time, and they will be disaggregated by a number of dimensions, including:

– the geographical relationship between the investor and the security;
– the size of the investor and/or size of the investor's activity in a particular market;
– the type of investor activity in any particular market;
– the channels used by the investor to obtain the complete service(s) required.

At each level in the value chain the temporal comparison will consist of two elements:

– the change in price(s) for the same set of services;
– the change in the use of the services (inputs).

[14] In estimating the prices and costs of cross-border transactions and assessing the changes over time, movements in currencies would have to be taken into account.
[15] Since the selected financial centres (see section 3) are in different currency zones, prices will have to be converted into one currency in order to calculate the costs of a cross-border channel.

To achieve this objective, after the methodology has been applied for the first time and information collected, all subsequent applications will involve collection of information against two types of user profile: the current user profiles, and the user profiles that were current at the time of the previous round of information collection. As a result, it will be possible to track the evolution of prices for different types of user and different types of transaction, even where some of the information is unclear due to bundling or negotiated prices at some point(s) in the value chain. Using the information on typical user profiles at each point in the value chain, a series of definitive and typical trades can be constructed. These transactions can be disaggregated down to the level of pairs of financial centre (cross-border transactions), as well as domestic (ie, within one financial centre) transactions (and holdings).

Examples for a domestic and cross-border trade for a single (main) financial centre and single channel are set out in Box 2.1, indicating how the required information will be generated in Lot 2.

Box 2.1 Example of results of applying the methodology in 2007 for domestic and cross-border trades

Trading (domestic—eg, France)

Step 1: Measurement of costs incurred by large institutional investor

– design of profile for large institutional investor (eg, value of annual domestic trade is equivalent to €500m);
– collect data on costs of trading given the user profile (eg, the commission rate is 7bp).

Source: Survey among fund management firms and brokerage firms.

Step 2: Measurement of (external) costs incurred by brokerage firm

– design profile for large institutional brokerage firm. The profile indicates the number of transactions sent to exchanges and other trading platforms, clearing houses, custodians, and CSDs;
– collect data on costs of these transactions.

Sources: Survey among brokerage firms, custody services providers, and infrastructure providers, and infrastructures' price lists.

Step 3: Measurement of (external) costs incurred by (local) custodian

– design profile for custodian (number of transactions sent to CSD);
– collect data on costs of these transactions.

Sources: Survey among custody services providers and CSDs, and CSD price list.

Trading (cross-border—eg, to Austria)

Step 1: Measurement of costs incurred by large institutional investor

– design of profile for large institutional investor (eg, value of annual trades in Austrian equities is equivalent to €100m);
– collect data on costs of trading given the user profile (eg, the commission rate is 10bp).

Sources: Survey among fund management and brokerage firms.

Step 2: Measurement of (external) costs incurred by brokerage firm

– design profile for large institutional brokerage firm in Austria. The profile indicates the number of transactions sent to exchanges and other trading platforms, clearing houses, custodians, and CSDs;
– collect data on costs of these transactions.

Sources: Survey among brokerage firms, custody services providers, and infrastructure providers, and infrastructure providers' price lists.

Step 3: Measurement of (external) costs incurred by local custodian

– design profile for custodian (number of transactions sent to CSD);
– collect data on costs of these transactions.

Sources: Survey among custody services providers and CSDs, and CSD price list.

The information set out above will enable the average and marginal prices and costs to be reported for a specific transaction using a specific channel, with other characteristics of the transaction defined where they impact on the price at any level in the value chain. In the example above, the institutional investor uses local brokers and local custody banks for both the domestic and cross-border transactions, and the total transactions in each centre will be recorded to capture the effects of volume discounts.

The fund managers' data request will relate to the actual amount paid to broker(s) and custody agent(s), which will be cross-checked against the prices for typical customers reported by the brokers and custody banks. The characteristics of these brokers and custody banks will in turn determine the prices that the infrastructures will charge them, and the actual amounts paid out to the infrastructures by brokers and custody banks can be cross-checked against the customer profiles and price lists. By using typical customer profiles that are appropriate for the relevant customer one level up in the value chain, it will be possible to produce price indicators for specific end-customer types undertaking specific transactions through specific channels.

The number of channels that will need to be captured in each domestic and cross-border transaction (and holding) will not be finalised until Lot 2. It is, however, likely that each investor type (retail, a small and large institutional investor and a hedge fund) may need to be covered by around 2–3 channels in the domestic market and around 3–4 channels in the cross-border market. The total number of typical end-to-end prices generated by this methodology will therefore be in the order of 200 (for equities) to cover the relevant domestic and cross-border transactions. The existence of both value- and bargain-related fees also means that changes in the way (larger) orders are executed, even within the same channel, will have an impact on the price. As a result, this characteristic of execution will need to be recorded, and any changes through time captured.

The crucial information in the application of the methodology is not these 200 (or more) prices, but the change in them over time. At every point in the value chain where prices/costs are recorded, the relevant characteristics that determine that price will also be recorded. The typical user profiles that are used to generate the relevant prices serve as this record.

In the first round of data collection (which is likely to be in 2007), the price and user profile will be collected for 2007 only. When the data is collected again (eg, in 2008), two sets of price information will be collected: the price for the 2008 user profile and, where the user profiles have changed, the price that would be charged in 2008 for the 2007 user profile. As a result, two changes are measured:

– a change in the price from 2007 to 2008 for the same set of services (ie, 2007 user profile); and
– the change (if any) in the typical user profile.

If the exercise is repeated—for example, in 2009—a similar approach would be adopted in order to compare 2009 with 2008. For some layers in the value chain it may also be possible to apply the new user profiles to the previous year's prices. The analysis of volume and price effects is discussed in the next section.

The output of the detailed surveys among investors, intermediaries and infrastructure providers gives the basis for the tracking of prices over time, through the many ways of trading and holding securities. For each pair of years, the same channels and volume can be compared, with the typical user profiles ensuring that the channels and volumes chosen for comparison are realistic and provide a good reflection of actual users' experiences.

With the addition of average bargain sizes, it would also be possible to calculate approximate contributions of the different changes to the observed changes in costs at the investor level. The prices/costs can then be calculated for the user profiles at each level in the value chain, either at the annual level (using the total annual activity for that user profile) or at the level of a typical marginal trade. Using the example set out above, these trading costs can be calculated for each year, and the difference (ie, change) in costs through time calculated. Table 2.2 sets out the type of results expected, based on the examples set out above, for trading.

Table 2.2 Illustrative framework of results

	2007 costs	2008 costs	2008 costs for 2007 profile	Change in costs: total	Component from pure price change	Component from change in profile
Large investor: domestic annual						
Large investor: domestic marginal						
Large investor: cross-border (Austria) annual						
Large investor: cross-border (Austria) marginal						
Institutional broker: (France) annual						
Institutional broker: (France) marginal						
Institutional broker: (Austria) annual						
Institutional broker (Austria) marginal						

Source: Oxera.

A similar set of data will be generated for holding prices/costs, allowing for the tracking of the evolution of prices/costs over time in the same way.

2.6 Measuring volume and price effects

As explained above, the costs of trading and post-trading activities will be measured at each layer in the value chain. For example, the methodology enables measurement of the costs incurred by a typical investor using a broker, a broker using an exchange, and a custody services provider using a CSD. Any changes in the costs of relevant activities can be due to price and volume effects.

'Volume effects' refers to changes in the behaviour of users and the services provided, which are captured by changes in the user profiles and usage of channels. 'Price effects' refers to an increase or decrease in the price of services. For example, prices may fall as a result of the removal of (Giovannini) barriers, increases in efficiencies (passed on in the form of lower prices), or the introduction of additional volume discounts. Changes in costs may be a result of a combination of price and volume effects. For example:

– the costs of trading may fall as a result of lower commission rates (price effect) and more transactions being executed through cheaper transaction methods, such as programme trades (volume effect);
– the costs of clearing may fall as a result of a higher degree of netting (volume effect);
– the costs of settlement may fall as a result of using cheaper channels for settling cross-border transactions (volume effect).

The price and volume effects may also work in opposite directions. For example:

– the costs of trading may change as a result of lower commission rates (price effect) and more transactions being executed through more expensive transaction methods (volume effect);

– the costs of settlement may change as a result of lower fees (price effect) and an increase in more expensive cross-border transactions (volume effect).

By designing user profiles, any changes in the costs of trading and post-trading activities can be broken down into a price and volume effect. Table 2.3 presents an example of the costs of trading for investors in two different periods.

Table 2.3 Price and volume effects of trading costs

	Commission rates $_{t}$ (bp)	Commission rates $_{t+1}$ (bp)
Investors' user profile $_{t}$	18	14
Investors' user profile $_{t+1}$	20	13

Source: Oxera.

In period t, investors incur an average cost per trade of 18bp, and in period t+1 a cost of 13bp. This means that total costs have fallen by 28%. The reduction in average commission costs can be split into a price and volume effect.

– **Price effect**—if investors were to continue to use the same trade execution transaction methods, but at new commission rates, they would incur a cost of 14bp. The ratio of 14bp to 18bp (78%) indicates the price effect—ie, commission rates for the user profile at time t fall by 22%.

– **Volume effect**—if investors in period t+1 were to use trade execution transaction methods at commission rates in period t, they would incur a cost of 13bp. The ratio of 13bp to 14bp (93%) is the volume effect—ie, in period t+1, investors are using transaction methods that are 7% cheaper.

The product of the price and volume effect is 72% (78% x 93%), indicating a reduction of 28% (100% – 72%) in the average unit costs incurred by investors. This is the same as the change from 18bp to 13bp – a fall of 28%.[16]

This is a highly stylised example of how changes in prices and volumes could be analysed. Similar analyses could in principle be undertaken at different levels in the value chain. In practice, however, there may not be a significant difference between a price and volume effect, and it may be difficult to distinguish between these two effects. For example, the introduction of a new service (with a lower price than existing services) could result in a volume effect, but might also be considered a price effect (users switching from a more expensive existing service to a cheaper new service).

[16] This analysis applies the price effect and then the volume effect. The analysis can be undertaken in reverse order, in which case the volume effect is measured first, producing an increase in average price (eg, because a higher proportion of more expensive transactions are used) of 11%, then a steeper fall of 35% as a result of the price effect. This is consistent with a higher price reduction in the more expensive transactions. Overall, the impact is the same: 111% x 65% = 72%, an average price reduction of 28%

3 Identification of financial centres

The methodology allows prices, costs and volumes of trading and post-trading activities to be monitored in a large number of financial centres. This section identifies these financial centres, discusses the reasons for their selection, and explains what types of transaction within and between these centres will be covered.

Before selecting financial centres, the scope of a financial centre needs to be defined. Although a simple approach is to define a financial centre around a trading venue (ie, a financial exchange), this fails to capture certain aspects of trading structures. In particular, this does not include off-exchange trading activity. As such, the definition of a financial centre has been expanded to the countries in which trading and post-trading service providers operate. This ensures that the selection and grouping of the financial centres are based on activities throughout the value chain for trading and post-trading services.

3.1 Selection of financial centres

The European Commission has requested a selection of 18 financial centres, which are classified as major, secondary, and other. The application of the methodology to these financial centres will depend on the classification. The selection of the 18 financial centres is as follows.

- **Major financial centres**—France, Germany, Italy, Spain, Switzerland, UK.
- **Secondary financial centres**—Belgium, Luxembourg, the Netherlands, Norway, Poland, Sweden.
- **Other financial centres**—Austria, Czech Republic, Denmark, Greece, Ireland, Portugal.

Two factors can be applied to identify and classify the financial centres:

- the importance of the financial centre (eg, in terms of number and value of transactions);
- the potential measurability of the indicators.

The principal factor in identifying all the financial centres was the importance of the financial centre. Given the above definition, importance was assessed on the basis of the entire value chain. Tables 3.1, 3.2 and 3.3 present the data on the importance of the financial centres. This was determined by the size of institutional investment funds (Table 3.1), the size of funds under management (Table 3.1), the significance of trading platforms (Table 3.2), and the volume and value of the securities registered in that financial centre (Table 3.3).

These measures of the importance are incomplete in that they do not capture all aspects of the value chain for trading and post-trading securities—eg, they ignore retail investors and most off-exchange trading. However, taking into account the availability of information, this data provides sufficient evidence for the classification of the 18 financial centres.

A further tool for identifying the other financial centres is the potential measurability of the indicators, based on the availability of, and access to, information (both public and private) with respect to applying the indicators to each of the financial centres. This has been a largely subjective assessment based on indications from interviews with market participants and responses to the questionnaires during the design of the methodology. However, in the application of the methodology, when there are clearer details about the availability of, and access to, information, it may be appropriate to change the selection of the other financial centres on the basis of the measurability of the indicators in those financial centres.

Table 3.1 Institutional investors and fund management (€m)

Financial centre	Institutional investors[1]		Fund management[2]	
	Pension fund assets	Life insurance assets	Funds under management	Funds under management
	Dec 2004	Dec 2004	Dec 2004	Dec 2005
Major				
France	90,950	685,397	1,110,290	1,270,600
Germany	76,631	569,794	855,031	965,543
Italy	32,629	239,615	396,886	410,078
Spain	70,027	89,757	237,502	275,073
Switzerland	286,553	117,704	83,325	116,705
UK	1,079,359	741,896	492,846	634,649
Secondary				
Belgium	10,673	82,062	98,785	112,942
Luxembourg	85	n/a	1,110,290	1,525,208
Netherlands	485,444	112,780	89,102	95,768
Norway	12,462	47,581	21,956	34,010
Poland	12,523	7,010	9,237	15,877
Sweden	31,931	134,844	81,438	105,587
Other				
Austria	9,784	45,560	125,289	156,697
Czech Republic	2,858	3,441	3,590	4,728
Denmark	53,776	109,076	77,179	106,434
Greece	n/a	n/a	32,985	28,299
Ireland	56,947	51,114	434,589	583,275
Portugal	13,881	13,096	31,465	36,451
None				
Cyprus	n/a	n/a	n/a	n/a
Hungary	5,142	3,061	4,441	7,082
Iceland	10,376	2,783	n/a	n/a
Malta	n/a	n/a	n/a	n/a
Slovak Republic	5	6,359	1,641	2,740
Slovenia	439	n/a	n/a	n/a

Sources: Oxera calculations and [1] OECD (2005), 'Pension Markets in Focus', December, and OECD (2006), 'Pension Markets in Focus'. October. [2] EFAMA (2005), 'Quarterly Statistical Release No.24'.

Table 3.2 Trading platforms

		Equity markets			Bond markets		
Financial centre	Exchange	No. of listed securities Dec 2005	Market capitalisation (€m) Dec 2005	Trading volume (€m) 2005	No. of listed securities Dec 2005	Market capitalisation (€m) Dec 2005	Trading volume (€m) 2005
Major							
France	Euronext Paris[1]	749	1,490,868	1,103,352	1,688	n/a	5,350
Germany	Deutsche Börse	764	1,035,254	1,545,794	10,848	n/a	307,538
Italy	Borsa Italiana	282	676,606	1,044,099	479	1,677,393	124,484
	MTS[2]	n/a	n/a	n/a	106	1,123,000	1,598,000
Spain	Spanish Exchanges (BME)	n/a	813,812	1,263,966	3,285	n/a	3,302,850
Switzerland	SWX Swiss Exchange	400	793,073	785,695	1,214	312,527	120,523
UK	London Stock Exchange	3,091	2,592,727	4,582,347	11,009	2,182,505	2,428,235
	Virt-X[3]	1,446	n/a	717,277	n/a	n/a	n/a
Secondary	Exchanges						
Belgium	Euronext Brussels[1]	222	244,574	91,049	150	n/a	313
	Regulated off-exchange[2]	n/a	n/a	n/a	n/a	250,000	1,345,000
Luxembourg	Luxembourg Stock Exchange	245	43,448	267	26,782	5,642,135	1,956
Netherlands	Euronext Amsterdam[1]	237	502,606	543,853	1,513	n/a	10,341
Norway	Oslo Børs	219	161,889	189,171	837	62,896	80,895
Poland	Warsaw Stock Exchange	241	79,356	24,552	76	74,934	656
Sweden	OMX[4]	272	372,000	405,500	1,621	n/a	1,421,101
Other	Exchanges						
Austria	Wiener Börse	111	107,085	37,503	2,724	189,352	343
Czech Republic	Prague Stock Exchange[3]	39	31,059	34,909	96	n/a	17,907
Denmark	OMX[4]	176	156,000	125,800	2,325	n/a	1,174,426
Greece	Athens Exchange	304	123,033	52,566	117	178,925	40
Ireland	Irish Stock Exchange	66	96,722	54,415	9,709	33,196	25,649
Portugal	Euronext Lisbon[1]	51	56,780	30,349	152	n/a	703
Not included	Exchanges						
Cyprus	Cyprus Stock Exchange	119	5,581	390	74	5,052	6
Hungary	Budapest Stock Exchange	44	27,618	19,492	96	31,268	1,123
Iceland	Iceland Stock Exchange[3]	26	24,266	15,447	359	n/a	17,027
Malta	Malta Stock Exchange	13	3,474	121	67	3,319	138
Slovak Republic	Bratislava Stock Exchange[3]	224	3,729	55	75	n/a	25,753
Slovenia	Ljubljana Stock Exchange	116	6,697	1,091	99	6,050	1,238

Sources: All data from WFE unless otherwise stated. [1] Data from Euronext. [2] Data from BIS. [3] Data from FESE. [4] Data from OMX.

Table 3.3 Central securities depositories

Financial centre	CSD	Total		Equities		Bonds	
		Value of securities (€m)	Value of settlement instructions (€m)	Value of securities (€m)	Value of settlement instructions (€m)	Value of securities (€m)	Value of settlement instructions (€m)
		Dec 2005	Dec 2005	Dec 2005	Dec 2005	Dec 2005	Dec 2005
Major							
France	Euroclear France	4,424,579	166,924,180	1,539,634	4,975,301	1,262,704	83,402,163
Germany	Clearstream Banking Frankfurt	5,687,006	39,146,808	1,945,956	8,338,804	3,265,939	25,663,103
Italy	Monte Titoli	2,468,516	68,558,152	724,030	150,793	1,569,772	57,660,910
Spain	IberClear	1,433,267	78,695,344	640,493	2,028,668	749,147	76,245,746
Switzerland		n/a	n/a	n/a	n/a	n/a	n/a
UK	CRESTCo	3,288,514	128,993,788	2,348,035	n/a	667,644	n/a
Secondary							
Belgium	Euroclear Belgium	7,064,932	238,671	211,397	200,975	6,597,650	819
Luxembourg	Clearstream Banking Luxembourg	3,416,602	30,832,268	152,695	369,584	2,990,943	28,155,543
Netherlands	Euroclear Netherlands	880,720	n/a	543,051	n/a	305,051	n/a
Norway		n/a	n/a	n/a	n/a	n/a	n/a
Poland	KDPW	150,861	1,973,447	73,002	85,686	77,829	1,887,731
Sweden	VPC	735,901	10,985,109	397,306	1,050,155	192,475	7,960,665
Other							
Austria	OEKB	420,278	n/a	223,030	n/a	187,198	n/a
Czech Republic	SCP	48,282	1,685	23,546	1,269	24,735	416
Denmark	VP	635,950	4,492,394	224,290	446,698	409,360	4,041,083
Greece	CSD SA	123,315	92,403	123,209	52,634	106	39,689
Ireland		n/a	n/a	n/a	n/a	n/a	n/a
Portugal	Interbolsa	351,380	88,509	260,092	69,888	89,755	17,555
None							
Cyprus	CDCR	6,313	717	5,816	656	478	9
Hungary	KELER	86,145	199,698	44,457	21,788	35,242	144,602
Iceland		n/a	n/a	n/a	n/a	n/a	n/a
Malta	Malta Stock Exchange	6,795	n/a	3,475	n/a	3,319	n/a
Slovak Republic	CDCP SR	15,620	41,468	11,404	32,635	4,216	8,832
Slovenia	KDD	14,978	16,659	7,966	5,887	6,674	7,183

Source: ECB (2006), 'Blue Book: Payment and Securities Settlement Systems in the European Union and in the Acceding Countries', December.

3.2 Relevant transactions

Within this geographical scope, three types of transaction would be considered.

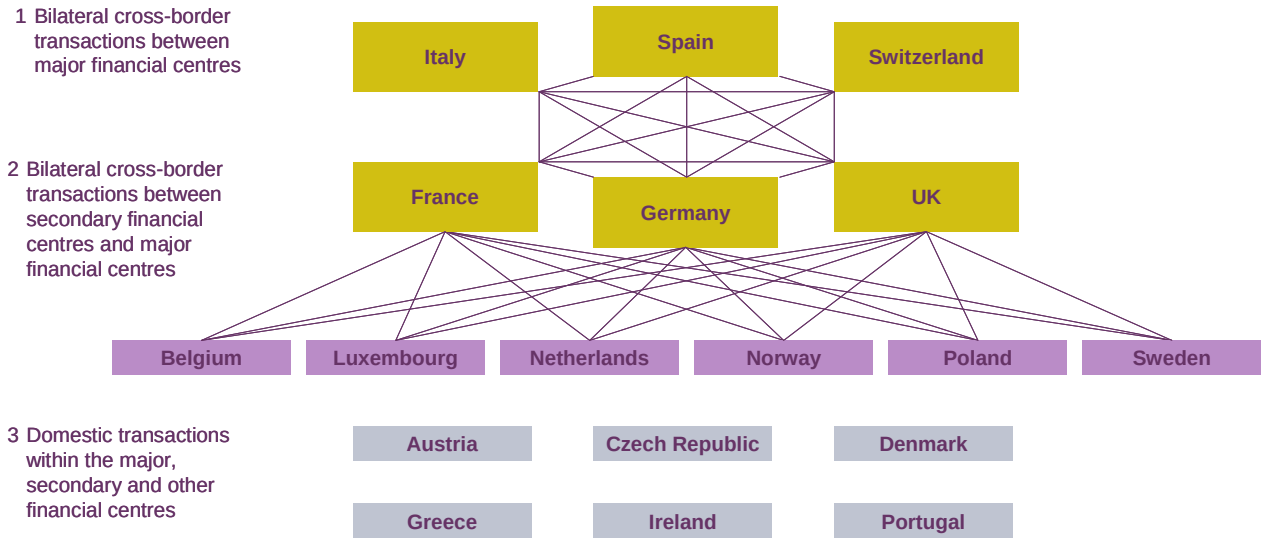
1. **Bilateral cross-border transactions between major financial centres in the EU (and Switzerland)**. For each major financial centre, there are five bilateral cross-border relationships.

2. **Bilateral cross-border transactions between each of the secondary financial centres and at least two of the major financial centres**. This category comprises transactions that take place between the secondary financial centres and major financial centres, where those major financial centres are selected on the basis of the importance of the bilateral transactions between the secondary financial centre and the major financial centre. The selection of the major financial centre requires data on the significance of cross-border relationships in the trading and post-trading value chain. No robust evidence is currently available on these relationships. Therefore, the methodology includes three bilateral cross-border relationships with the three most significant financial centres—ie, France, Germany and the UK.

3. **Domestic transactions within each of the major financial centres, secondary financial centres and six of the other financial centres**. This category comprises transactions within each of the financial centres identified within the geographical scope.

Figure 3.1 provides an illustration of the relevant transactions that would be included in the study to apply the methodology for monitoring the evolution of prices, costs and volumes of trading and post-trading services. This shows the bilateral cross-border transactions between the major financial centres, the bilateral cross-border transactions between secondary financial centres and major financial centres, and the domestic transactions within the major, secondary and other financial centres.

Figure 3.1 Relevant transactions



Source: Oxera.

4 Description of the value chain

This section provides a generic description of the value chain for trading and post-trading services. The purpose of this section is twofold. First, section 4.1 identifies and describes the relevant activities that are provided in the value chain for trading and post-trading services. Second, section 4.2 identifies and describes the different channels through which these activities can be provided. It is important to note that the provision of these activities can vary, both between financial centres and between securities. In order to capture these variations, section 4.2 highlights some of the distinctions between market structures, securities and financial centres.

This section does not set out to provide a comprehensive description of the market structures in and between each financial centre. Instead, it identifies and describes the various potential market structures. This serves to inform the development of the methodology, while the application of the methodology will provide further information about the relevant market structures in the financial centres.

The market structures for the provision of certain services depend on the level of interoperability between market participants. As such, it will be necessary to consider the reports of the access and interoperability working groups at FESE, EACH and ECSDA, which are due to be published shortly.

A number of market participants from throughout the value chains in the major financial centres have been consulted on this description of the value chain. These consultations provided helpful clarifications on the market structures for the provision of individual activities, and identified some distinctions between the market structures in different financial centres. Overall, these consultations indicated that market participants supported this description of the value chain.

This report refers to both activities and services in the trading and post-trading value chain; 'activities' refers to functions that are undertaken, while 'services' refers to an activity that is provided to another market participant. As such, there is significant overlap between activities and services in the value chain. There are also a number of ancillary services that may be provided by agents in the value chain; these are considered in section 5.

4.1 Description of market activities

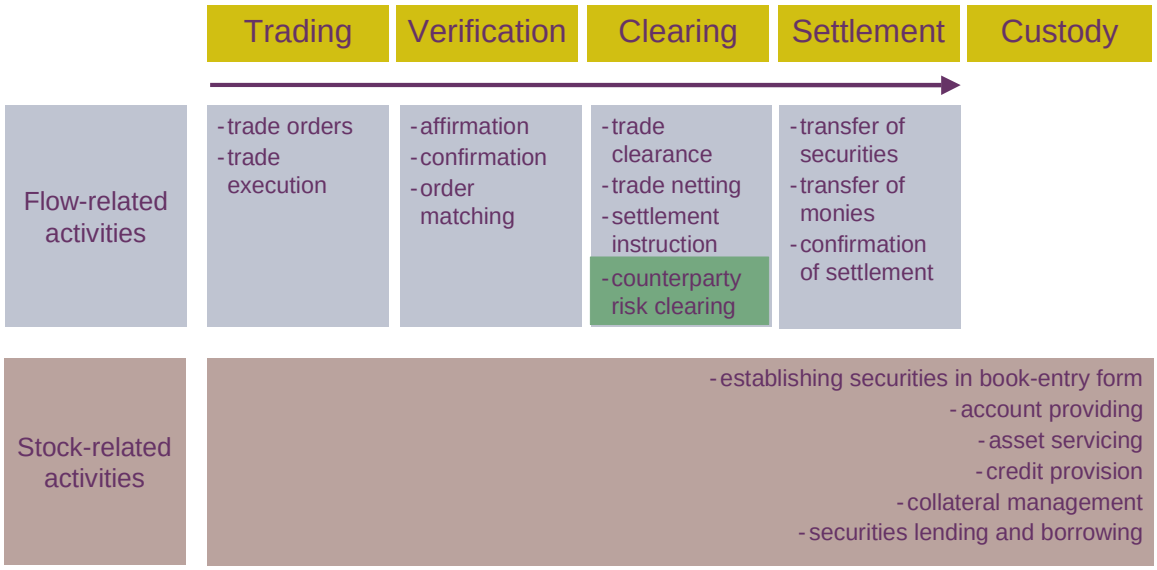
In the markets for trading and post-trading services, numerous definitions have been offered for the different activities that make up trading and post-trading services. This report does not attempt to introduce new terminology, but to use that which has already been developed by the European Commission or is common industry practice. As such, in both the description of the value chain and the development of the methodology, Oxera has followed the categorisation for these services set out in the industry code of conduct and the European Commission's Draft Working Document on Post-trading Services.

The Draft Working Document on Post-trading distinguishes between two types of activities: flow-related activities and stock-related activities. The former are activities, such as clearing and settlement, that arise from securities transactions, while stock-related activities, such as custody and asset servicing, are related to the existence of the securities rather than transactions involving those securities. In other words, stock-related activities are those that would have been provided regardless of whether the security was traded in a given period. However, it is important to understand the links between both types of activity, since some

stock-related activities facilitate the provision of flow-related activities—eg, maintaining a book-entry register of securities.

The distinction and interaction between flow- and stock-related activities is particularly important when considering the value chain for trading and post-trading services. It is helpful to introduce this distinction when defining the different trading and post-trading services. Figure 4.1 illustrates the generalised trading and post-trading activities, and distinguishes between services that are flow-related and those that are stock-related.

Figure 4.1 Trading and post-trading activities



Note: While the flow-related activities relate to specific stages in the trading and post-trading value chain, the stock-related activities both provide the custody services and enable the provision of the flow-related activities.
Source: Oxera.

4.1.1 Flow-related activities

As described above, flow-related activities arise from securities transactions.

Trading

Trading is the execution service that is provided from the point at which a trade order is received by a broker, to the point at which the execution of that trade is completed by the broker. The service being provided is the actual execution of the trade order. There are a large number of market structures for the provision of trading services, which are described in section 4.2.

Verification

The Draft Working Document on Post-trading Services defines verification as:

> **Verification:** The process of comparison and reconciliation of transaction or settlement details, to ensure that there is agreement on these details. (p. 6)

Thus verification is the process of confirming that a transaction has been agreed. For any given transaction, there are two parties—a buyer and a seller. To reduce the failure rate of transactions, prior to the clearing and settlement of a transaction, it is necessary to confirm that the corresponding trade orders match. This service may be provided by various market participants in the value chain, as discussed in section 4.2.

Clearing

The Draft Working Document on Post-trading defines clearing as:

> **Clearing:** The process of establishing settlement positions, including the calculation of net positions, and the process of checking that securities, cash or both are available. (p. 7)

Clearing is the preparation of a transaction for settlement. It comprises three processes: netting, clearance and settlement instruction.

– **Netting** is the process of bundling multiple transactions into a single settlement order. For any given time period, multiple transactions with respect to any given security may be executed.[17] To simplify the settlement process, these transactions can be netted such that only the net trade position at the end of the trading period will be settled. However, netting is not a requirement of clearance.

– **Clearance**, commonly referred to as the 'resource check', is the process of ensuring that the buyer has the monies available and that the seller has the securities available, based on either the gross or netted positions.

– The **settlement instruction** comprises the processing of the matched and netted trades to be sent for settlement.

Clearing, as defined here, is commonly provided by CSDs. However, in some financial centres, some functions, such as netting, are provided by other market participants. The market structures for the provision of clearing are described in more detail in section 4.2.

Counterparty risk clearing

An additional activity may be counterparty risk clearing.[18] While the Draft Working Document on Post-trading Services refers to 'counterparty clearing', this report uses the term 'counterparty risk clearing', as this clearly indicates that this activity is focused on counterparty risk and recognising this distinction is common industry practice. The counterparty interposes itself between the two parties to the transaction, acting as the counterparty to both other parties (eg, it acts as the buyer to the seller and as the seller to the buyer). Where the counterparty undertakes this role for all transactions in a given market segment, it is considered to be a central counterparty (CCP).

Due to differences in the processes of clearing and counterparty risk clearing—particularly with respect to the risks undertaken in providing the service—the Commission has determined that counterparty risk clearing should be considered independently of clearing. This is appropriate, since clearing and counterparty clearing are likely to be provided by different market participants. This is discussed in section 4.2.

The European Commission's Draft Working Document on Post-trading Services defines counterparty clearing and central counterparty clearing as:

> **Counterparty clearing:** The process by which a third party interposes itself, directly or indirectly, between the transaction counterparties in order to assume their rights and obligations.
>
> **Central counterparty clearing:** The process by which a third party interposes itself, directly or indirectly, between the transaction counterparties in order to assume their rights and obligations, acting as the direct or indirect buyer to every seller and the direct or indirect seller to every buyer. (p. 7)

[17] In financial centres where continuous net settlement is provided, netting will include transactions from multiple time periods.

[18] This is sometimes referred to as either 'novation' or 'open offer'. However, these are legal terms that are not universally applied to counterparty risk clearing throughout Europe.

Neither counterparty risk clearing nor central counterparty risk clearing is a required element of the clearing process, but the development of counterparty risk clearing has significantly reduced counterparty risk.

Settlement

The Draft Working Document on Post-trading Services defines settlement as:

> **Book-entry settlement:** The act of crediting and debiting the transferee's and transferor's accounts respectively, with the aim of completing a transaction in securities. (p. 8)

Settlement constitutes the completion of a transaction through the transfer of ownership of assets and monies. This is a two-stage process: the first involving the transfer of securities, and the second involving the transfer of monies. Settlement is only complete when the transfer of securities and the transfer of monies are achieved, final and irrevocable. These two stages should take place simultaneously. Settlement is provided by several market participants throughout the value chain for stock-related activities, as discussed in section 4.2.

4.1.2 Stock-related activities

As described above, stock-related activities are related to the existence of the securities rather than transactions involving those securities. Therefore, these services would be provided regardless of whether the security had been traded in a given period. However, some stock-related activities are provided to facilitate flow-related activities.

The majority of stock-related activities relate to the provision of custody services, where custody is the process of securely holding securities and making them available for trading. Custody services are not precisely defined, and are subject to several interpretations. These range from the safekeeping of assets through to a wide range of services, including the core stock-related activities, various other additional services (discussed in more detail in section 5) or various settlement activities. Since the term is widely used, the study continues to refer to custody services and custody services providers where these refer to the provision of the six core stock-related activities.

As this suggests, there are many aspects to the provision of custody, and the unbundling of custody services into core and ancillary services is a complex task. Since many of the services within custody are related to holding securities as opposed to trading securities, custody services are referred to only with respect to the value chain for stock-related activities.

Furthermore, a range of market participants throughout the value chain may provide custody services. As such, this study and these definitions focus on particular activities, rather than the generic provision of custody services. For consistency, and in agreement with industry participants, the activities that are included are those within the code of conduct.[19]

Establishing securities in book-entry form

The Draft Working Document on Post-trading Services defines establishing securities in book-entry form as:

> **Establishing securities in book-entry form:** The initial representation and subsequent maintenance of securities in book-entry form through initial credits and subsequent

[19] The Draft Working Document on Post-trading also includes the service of 'Deposit', which is defined as 'the storage of physical securities on behalf of others' (p. 8). However, since this study focuses on the trading and post-trading services for dematerialised and immobilised securities, this activity is excluded from this analysis.

> credits or debits to securities accounts, on the basis of: (a) the information provided by the issuer or its agent; or (b) the number of securities on deposit. (p. 8)

The establishment of a book-entry register records all the holdings of a security in different securities accounts in a book-entry form, and subsequently updates these accounts on the basis of settlement instructions. This activity may be provided by multiple participants in the value chain, particularly for fixed income securities or cross-border holdings of securities. Section 4.2 describes the distinction between a primary book-entry register and other book-entry registers.

Account providing

The Draft Working Document on Post-trading Services defines account providing as:

> **Account providing:** The maintenance of securities accounts. (p. 8)

This is the provision and maintenance of securities accounts for clients, which entails the secure holding and recording of the clients' securities. Again, this activity may be provided by multiple participants in the value chain, as there can be many layers of account holding between the investor and the book-entry register.

Asset servicing

The Draft Working Document on Post-trading Services defines asset servicing as:

> **Asset servicing:** Securities administration activities performed for others—eg, processing of corporate actions, tax reclaims and portfolio valuation. (p. 9)

Asset servicing comprises the administrative activities performed for the holders of securities, which may include the processing of corporate actions, processing tax reclaims and valuation of portfolios.

Credit provision

Although credit provision is included in the code of conduct, no definition is provided. However, for the purposes of analysing the value chain, it is necessary to provide a description. Credit provision is the banking function within the value chain—ie, the extension of credit to ensure the clearing and settlement of transactions. As such, custody service providers and CSDs may offer credit provision as a standard arrangement to ensure that sufficient capital is available to process their transactions.

Collateral management

Again, although collateral management is included in the code of conduct, no definition is provided. For the purposes of analysing the value chain, collateral management can be defined as follows. Collateral is provided for structural purposes to ensure the efficient settlement of transactions—ie, investors and intermediaries may be required to post collateral with custody service providers and CSDs. Collateral management ensures that the best use is made of this collateral—for example, to generate inexpensive credit for the investor.

Securities lending and borrowing

Securities lending and borrowing is included in the code of conduct, but no definition is provided. For the purposes of analysing the value chain, it can be described as follows. Securities lending and borrowing are services provided by custody service providers, where securities are either lent to or borrowed by other financial intermediaries. Securities lending is arranged by the custody service provider, which makes those securities available to other intermediaries (for the purposes of short-selling) and custody service providers (for the

purposes of settlement). In the context of the trading and post-trading value chain, securities borrowing predominantly relates to fail management, whereby it may be arranged by the custody service provider prior to the clearing and settlement of an agreed transaction for which the securities are unavailable. Alternatively, securities lending makes unutilised securities available for borrowing (for either short-selling or fail management) to generate additional revenue.

4.2 The trading and post-trading value chain

Having considered the activities of trading and post-trading services, it is possible to consider the value chains and market structures for the provision of trading and post-trading activities. For the purposes of this report, the value chain refers to the complete set of relationships from investors to custody service providers, including the provision of all the trading and post-trading activities described in section 4.1.

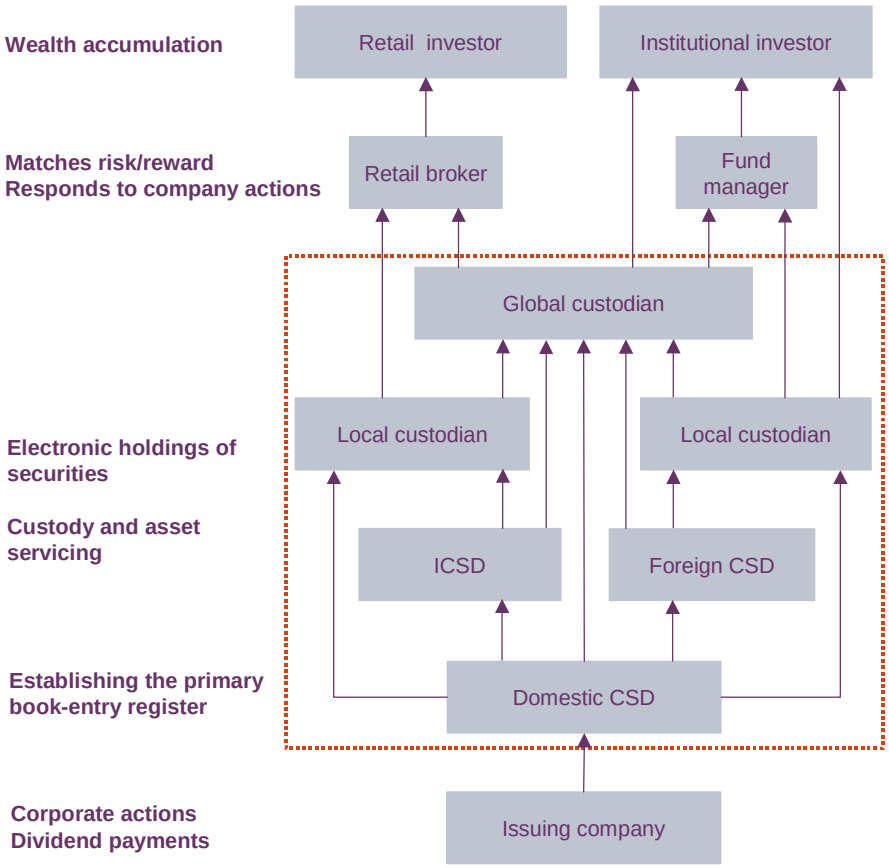
As described above, there are two types of activities in the trading and post-trading value chain: flow-related and stock-related activities. Indeed, two separate value chains can be constructed for these types. These two value chains are closely related, such that the choice of market structures for the provision of stock-related activities (eg, account providing) will directly affect the market structures for flow-related activities (eg, settlement). Given the relationship between these two value chains, the value chain for stock-related activities (ie, for the holding of securities) should be considered first, with the relationships in providing flow-related activities (ie, the value chain for the trading of securities) considered second.

In addition, there may be considerable vertical integration between providers of different trading and post-trading services. Although these may be single corporate entities, for the purposes of this study, they are treated as separate entities providing different services.

4.2.1 Value chain for stock-related activities

Figure 4.2 provides a stylised illustration of the value chain for stock-related activities; where the arrows indicate the provision of these activities. As it illustrates, there is considerable scope for variation in the provision of custody and asset servicing. These variations in the value chain (ie, different market structures) are identified by the dashed box and are considered in greater detail in this section.

Figure 4.2 Stylised illustration of the value chain for stock-related activities



Notes: The arrows in this figure show the provision of stock-related activities. For simplification, some possible relationships are not shown—eg, fund managers may access the domestic CSD directly. These differences are discussed below. ICSD, international central securities depository.
Source: Oxera.

Retail investors have an account with a retail or private client broker specialising in servicing the holdings of private investors. The retail broker has accounts with both global and local custodians, which in turn have accounts with the CSDs. The CSDs act as the primary location for holding securities. However, as mentioned above, the relationships at both custodian and CSD levels are both complex and variable.

Institutional investors grant a fund manager a mandate to manage funds. The provision of custody services is contracted between the institutional investor and the global or local custodians. However, depending on the relationship between the institutional investor and the fund manager, the contract for the provision of custody services may be arranged by the fund manager. In either case, the fund manager will be in communication with the selected custodian to manage aspects of stock-related activities, such as custody and asset servicing, and flow-related activities, such as settlement. Again, the custodians have relationships with the CSDs.

Although Figure 4.2 provides a stylised illustration of the value chain for stock-related activities, there are two activities—establishing (and maintaining) the *primary* book-entry register of securities, and custody services (ie, the other stock-related activities)—that require more thorough discussion. However, as indicated by the dashed box in Figure 4.2, the provision of these services is highly integrated.

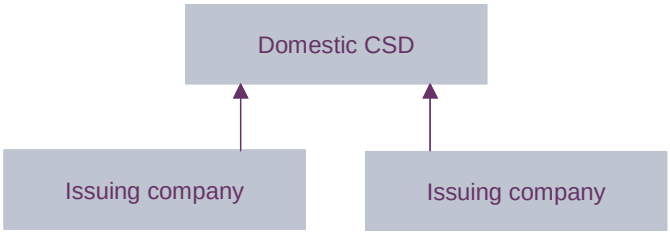
Establishing and maintaining the primary book-entry register

As described in section 4.1, a book-entry register records all the holdings of a security in different securities accounts in book-entry form, and subsequently updates these accounts on the basis of settlement instructions. At the same time, these securities accounts provide a

secure record of clients' securities holdings within the book-entry register. However, such activities are undertaken throughout the value chain for stock-related activities, and may be repeated at different layers of the value chain.

It is therefore necessary to distinguish between the primary register and other subsequent registers. The primary book-entry register is that which is established and maintained by the CSD into which the issuer has issued the securities. There are three possible structures for the primary book-entry register.[20] For equities and most domestically issued bonds (both corporate and government bonds), these securities are issued into the domestic CSD, which is in the same financial centre as the primary listing location—ie, this is the domicile of the securities, which may or may not be the same as the domicile of the issuing company. This is shown in Figure 4.3.

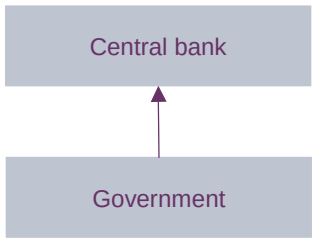
Figure 4.3 Establishing the primary book-entry register for equities and bonds



Note: The arrows in this figure show the issuance of securities into the CSD.
Source: Oxera.

Alternatively, in some financial centres (eg, Greece), the central securities depository for government bonds is the central bank. However, this is functionally similar to the issuance into a domestic CSD. This is shown in Figure 4.4.

Figure 4.4 Establishing the primary book-entry register for government bonds

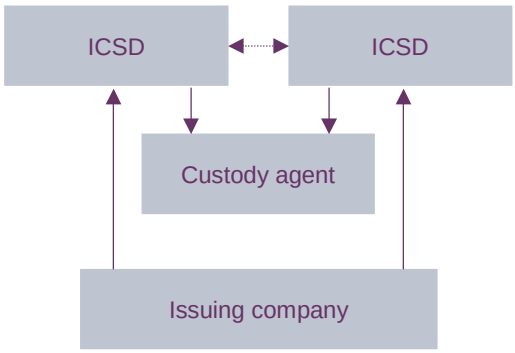


Note: The arrow in this figure shows the issuance of securities into the central bank, acting as a CSD.
Source: Oxera.

An alternative structure for establishing the primary book-entry register has been developed for Eurobonds. Rather than being issued into a domestic CSD, Eurobonds are issued into one or both of the two ICSDs. This issuance procedure involves a custody agent (usually in the country of the issuing company) that is the holder of the global certificate issued by the company. The ICSDs establish and maintain their book-entry registers for the Eurobonds. The link, or 'bridge', between the two ICSDs was an early development that allows members to settle securities in either ICSD without having to become a member of both. To facilitate this, where an issuer wants securities to be available through both ICSDs, the ICSDs appoint the same custody agent in that issuer's domestic country; the custody agent makes two entries, one for each ICSD. As transactions are settled on each ICSD, the custody agent is periodically informed, and the records of the securities held in the accounts of each ICSD are updated accordingly. This is shown in Figure 4.5.

[20] Another market structure is where, for private placements, securities are primarily recorded in the issuing bank. However, since this is beyond of the scope of this study, this market structure is not considered.

Figure 4.5 Establishing the primary book-entry register for Eurobonds

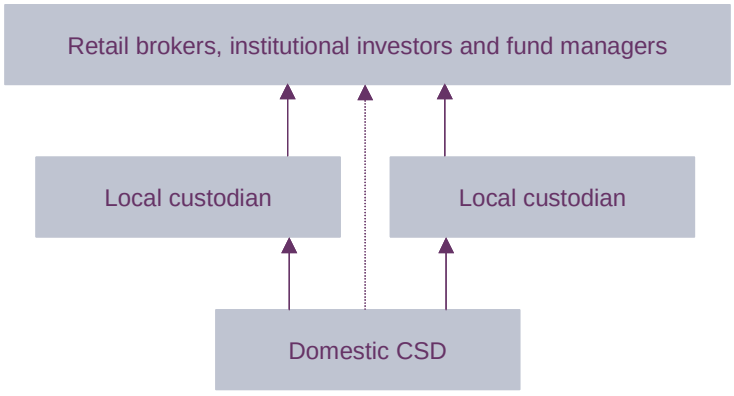


Note: The solid arrows show the issuance of securities into the ICSDs or custody agent. The dashed arrow shows the ICSD link.
Source: Oxera.

Custody services

As described above, custody services are very broad, and may include a wide range of activities. However, for the purposes of this study, the relevant activities in custody services are taken to be the six stock-related activities described in section 4.1. There are four types of participant in the market structure for the provision of custody services—CSDs, ICSDs, local custodians and global custodians—and the provision of custody services may include multiple layers of participants. The traditional structure for the provision of custody services within a financial centre is fairly simple, as shown in Figure 4.6, where each investor or intermediary appoints a single local custodian, which holds an account with the domestic CSD and provides custody services. However, some major financial centres are increasingly offering direct access to the domestic CSD.

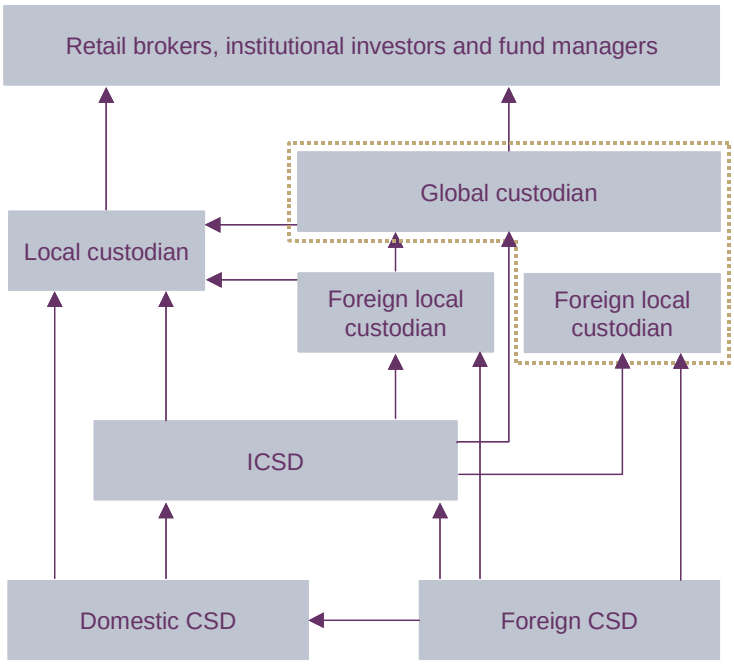
Figure 4.6 Value chain for domestic custody services



Note: The arrows in this figure show the provision of custody services, the solid arrows show the usual provision of custody services, and the dashed arrow shows a potential means of providing custody services.
Source: Oxera.

The market structure for the provision of cross-border custody services is more complex, since there are multiple structures that could be in place. Figure 4.7 provides an overview of potential market structures for the provision of cross-border custody services.

Figure 4.7 Value chain for cross-border custody services



Note: The arrows illustrate the provision of custody services. For simplification, some possible relationships are not shown—eg, domestic CSDs may access foreign CSDs via a local custodian or global custodians may access foreign CSDs through a domestic CSD.
Source: Oxera.

As Figure 4.7 shows, there can be between one and four layers in the provision of custody services for the supply of cross-border custody services. The simplest route is for the investor or intermediary to appoint a global custodian—these are increasingly vertically integrated with established local custodians—to provide access to the foreign CSD. For investors that expect to hold a significant number of cross-border securities, a relationship with a global custodian appears to be the norm. Global custodians may operate a number of local custody services, as shown by the dashed yellow box. Alternatively, where the global custodian does not have a local presence, it must either contract out the local custody services to a local custodian in that market, or access an ICSD that has access to that market.

Alternatively, where the investor or intermediary has not appointed a global custodian, their local custodian can access the foreign CSD indirectly. This may be through a global custodian, a foreign local custodian, an ICSD or via the domestic CSD. Furthermore, these market participants may also access the foreign CSD indirectly, increasing the number of layers of provision of cross-border custody services. For example, in the extreme, these services may be provided by a local custodian, via a global custodian, via an external foreign local custodian, via an ICSD, and finally through accessing the foreign CSD. However, such arrangements are extremely unlikely to occur.

This does raise an important issue regarding the significant overlap in the provision of custody services, particularly for cross-border transactions. For example, Figure 4.7 suggests that, for the purposes of cross-border custody, global custodians and ICSDs are very similar. While this may facilitate a range of routes for accessing a foreign CSD, the service offering may differ considerably between global custodians and ICSDs. CSDs and ICSDs provide the core services of custody—ie, those outlined in section 4.1—while custodians and global custodians typically provide a more extensive bundle of services beyond the core services—eg, portfolio monitoring or risk management services.

The range of market structures for the provision of custody services, which will vary according to particular markets, securities and the preferences of investors, is not a

significant factor for the purposes of designing a methodology. While the number of layers within this market may have an impact on the cost of cross-border custody services—as each layer adds additional costs—the methodology does not depend on the combinations of these layers.

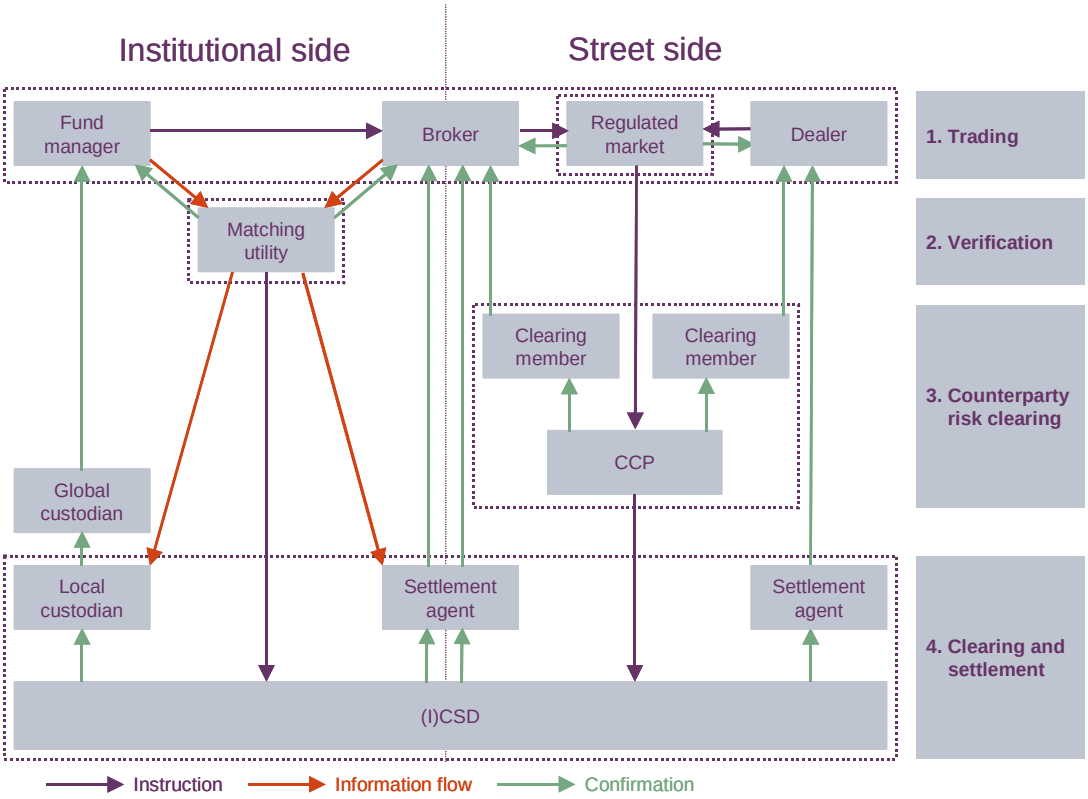
While the market structures for the provision of the primary book-entry register differs for equities and various fixed income securities, those for the provision of custody services are similar for equities and fixed income securities. However, the nature of those custody services (eg, asset servicing) will differ for equities and fixed income securities.

4.2.2 Flow-related activities

Having considered these stock-related activities, it is useful to look at the relationships for the provision of the flow-related activities. This section attempts to describe the value chain for the provision of flow-related services for both equities and fixed income securities. Such an approach is suitable, since the potential market structures for the provision of trading and post-trading services for equities and fixed income securities are similar, although there is a considerable difference in the significance of market structures for the equities and fixed income securities.

Figure 4.8 provides a stylised illustration of the value chain for the provision of these activities for equities. As with the stock-related activities, there is considerable scope for variation in the provision of some flow-related activities. However, as indicated by the figure, it is necessary to consider two value chains for the provision of flow-related services, one on the street side of the transaction and one on the institutional side of the transaction.

Figure 4.8 Stylised illustration of the value chain for flow-related activities



Note: This is a stylised illustration combining a regulated market with CCP on the street side with a centralised matching utility on the institutional side. As such, this diagram shows the interaction of the transactions on the street side and the institutional side, and does not capture all the possible value chains, which are discussed in further detail below.
Source: SWIFT and Oxera.

For any given trade order, there may be two transactions; one on the street side, in which the broker/dealer executes the trade via a trading platform, and one on the institutional side, in which the broker/dealer completes the transaction with the investor. It is important to note that not all transactions will include both sides. For example, a dealer trading on its own account would transact only on the street side, while an investor transacting with a dealer would only do so on the institutional side.[21]

Figure 4.8 shows how the value chains for these two transactions interact. The transaction is commenced by the trade order from the investor, the broker then completes it on the street side, and completes it with the investor on the institutional side. However, it shows only one possible structure for each of the two sides of the transaction. As such, it is necessary to consider alternative market structures for the provision of trading and post-trading services on both the street side and the institutional side of the transactions.

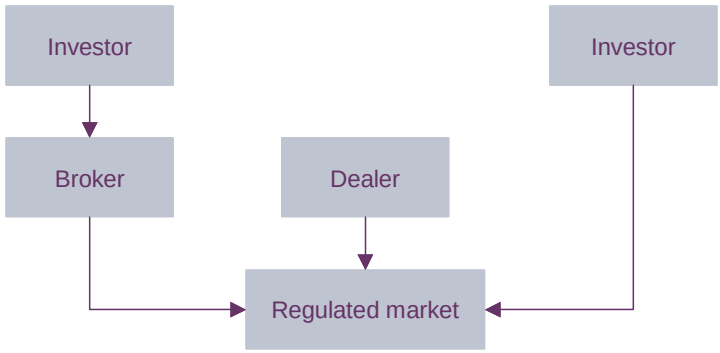
4.2.3 Flow-related activities on the street side

There are several value chains for the provision of trading and post-trading services on the street side of a transaction. These variations are primarily driven by different market structures for the provision of trading, and different market structures for the provision of clearing and/or counterparty risk clearing. This section considers the market structures throughout the value chain on the street side of a transaction, before comparing a number of complete value chains.

Channels for trade execution within a domestic financial market

Trade execution commences with a trade order being sent from the fund manager to the broker, or a trade decision being made by a dealer. The broker/dealer will execute the transaction in the financial markets, via one (or more) of several trading platforms, depending on the transaction and/or instructions of the fund manager. There are many alternative arrangements for transactions in the financial markets. Based on the Markets in Financial Instruments Directive (MiFID), Figures 4.9 to 4.12 show alternative channels for executing a trade via four different market structures, only within a domestic financial market. These diagrams do not show an individual transaction, but represent the alternative means of accessing a trading platform.

Figure 4.9 Trading via a regulated market

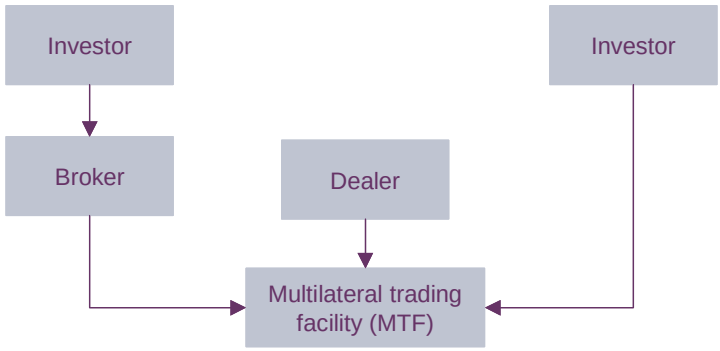


Note: The arrows in this figure show the means of access to the regulated market.
Source: Oxera.

Figure 4.9 shows an alternative means of trading on a regulated market. Investors could access the regulated market via a broker, or in some cases, via DMA. Dealers will also access the market directly.

[21] The distinction between the 'street-side' and the 'institutional-side' should not be confused with the distinction between 'institutional' and 'retail' investors. The 'street-side' of the transaction is that which takes place between broker/dealers, and the 'institutional-side' is that which takes place between a broker/dealer and the investor (either an institutional or retail investor).

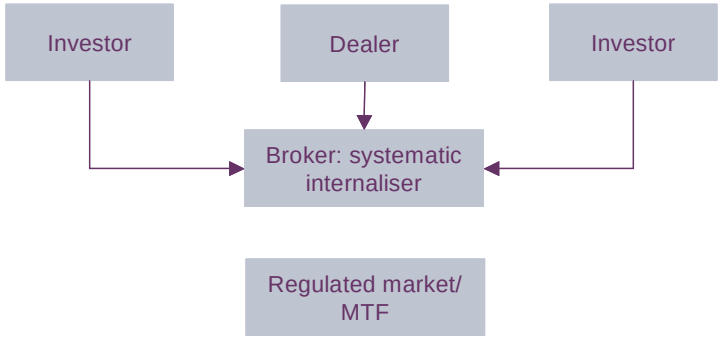
Figure 4.10 Trading via a multilateral trading facility



Note: The arrows show the means of access to the MTF.
Source: Oxera.

As with Figure 4.9, Figure 4.10 shows an alternative means of trading on a multilateral trading facility (MTF). Investors could access the MTF via a broker, or where the broker operates the MTF, the investor could access it directly. Similarly, dealers could access the MTF directly. Off-exchange transactions are considered to be functionally the same as transactions on MTFs—ie, this is equivalent to one of the brokers/dealers operating an MTF.

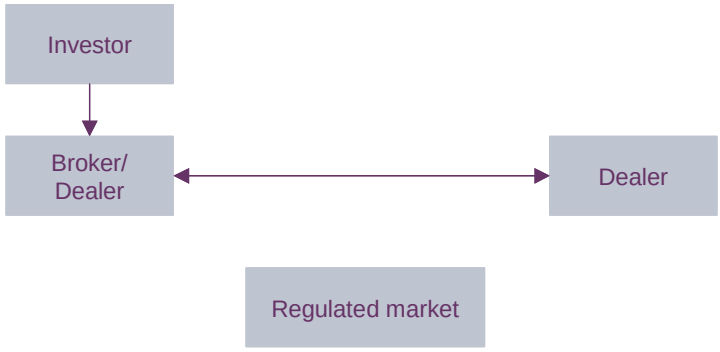
Figure 4.11 Trading via a systematic internaliser



Note: The arrows show the means of access to the systematic internaliser.
Source: Oxera.

Figure 4.11 shows an process whereby the broker internally crosses transactions between investors, or takes the other side of a transaction. For example, if the broker had previously bought the securities, it would hold them on its books until it could sell them to another investor. The broker is considered to be a systematic internaliser, such that it executes transactions between its own clients without sending trade orders to an exchange or MTF.

Figure 4.12 Over-the-counter trading



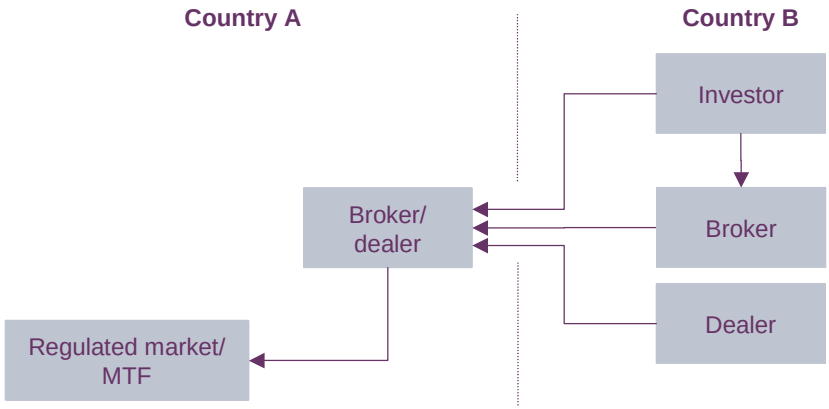
Note: The arrows show the means of access to over-the-counter trading—ie, the investor accesses OTC trading via a broker/dealer, which trades with other wholesale counterparties.
Source: Oxera.

Figure 4.12 shows a fourth arrangement, in which the brokers and dealers trade bilaterally. Such off-exchange or over-the-counter (OTC) trading is distinct from either MTFs (due to the absence of an underlying trading platform) or systematic internalisation (due to the need to trade with other wholesale counterparties). This would describe the inter-dealer market for fixed income securities.

Different channels for cross-border trade execution

Although Figures 4.9 to 4.12 focus on transactions within a single financial centre, there are similar means of accessing trading platforms in other financial centres. Figures 4.13 to 4.17 show possible arrangements for cross-border trade execution. For the purposes of these figures, regulated markets and MTFs are considered together.

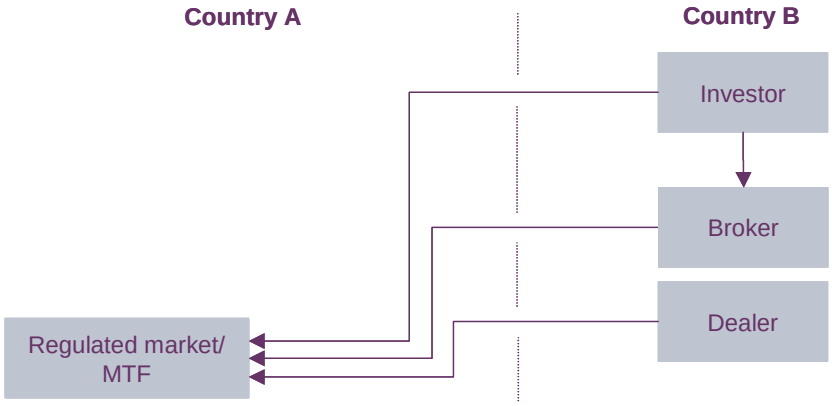
Figure 4.13 Cross-border trading via a local (foreign) broker



Note: The arrows show the means of access to the regulated market or MTF. For simplification, some possible relationships are not shown—eg, the brokers in country A and B may be horizontally integrated.
Source: Oxera.

Figure 4.13 shows the simplest structure for cross-border trading, whereby the market participants in country B send their trade orders to a broker in country A. The investor in country B may have a direct relationship with the broker in country A, or may have an indirect relationship, via the broker in country B.

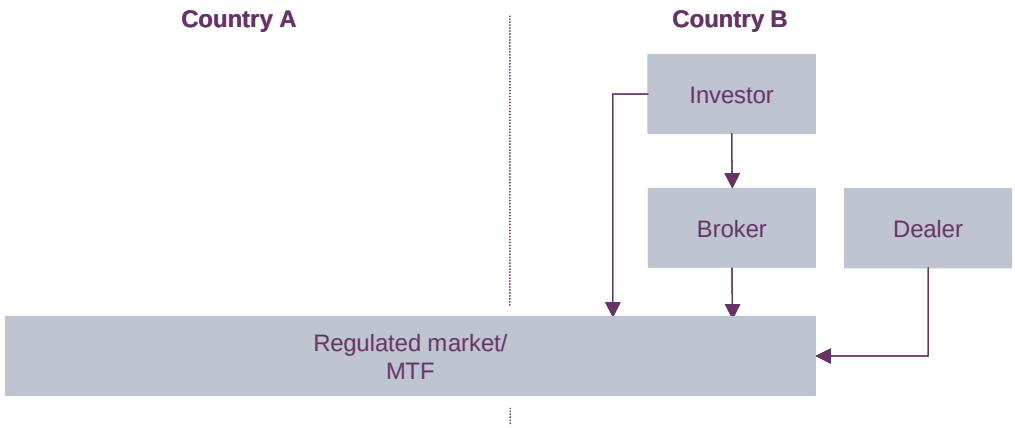
Figure 4.14 Cross-border trading without a local (foreign) broker



Note: The arrows show the means of access to the regulated market or MTF.
Source: Oxera.

Alternatively, Figure 4.14 illustrates a scenario in which the domestic broker accesses the financial markets in country A directly.

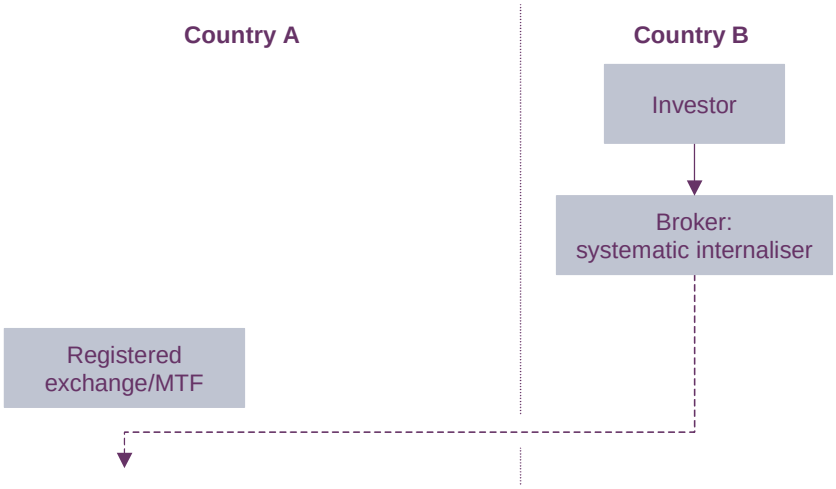
Figure 4.15 Cross-border trading via a global trading platform



Note: The arrows show the means of access to the regulated market or MTF. For simplification, some possible relationships are not shown—eg, the broker or dealer in country A may operate the global MTF.
Source: Oxera.

Figure 4.15 presents a similar scenario to that shown in Figure 4.14, where the market participants in country B access the regulated market or MTF directly, although in this case the regulated market or MTF operates in both countries.

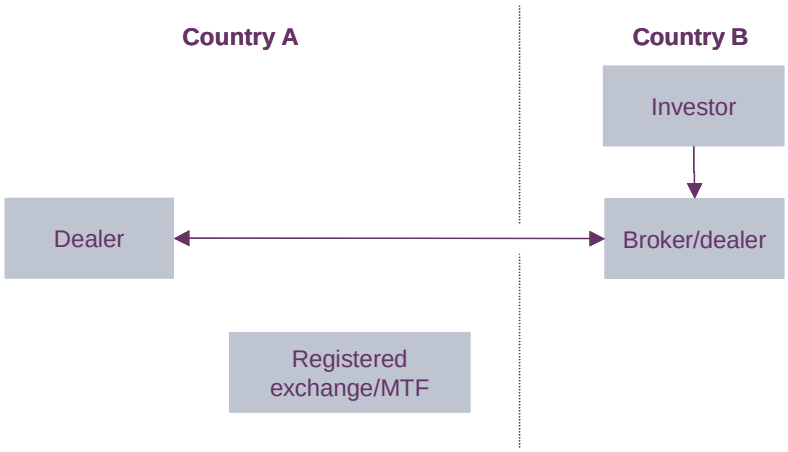
Figure 4.16 Cross-border trading via a systematic internaliser



Note: The solid arrow in this figure shows the means of access to the systematic internaliser, and the dashed arrow shows the access to the clearing and settlement system in country A. For simplification, some possible relationships are not shown—eg, the systematic internaliser may operate in both countries.
Source: Oxera.

Figure 4.16 shows the relationships for a cross-border trade via a systematic internaliser. This is similar to a domestic trade via a systematic internaliser, as shown in Figure 4.11. The broker may have bought securities traded in another country and have them on its books when another client (the investor in country B) seeks to purchase those securities. The broker can execute the transaction (in country B), but would have to send the clearing and settlement instructions across the border for clearing and settlement in the other country (country A).

Figure 4.17 Cross-border OTC trading



Note: The arrows show the means of access to OTC trading—ie, the investor accesses OTC trading via a broker/dealer, which trades with other wholesale counterparties.
Source: Oxera.

Figure 4.17 shows another market structure, in which brokers and dealers operate OTC trading between country A and country B. Investors in country B can access this market structure either through a broker in country B (as shown), or through a broker operating in country A (not shown).

As these various relationships show, the structures for both domestic and cross-border trading in securities are subject to numerous potential variations. It is likely that some of these routes are predominantly used for transactions of certain securities, while others may not be used very often, if at all. For example, regulated markets are the principal market structures for the trading of equities, while OTC trading is the most prevalent for many fixed income securities. In addition, since these are *potential* structures, it is unclear whether they are prevalent in the various financial centres at this stage of the study.

Verification

After the transaction has been agreed, where it involves two brokers, the trade will be confirmed prior to being sent for clearing or settlement. On the street side, for many on-exchange transactions, this service will be provided by the trading platform.

Alternatively, for off-exchange transactions, verification may be provided by one of three routes. First, the back offices of the brokerage firms may confirm the trade with each other before sending the transaction for clearing and settlement. Second, the brokers may send their trade orders to a matching utility for confirmation, which will either provide confirmation to the brokers or send the transaction for clearing and settlement. Third, confirmation may be provided by the CSD prior to settlement of the transaction.

Counterparty risk clearing

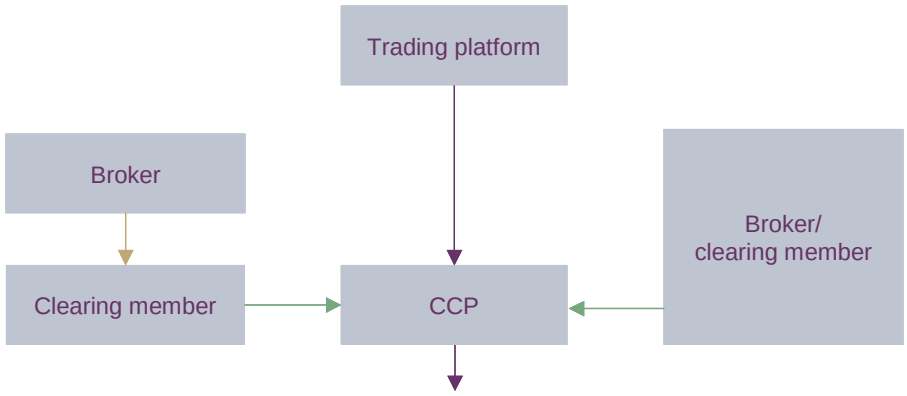
In keeping with the definitions and descriptions of the post-trading services in section 4.1, this section distinguishes between clearing and counterparty risk clearing. Counterparty risk clearing may be provided by a counterparty or CCP. Where counterparty risk clearing is provided, the trading platform will send the instruction to the counterparty or CCP, which will net the transactions for the trading counterparties, and interpose itself as the counterparty to the trading counterparty for any given transaction. Where there is a CCP, it will interpose itself as the counterparty for every transaction. The counterparty or CCP will then send the instruction to the primary CSD for clearing and settlement.

However, in order to benefit from counterparty risk clearing, the broker/dealer must be a member of the counterparty or CCP providing the service. Some brokers may be clearing

members of the counterparty or CCP. Where brokers are not clearing members, they must appoint a clearing member to access the counterparty or CCP for their transactions.

Figure 4.18 illustrates the instructions from the trading platform and to the CSD (shown by the purple arrows), the membership of the CCP (the green arrows), and indirect access via a clearing member (the yellow arrow). It has also been noted that, in some financial centres, the settlement instructions may be sent by the clearing members, rather than by the CCP.

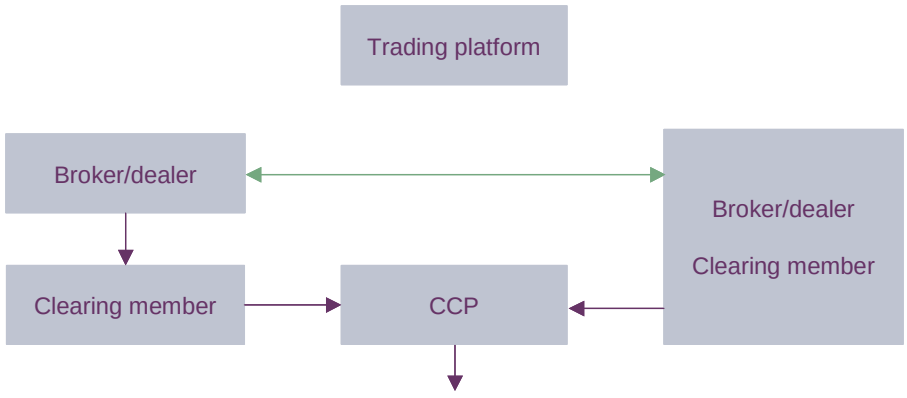
Figure 4.18 Stylised illustration of counterparty risk clearing



Note: The purple arrows indicate the instruction from the trading platform to the CCP, and from the CCP to the CSD; the green arrows indicate membership of the CCP; and the yellow arrow indicates access via an external clearing member.
Source: Oxera.

Alternatively, in the absence of straight-through processing from the trading platform to the clearing house, it is possible that counterparties in OTC trading might access the CCP via their clearing members. Although the counterparties would not benefit from the anonymity provided by the CCP for on-exchange transactions, the CCP would still provide counterparty risk clearing. Figure 4.19 shows the possible market structure for the provision of counterparty risk clearing for OTC trading.

Figure 4.19 Stylised illustration of counterparty risk clearing for OTC trading



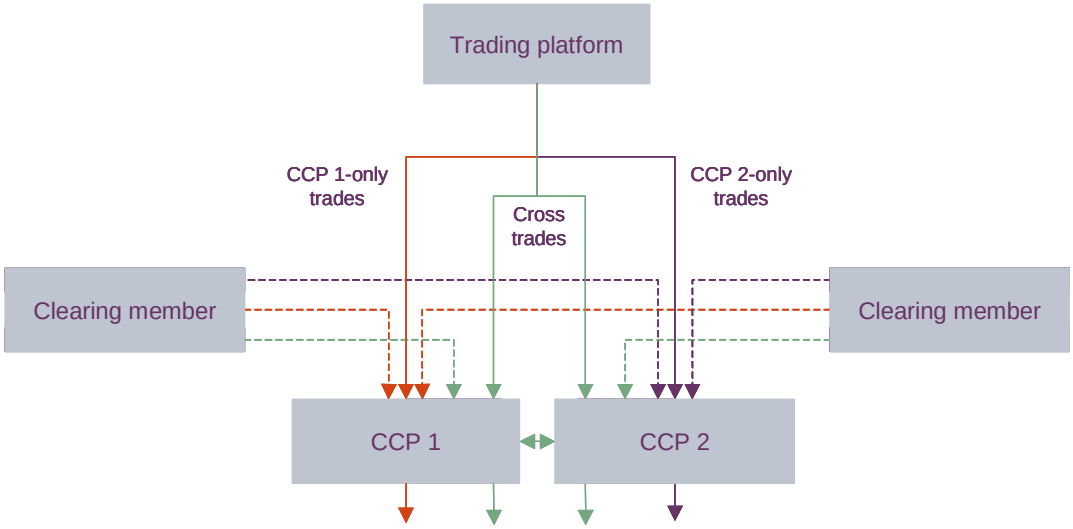
Note: The green arrow indicates the OTC trade between the broker/dealers, and the purple arrows indicate the clearing and settlement instructions to the CCP and from the CCP to the CSD.
Source: Oxera.

However, the structure of the value chain for clearing is becoming more complex with the development of competitive clearing. This follows from the development of access and interoperability as part of the industry code of conduct, which will introduce a range of models

of competitive clearing.[22] Two stylised illustrations of competitive clearing are shown in Figures 4.20 and 4.21.

Figure 4.20 shows a model of pure competitive clearing. The solid arrows show the instructions from the trading platform, while the dashed arrows show the membership of the different CCPs. Where both trading counterparties select either of the two clearing houses, this clearing house will act as the clearing house for that trade. However, where the trading counterparties choose different clearing houses, the two clearing houses will appear as the other participant in the trade (ie, in place of the client), resulting in 'inter-central counterparty positions'.

Figure 4.20 Stylised illustration of competitive clearing (I)

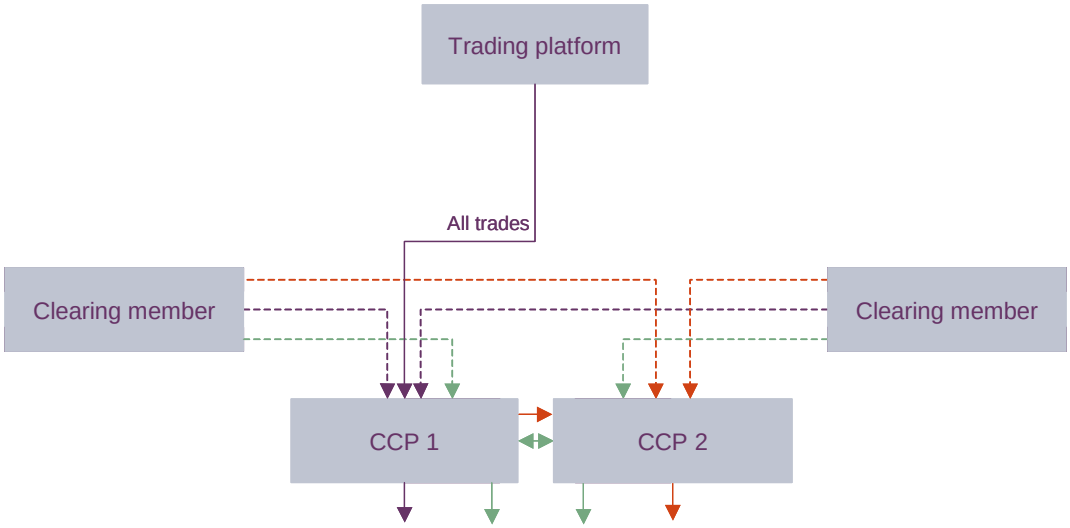


Source: Oxera.

Alternatively, Figure 4.21 shows a model of a secondary clearing house. All clearing instructions are sent to the primary clearing house (ie, clearing house 1). Where both trading counterparties select this clearing house, it will act as the clearing house for this trade. Where both trading counterparties select the secondary clearing house (clearing house 2), the primary clearing house will send the instructions on to the secondary clearing house, which will clear this transaction. Where the trading counterparties choose different clearing houses, the primary clearing house will clear the transaction with the secondary clearing house before sending the settlement instruction to the CSD.

[22] The EACH report on access and interoperability is due to be published shortly.

Figure 4.21 Stylised illustration of competitive clearing (II)



Source: Oxera.

Figures 4.20 and 4.21 present just two of the models of competitive clearing. As noted above, the work of EACH on access and interoperability may extend the range of models for competitive clearing.

Clearing and settlement

As described in section 4.1, clearing is the process of preparing a security for settlement, which may include netting, clearance and the settlement instruction. Where counterparty risk clearing is provided by the CCP, the CCP will usually provide the netting service prior to the provision of counterparty risk clearing. However, both clearance and the settlement instruction are provided by the primary CSD, ahead of the provision of the settlement service.

In terms of the flow-related activities, settlement is the actual exchange of securities and monies between accounts with both custodians and the CSDs. This service is commonly referred to as delivery versus payment (DvP), whereby the transfer of securities and the transfer of monies occur at the same time.

However, the participants in the provision of settlement services are predominantly determined by the vertical market structures for each country and the securities issued within that country. As such, access to the settlement infrastructure in the value chain for flow-related activities will be determined by the relationships in the value chain for stock-related activities.[23]

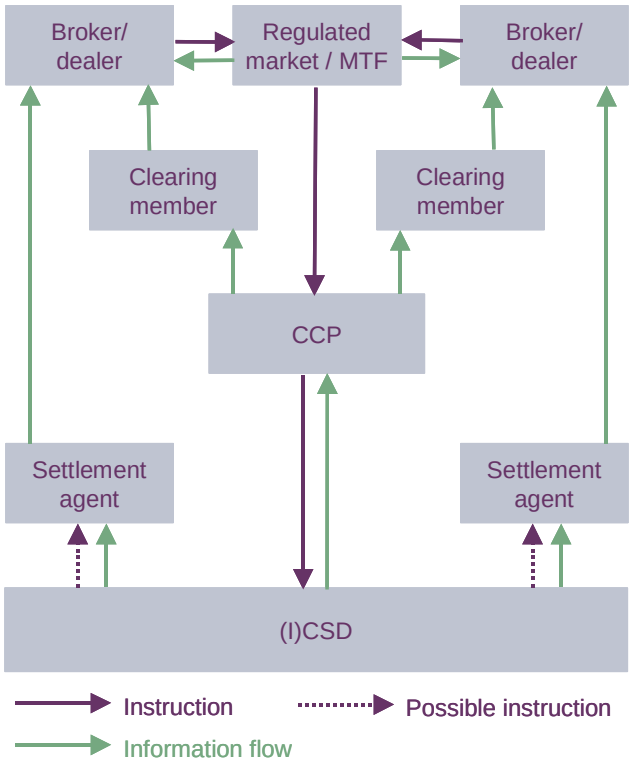
The location of the actual transfer of securities and monies will be determined by the level of detail of account holding throughout the value chain for stock-related activities. Although the settlement instruction is received by the CSD, settlement may also (or only) be required between the accounts within another custody service provider. As such, the primary CSD would be required to send the settlement instruction back up the value chain to the relevant settlement agents and custodians. Settlement agents are those market participants that provide access to the primary CSD.

[23] It may also be useful to distinguish between the services provided by the CSD and those provided by settlement agents (custodians or other (I)CSDs). For example, central settlement could describe the DvP on the primary book-entry register, while settlement could describe the DvP at other layers in the value chain.

The value chain for street-side trading and post-trading services

Following from the description of the possible market structures for the provision of both trading and post-trading services on the street side, several possible value chains can be constructed, as shown in Figures 4.22 to 4.27. These value chains represent the primary value chains on the street side, but do not provide a comprehensive coverage of the different potential value chains.

Figure 4.22 Value chain with trading platform and counterparty risk clearing

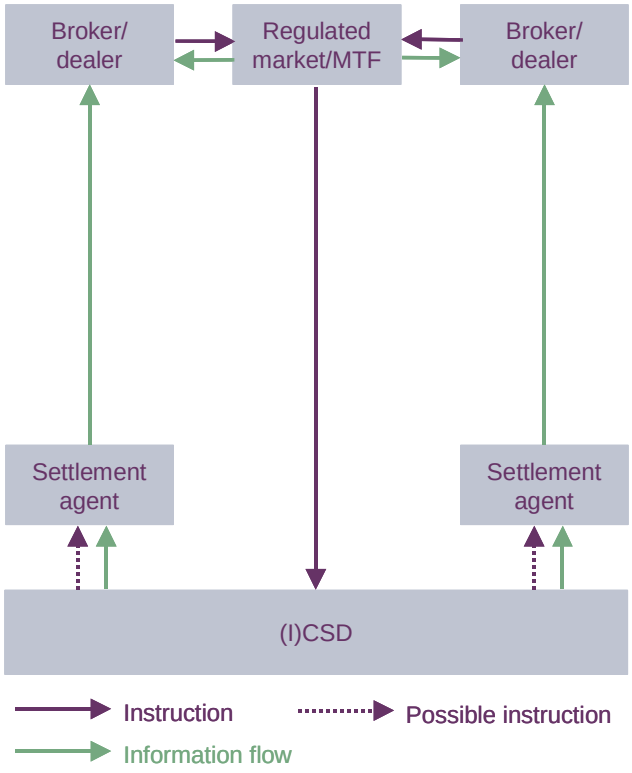


Source: Oxera.

In Figure 4.22, there is both a trading platform (either a regulated market or an MTF) and a CCP. In this case, the trading platform would provide both the trading services and verification to the brokers and/or dealers. The trading platform would send the transactions to the CCP, which would provide netting and counterparty risk clearing to the brokers and/or dealers, via the clearing members, which would provide notification to brokers and/or dealers. The CCP would then send the trade to the (I)CSD for clearing and settlement, which would include clearance (ie, the 'resource check') and settlement.

The (I)CSD would settle the transaction, and may send it back up the value chain for the provision of stock-related activities (ie, via the settlement agent) for settlement at the different levels of account holding. Notification would flow back through the value chain for the provision of stock-related activities back to the brokers and/or dealers.

Figure 4.23 Value chain with trading platform and direct CSD relationship

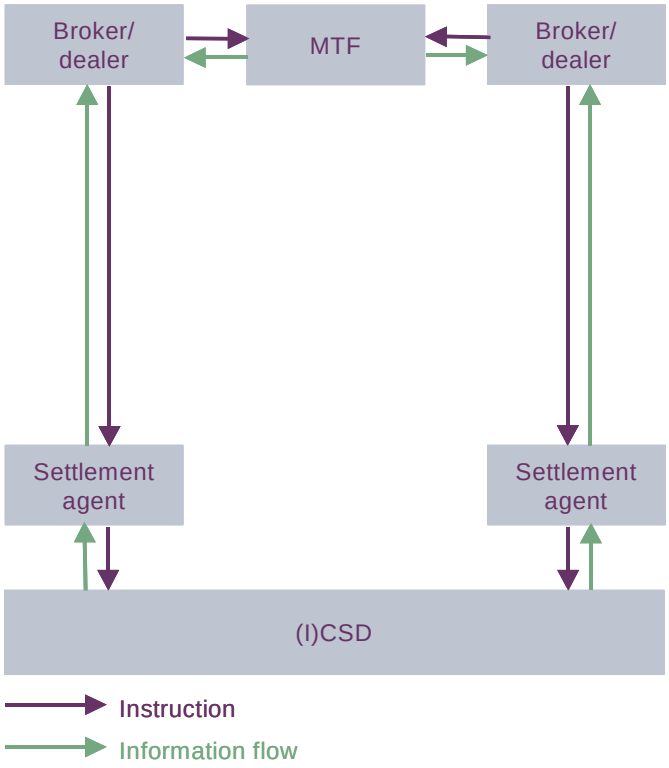


Source: Oxera.

In Figure 4.23, there is a trading platform (either a regulated market or an MTF) but no CCP. In this case, the trading platform would provide both the trading services and verification to the brokers and/or dealers. No counterparty risk clearing is provided. The trading platform would send the transactions to the (I)CSD for clearing and settlement, which would include netting, clearance (ie, the 'resource check') and settlement.

The (I)CSD would settle the transaction, and may send the transaction back up the value chain for the provision of stock-related activities (ie, via the settlement agent) for settlement at the different levels of account holding. Notification would flow back through the value chain for the provision of stock-related activities back to the brokers and/or dealers.

Figure 4.24 Value chain with MTF and indirect CSD relationship



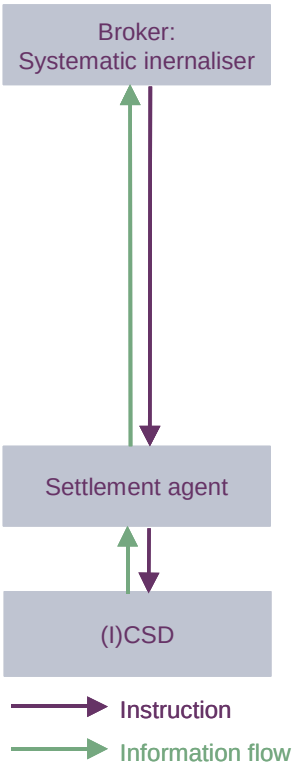
Source: Oxera.

In Figure 4.24, there is an MTF, but no CCP. In this case, the MTF would provide both the trading services and verification to the brokers and/or dealers. No counterparty risk clearing is provided. Since there is no direct link between the MTF and the (I)CSD, the brokers and/or dealers would send the transactions to the (I)CSD for clearing and settlement, via their settlement agents. This would include netting, clearance (ie, the 'resource check') and settlement.

The (I)CSD would settle the transaction, and may send the transaction back up the value chain for the provision of stock-related activities (ie, via the settlement agent) for settlement at the different levels of account holding. Notification would flow back through the value chain for the provision of stock-related activities back to the brokers and/or dealers.

Alternatively, depending on the level of account holding and any commonality of settlement agents, the transaction may be cleared and settled by a custodian without being sent to the (I)CSD.

Figure 4.25 Value chain with systematic internaliser



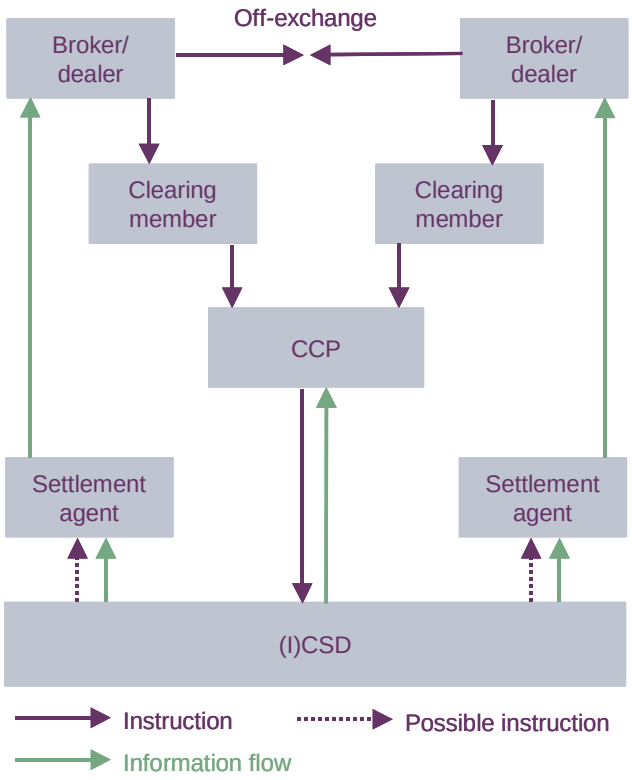
Source: Oxera.

In Figure 4.25, the trade is completed by a systematic internaliser. In this case, the broker/dealer provides both the trading services and verification to the investors. No counterparty risk clearing is needed or provided. The systematic internaliser would send the transactions to the (I)CSD for clearing and settlement, via its settlement agent. This would include netting, clearance (ie, the 'resource check') and settlement.

The (I)CSD would settle the transaction, and may send the transaction back up the value chain for the provision of stock-related activities (ie, via the settlement agent) for settlement at the different levels of account holding. Notification would flow back through the value chain for the provision of stock-related activities back to the brokers and/or dealers.

Alternatively, depending on the level of account holding and any commonality of settlement agents, the transaction may be cleared and settled by a custodian without being sent to the (I)CSD.

Figure 4.26 Value chain with off-exchange trading and counterparty risk clearing

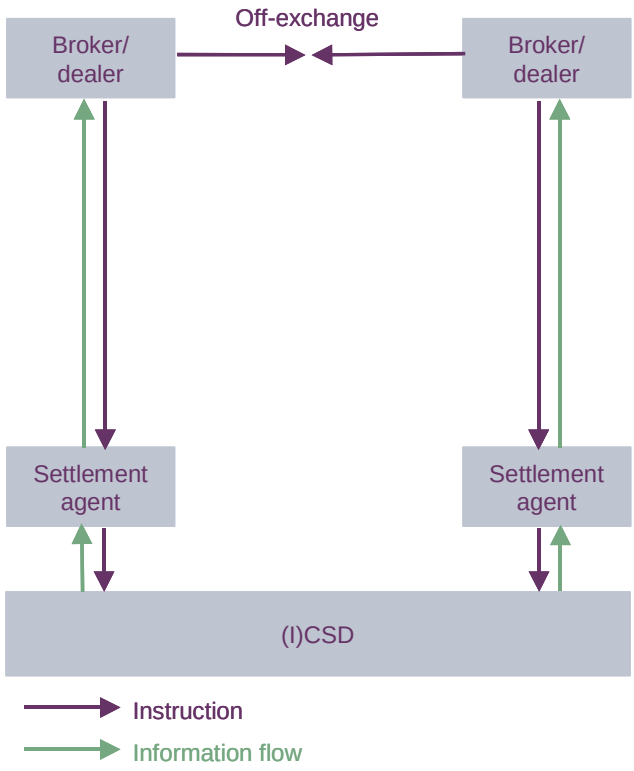


Source: Oxera.

In Figure 4.26, there is no trading platform, but the two OTC counterparties agree to send the trade to a CCP. In this case, the broker/dealers provide the trading services and send the transactions to the CCP via their clearing members. The CCP provides netting and counterparty risk clearing to the brokers/dealers, and then sends the trade to the (I)CSD for clearing and settlement, which would include clearance (ie, the 'resource check') and settlement.

The (I)CSD settles the transaction, and may send the transaction back up the value chain for the provision of stock-related activities (ie, via the settlement agent) for settlement at the different levels of account holding. Notification would flow back through the value chain for the provision of stock-related activities back to the brokers and/or dealers.

Figure 4.27 Value chain with off-exchange trading and indirect CSD relationship



Source: Oxera.

In Figure 4.27, there is no trading platform, and the two OTC counterparties send the trade to the (I)CSD. In this case, the broker/dealers provide the trading services and send the transactions to the (I)CSD, via their settlement agents.

The (I)CSD settles the transaction, and may send the transaction back up the value chain for the provision of stock-related activities (ie, via the settlement agent) for settlement at the different levels of account holding. Notification then flows back through the value chain for the provision of stock-related activities back to the brokers and/or dealers.

Alternatively, depending on the level of account holding and any commonality of settlement agents, the transaction may be cleared and settled by a custodian without being sent to the (I)CSD.

4.2.4 Flow-related activities on the institutional side

While there are several value chains for the provision of trading and post-trading services on the street side of a transaction, the institutional side is much simpler. This section considers the market structures throughout the value chain on the institutional side of a transaction.

Trading

Although there are many market structures for the provision of trading on the street side, on the institutional side, trading consists purely of the trade order sent to the broker/dealer by the investor, and the completion of the transaction.

Verification

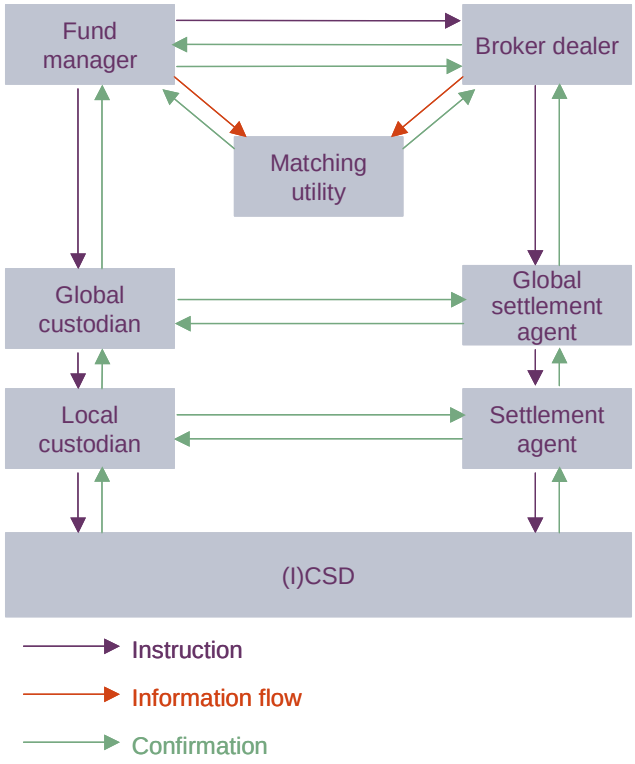
Although trading is functionally simple, a number of market structures have developed for the provision of verification. This is the matching process that ensures that differences in the trade orders on either the street side or the institutional side are identified quickly. Where

such discrepancies arise, they can be corrected quickly, with a view to avoiding a failure at a later stage of the clearing and settlement cycle.

There are a number of structures in the provision of trade order matching. The significant variations arise depending on whether a matching utility is involved, and if so, to what extent it operates as a central trade manager. Three potential arrangements for verification on the institutional side are shown in Figures 4.28, 4.29 and 4.30.

Figure 4.28 shows the structure in place in the absence of a centralised matching utility, where matching takes place at a localised level. In this structure, matching takes place at each level of the stock-related activities value chain. The fund manager and broker may still use a matching utility to confirm trade order matching with each other. However, both will send the settlement instruction to the custodians and settlement agents. In turn, the custodians and settlement agents will match the trade orders prior to sending the settlement instructions to the (I)CSD. This market structure appears in the majority of European financial centres for both domestic and cross-border transactions.

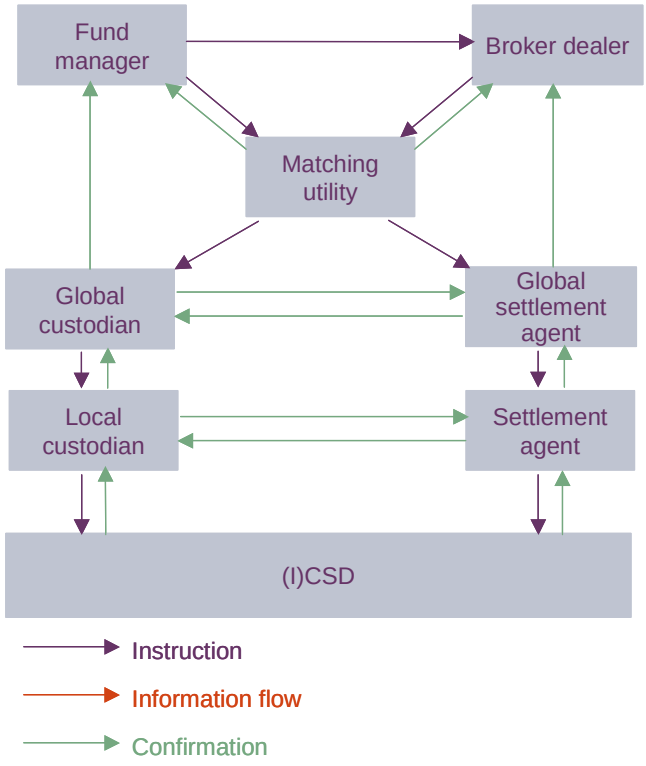
Figure 4.28 Institutional-side confirmation: local matching model



Source: Oxera.

Figure 4.29 shows a centralised matching utility. In such a case, the matching utility matches the trade orders and confirms this with the fund manager and the broker. It then sends the settlement instructions to the custodians and settlement agents. However, as in Figure 4.28, the custodians also confirm that the trade orders match, prior to sending the settlement instructions to the CSD. Once the transaction has been settled, the CSD sends confirmation back to the custodians and settlement agents, which send confirmation back to the fund manager and broker respectively.

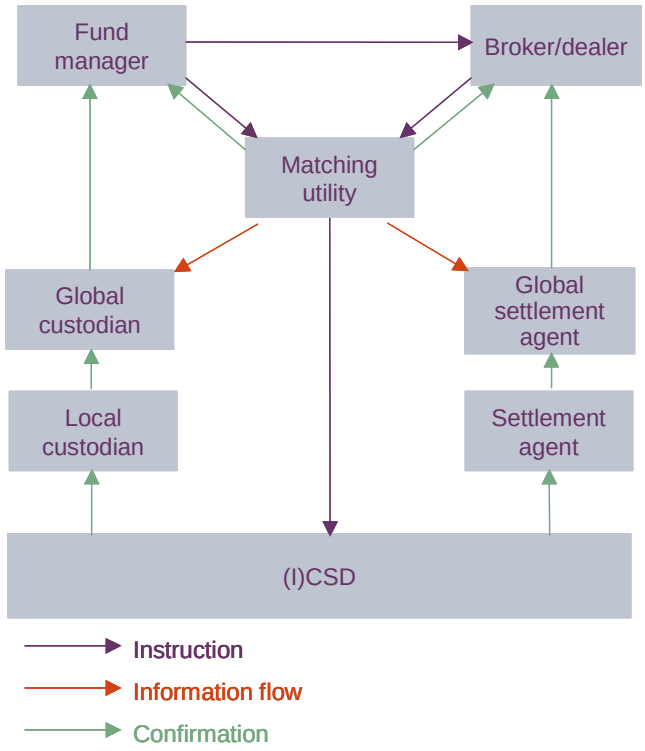
Figure 4.29 Institutional-side confirmation: centralised matching utility



Source: Oxera.

Figure 4.30 also shows a centralised matching utility. However, in this case, the matching utility sends the settlement instruction directly to the CSD. As in Figure 4.28, the matching utility matches the trade orders and sends a confirmation that they match back to the fund manager and the broker. The centralised matching utility then sends the settlement instructions directly to the CSD, and also sends notification to both the custodians and settlement agent. Once the CSD has settled the transaction, the CSD sends confirmation to the custodians and settlement agents, which send confirmation back to the fund manager and broker respectively. This is the structure that exists in the USA for domestic transactions.

Figure 4.30 Institutional-side confirmation: centralised matching utility with custodians and CSDs



Source: Oxera.

Although these structures are similar, they may result in different costs. This can be seen in the differences between the three models in Figures 4.28, 4.29 and 4.30. For example, in both Figures 4.28 and 4.30, the trade orders are confirmed two or three times. This may increase the time for the settlement of the transaction, and thereby the risk of settlement failure.

Where matching utilities are used, these services are typically paid for by both the broker and fund manager, although the breakdown of these costs may not be equal between the two parties.

Clearing and settlement

The clearing and settlement of the institutional-side transactions is functionally similar to the street-side transactions. As indicated by Figures 4.26, 4.27 and 4.28, the instruction for clearing and settlement may be received from the custodians and settlement agents or directly from a matching utility. The primary (I)CSD will provide the clearing (netting, clearance and settlement instruction), and settlement of the transaction. Again, depending on the level of account holding details, the (I)CSD may pass the settlement instruction back up the value chain for the provision of stock-related activities for settlement in the accounts of the other market participants in that value chain.

5 Relevant activities and their pricing structures in the value chain

5.1 Introduction

Section 4 provided a framework that identified and described the relevant activities in the value chain for the provision of trading and post-trading activities, and provided a description of the value chain (including a number of potential market structures) for the provision of trading and post-trading activities. This section identifies the typical providers of those activities, and provides both a description of the services that are provided and a description of how these services are priced. Furthermore, to provide a more detailed understanding of the interaction of market participants, this section describes the services that are purchased by market participants.

For the purposes of this report, the nature of the organisation that offers the trading and post-trading services is not relevant—the methodology focuses on the *activity,* irrespective of the type of organisation that is providing that service. This means, for example, that in this report the terms 'brokers', 'brokerage firms' and 'custodians' refer to those firms that provide brokerage services and custody (and settlement) services respectively. Brokerage and custody services can be provided by a range of firms—for example, custody services may be provided by global custodians, banks or CSDs (ie, CSDs acting as intermediaries by providing access to a CSD in another financial centre). Similarly, brokerage services may be provided by investment banks, retail banks, or full-services brokerage houses or execution-only brokerage firms. There are also a large number of firms that offer both brokerage and custody services. All these different firms are, in principle, covered by the methodology.

Infrastructure providers and intermediaries can offer a wide range of services, the pricing structures of which can be complex. This section provides a high-level description of the services and pricing structures. A detailed description of all the services and pricing structures across all the selected financial centres is beyond the scope of this report, and will be covered in the application of the methodology.

Trading and post-trading services are provided by a number of infrastructure providers and intermediaries. These services may be provided as separate individual services, or in a bundle. Two types of bundle can be distinguished:

– **a bundle of different trading and post-trading activities**—for example, brokerage firms often provide different types of transaction execution methods in a bundle;

– **a bundle of trading and post-trading activities and other services**—for example, a custodian may offer settlement and custodian services in a bundle with portfolio and risk analysis.

As such, it is necessary to consider the services that are provided, and how they are priced throughout the value chain. Since there is considerable integration between the value chains for the provision of stock- and flow-related services, this section will consider these as an integrated value chain. Table 5.1 provides a summary of the relationships between market participants.

Table 5.1 Relationships between agents in the value chain

Seller / Buyer	Broker/dealer	Trading platform (exchange/MTF)	Clearing agent	CCP	Custodian (settlement agent)	(I)CSD
Investor	Trade execution Research	Trade execution	–	–	Settlement Custody services Additional services	Clearing Settlement Custody services
Broker/ dealer	Trade execution	Trade execution	Counterparty risk clearing	Counterparty risk clearing	Settlement Custody services Additional services	Clearing Settlement Custody services
Trading platform	–	–	–	–	–	–
Clearing agent	–	–	–	Counterparty risk clearing	–	–
CCP	–	–	–	Counterparty risk clearing	–	–
Custodian	–	–	–	–	Settlement Custody services Additional services	Clearing Settlement Custody services
(I)CSD	–	–	–	–	Settlement Custody services	Clearing Settlement Custody services

Source: Oxera.

This section considers each market participant, and describes three characteristics of the market participants; first, the range of relevant services provided by the market participants in the value chain, second, the pricing structure for these services, and third, the relevant services that are purchased from other market participants.

Detailed information on services and pricing structures can be found on the websites of the providers, and further information was provided to Oxera in the questionnaires. This information will be used in the application of the methodology to tailor the questionnaires for the actual collection of data on prices and volumes.

5.2 Investors

The investor is the market participant that makes the investment decision. As such, while there may be many individual investors (retail investors or high net worth individuals), the majority of investment decisions are made by fund management firms. Therefore, this section focuses on the services provided and purchased by fund management firms.

5.2.1 Services provided by fund management firms

Fund managers invest funds on behalf of institutions or private clients, and charge the client a management fee. Their primary task is to invest pension contributions, insurance premiums and savings in a portfolio of financial assets that will best meet their clients' needs.

Fund management firms offer two types of management: active and passive. With passive management, the fund manager tracks an index, such as the FTSE 100—ie, assets are held

in exactly the same weighting as they appear in the chosen index. With active management, the fund manager adopts positions in the market to generate higher returns than the benchmark (eg, an index). Passive management can normally be carried out at a lower cost than active management, reflecting the levels of input required in the respective investment allocation processes.

Fund management covers a broad range of activities, which can be roughly divided into three categories.[24]

– **Core asset management**. This constitutes the core function and includes investment research, management of investment portfolios, buying and selling investments (dealing desk), interaction with the companies invested in and pre- and post-trade broker liaison.

– **Marketing and distribution**. This encompasses activities relating to marketing, sales and business development.

– **Middle- and back-office functions**. This includes all trade support functions, such as transaction processing, settlement, custody and stock lending, IT support, performance measurement, investment accounting, compliance, financial accounting, and corporate management.

The methodology focuses on trade execution and trade execution-related activities, which cover the dealing desk, pre- and post-trade broker liaison, and all support functions in the middle- and back-office-related trading and post-trading activities. Some of these activities are sourced from external parties, while others, such as dealing with exemptions, are often carried out in-house.

5.2.2 Pricing structure

Fund managers charge their clients (investors) a management fee. Management fees are commonly expressed as a proportion of fund value. Fee arrangements for some funds (particularly those with more 'aggressive' mandates) may incorporate a performance-related element, whereby an extra fee is charged if the manager outperforms a benchmark portfolio by more than an agreed amount. The fee is generally expressed as a percentage of the value of the fund above a given benchmark, and is usually capped at a certain amount.

The level of management fee depends on a number of factors, such as fund size, and whether it is actively or passively managed.

– **Type of fund management**. With passive management the fund manager tracks an index, such as the FTSE 100—ie, assets are held in exactly the same weighting as they appear in the chosen index. Passive management can usually be undertaken at a lower cost than active management, reflecting the levels of input required in the respective investment allocation processes.

– **Size of mandate**. For both types of fund management, there is usually a negative relationship between fees and the value of the fund. This relationship (which is not necessarily linear) can be explained by the presence of economies of scale in fund management.[25] Economies of scale in passive fund management are likely to be more significant than those in active management, since the former may allow for a greater degree of automation, and the latter may require more manual input from fund

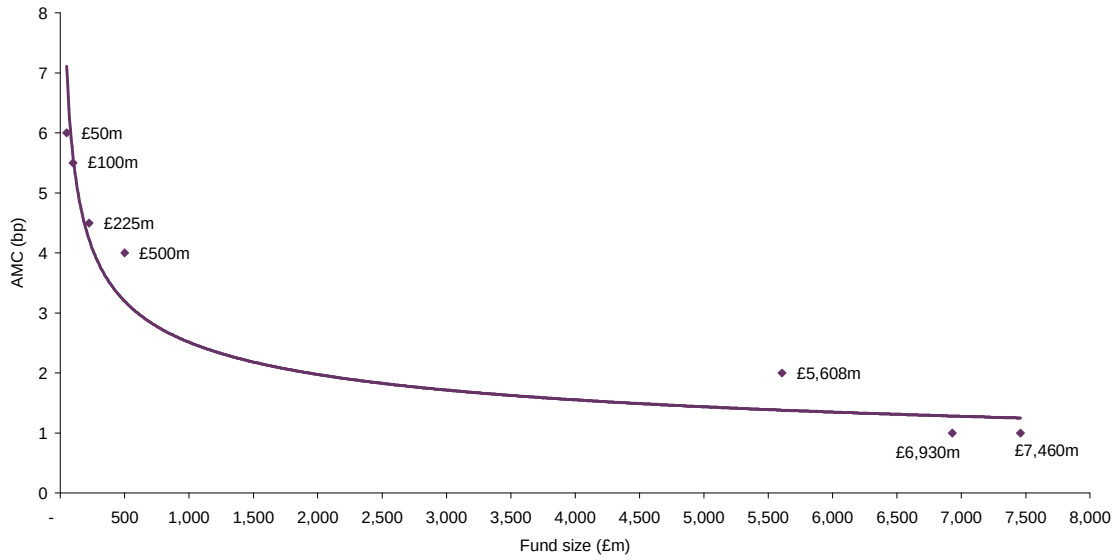
[24] For an analysis of recent developments in the asset management sector, see Oxera (2005), 'The Future of UK Asset Management: Competitive Position and Location Choice', report prepared for the IMA, May; and Oxera (2006), 'Current Trends in Asset Management', report prepared for the European Commission, October. See www.oxera.com.

[25] For an overview of the evidence on economies of scale in fund management, see Oxera (2006), 'How To Evaluate Alternative Proposals for Personal Account Pensions', report prepared for the Association of British Insurers, October.

managers. Furthermore, research indicates that, for a given size of fund, the fee for active management varies more than that charged for passive management.

Figure 5.1 shows passive fund management fees relative to the size of fund under management. The management fees are based on data provided by a representative sample of UK fund management firms, and reflect typical fund management fees charged to UK pension funds averaged across the sample of fund management firms. The figure includes a number of large pension funds in the USA. It indicates that there are significant economies of scale, particularly for funds up to a size of £500m. Economies of scale become less significant in the range £500m to £1 billion, and particularly less so once the funds under management reach around £1 billion.

Figure 5.1 Relationship between fund size and passive fund management fee



Note: The data on fund management fees in the 2003 Oxera study was collected through a survey of a representative sample of UK fund management firms. The fees refer to typical fees charged by UK fund management firms to UK pension funds, and are weighted averages across all fund management firms in the sample (weighted by the size of the funds under management). Data is from 2001 and 2005. AMC, average management charge.
Source: Oxera (2003), 'An Assessment of Soft Commission Arrangements and Bundled Brokerage Services in the UK', March, commissioned by the Financial Services Authority; Oxera (2006), 'Soft Commissions and Bundled Brokerage Services: Post-implementation Review', October; and Thrift Savings Plan (2005), 'Annual Report 2004'.

– **Type of asset class**. Funds often use specialist mandates for each asset class and may have a different fund manager for each mandate. Although most fund managers are able to offer management of different asset classes, there is some degree of specialisation—for example, some fund managers are specialists in managing bond funds. Management fees for bond funds are generally lower than those for equity funds.

– **Geographic specialisation**. Most fund managers offer management of assets listed on exchanges in different parts of the world. However, there is some degree of geographic specialisation. For example, a UK pension fund may choose a Japanese fund manager to manage its Japanese equities—ie, equities listed on the Nikkei.

5.2.3 Services purchased by fund management firms

Fund management firms obtain a number of services from external suppliers.

– **Brokerage services**. Fund managers normally have a contract with a range of brokerage firms. The costs of brokerage services are passed on to the fund manager's

clients—they are deducted from the value of the fund—and may also cover the costs of other services such as research.

– **Custody services and other back-office service providers**. The services provided by custodians to fund management firms and investors are described below.

– **Research**. Fund managers may purchase research from either brokers or independent research providers.

– **Other services**. Fund management firms purchase a range of other services such as data communication and messaging services.

For the purposes of the methodology, the brokerage and custodian services are relevant.

5.3 Brokers and dealers

Brokers and dealers provide trade execution services. This section describes four types of market participant: institutional brokerage firms, prime brokerage firms, retail brokerage firms and dealers.

Institutional brokerage firms

5.3.1 Services offered by institutional brokerage firms

Trade execution is the principal service offered by brokers. However, most brokers also offer services in addition to trade execution, such as access to analysts, research, and access to IPOs. All these services are paid for through a commission rate. Brokers that offer additional services are often referred to as full-service brokers, as opposed to execution-only brokers, which offer trade execution only.

The trade execution service includes execution of the trade, active order management, carrying out programme trades and other complex trading strategies, and 'working' orders in tranches to minimise market impact costs.

When executing a trade, brokers may either act as agent (where the broker executes the trade on behalf of its client) or principal (where the broker takes a trading position). Broker commissions are usually paid only if the broker acts as agent. Principal trades are usually undertaken on a 'net' basis—ie, without commission (here, the broker aims to recover its costs from gains made on spreads). The methodology focuses on trades executed on a commission basis. Generally speaking, in most financial centres, trades are conducted largely on a commission basis. For example, recent estimates indicate that more than 90% of the trades sent to brokerage firms in the UK are undertaken in this way.[26]

A number of specific trade execution services offered by brokerage firms (on a commission basis) can be distinguished.

– **Direct market access (DMA)**. DMA means that fund managers input the order, which is directly routed to the exchange or trading platform of their choice. The provision of this service typically also enables clients to view data for the markets in which they wish to trade.

– **Agency programme trading**. This is a trade in which a list of orders is packaged and placed with one broker on common terms. Programme trading is often used by fund

[26] Oxera (2006), 'Soft Commissions and Bundled Brokerage Services: Post-implementation Review', report prepared for the Financial Services Authority, October, p. 64.

managers that need to purchase blocks of shares which mirror the composition of a particular index that they are tracking. Rather than purchasing shares in each of the companies that make up the index on a trade-by-trade basis, the whole block of shares is bought or sold through a programme trade. Execution of a programme trade may take longer than if the shares had been executed individually. Programme trading may involve the provision of capital by the broker.

– **Algorithmic trading**. Trading in which buy or sell orders of a defined quantity are determined by a quantitative model that automatically generates the timing and size of orders, based on goals specified by the parameters and constraints of the algorithm.

– **Core trading**. Trading that involves the use of traders to manage the execution process. Core trading may involve the provision of capital by the broker.

Research and other services not directly related to trade execution that fund managers may receive from brokers, and which are paid for out of commissions, are subject to regulation. Articles 13.3 and 19.1 of the MiFID Level 1 Directive require firms to act honestly, fairly and professionally in the best interest of their clients, and to take all reasonable steps to prevent conflicts of interest from adversely affecting their clients' interest.[27]

In some countries (such as the UK) there are more specific rules or codes of conduct describing the type of services that fund managers are permitted to purchase with brokerage commissions. In 2006, in the UK, the Financial Services Authority introduced a new regime for soft commission and bundled brokerage arrangements, limiting investment managers' use of trade commissions to buying 'execution' (including execution-related services) and 'research' services.[28] Services outside these definitions, such as measurement of portfolios, computer hardware, dedicated telephone lines, seminar fees, purchase or rental of standard office equipment, or ancillary facilities, cannot be purchased using commissions. Another element in the new regime is that fund managers are required to disclose to their customers details of how the commission payments have been spent and what services have been acquired with them. This means that, in the UK, brokerage firms inform fund management firms about the proportion of the commission rate that is used for execution, and the proportion that is used for research.

5.3.2 Pricing structure and user profile

As explained above, trades can be executed on a commission or a 'net' basis—ie, without commission. The methodology covers trades on a commission basis. The commission rate is typically expressed in terms of a number of basis points—applying the number of basis points to the size of trade results in the price investors pay for executing the trade.

The pricing structure may vary by brokerage firm and client. Generally speaking, the following pricing structures are possible.

– **Bundled brokerage commission rate**. This commission rate pays for execution and other non-execution goods and services, such as research.

– **Execution-only commission rate**. This commission rate pays for execution-only transactions. This includes all types of transaction method, but does not include other services such as research.

– **Basic execution-only commission rate**. This commission rate pays for basic execution-only transactions and does not involve 'working on the trade'.

[27] The Committee of European Securities Regulators (2005), 'CESR's Technical Advice on Possible Implementing Measures of the Directive 2004/39/EC on Markets in Financial Instruments: 1st Set of Mandates', January.

[28] Financial Services Authority (2005), 'Bundled Brokerage and Soft Commission Arrangements: Feedback on CP05/5 and Final Rules', July.

The commission rate depends on a number of factors.

- **Mix of transaction methods (eg, DMA, programme trading, etc)**. In general, the more human resources and capital that are used, the higher the commission rate. This means that DMA is the cheapest transaction method, followed by programme trading, then core trade execution.
- **Asset class**. Brokers often specialise in a particular type of security (ie, equity, fixed income securities, or derivatives). Trade in different asset classes attracts different commission rates.
- **Market**. Investors typically pay a commission rate that is applicable to all developed European markets. However, the commission rates for DMA may vary by market. Furthermore, investors may pay higher commission rates for certain emerging markets to reflect the greater risk and higher costs of execution in those markets.
- **Volume of trades per year**. Commission rates are usually agreed through negotiation between the broker and the fund manager for (almost) all the fund manager's trades. The commission rate agreed depends on the value of total trades sent by that fund manager over a certain period (usually a year). As a result of economies of scale, the higher the value of total trades in equities and other securities, the lower the commission rate.
- **Value of research and other additional services**. The level of the bundled brokerage commission rate will depend on the amount of research and access to analysts.

In a number of Member States, brokerage firms offer their services for a bundled brokerage commission rate that includes trade execution (covering internal brokerage firm costs, trade execution fees paid to exchanges, and clearing and settlement fees) and research.[29] This means that changes in the commission rate may be driven by changes in the costs of trade execution, clearing, settlement, or the costs of research. In the UK, the new regime for soft commission and bundled brokerage arrangements means that brokers allocate the commission rate to trade execution (including trade execution-related services) and research. In other words, this results in a commission rate that covers only trade execution, and no research. The bundled commission rate in the other financial centres may be broken down into trade execution and research by using the allocation of commission rates between trade execution and research in the UK and France as a proxy. Trade execution costs may be higher or lower than in the UK or France; to adjust for this, the execution-only commission rates would be compared.

Prime brokerage firms

5.3.3 Services offered by prime brokers

Prime brokerage is the generic name for a bundled package of services offered by investment banks, particularly to hedge funds. The prime broker provides a centralised securities trading and clearing facility for the hedge fund, and the hedge fund's collateral requirements are netted across all deals handled by the prime broker.

The following core services are typically bundled into the prime brokerage package:

[29] In some countries, the commission rate may also cover other services. In the UK, prior to the implementation of the new rules on soft commission and bundled brokerage arrangements, these services were typically provided by full service brokerage firms to fund management firms.

– global custody (including settlement, custody, and asset servicing);
– securities lending and borrowing;
– financing (to facilitate leverage of client assets).

Furthermore, the prime broker normally acts as a hedge fund's primary operations contact with all other brokers. In addition, certain prime brokers provide additional value-added services, which may include, for example, risk management advisory services and a range of consulting services.

5.3.4 Pricing structure for prime brokerage services

Prime brokers typically derive revenues from three sources: spreads on financing (including stock loans); trading commissions; and fees for the settlement of transactions conducted away from the prime broker. The financing and lending spreads tend to make up the majority of prime brokerage revenue.

5.3.5 Services purchased by brokerage firms

Brokerage firms purchase services from the following agents in the value chain:

– exchanges, other trading platforms, and brokers. Brokers can execute trades in a number of ways—eg, by using traditional stock exchanges or alternative trading platforms; by trading with another broker (including local branches of the brokerage firm in other European countries) on a bilateral basis; or by internalising the trade;
– custodians (settlement and custody services);
– CCPs (counterparty risk clearing services);
– CSDs (clearing, settlement and custody services);
– brokerage firms may have access to exchanges, custodians, CCPs, and CSDs in a number of countries.

Retail brokerage firms

5.3.6 Services provided by brokerage firms

In the retail market, fund management and brokerage services are vertically integrated and offered by private client stockbrokers. The firms in this segment of the market can be broken down into two main types:

– **execution-only stockbrokers**—these firms offer telephone and online dealing services providing execution and custody services;

– **full service stockbrokers**—in addition to trade execution, these firms offer discretionary and advisory services often supplemented by financial planning services. Full service stockbrokers may also provide execution-only services.

The methodology focuses on execution-only private client stockbrokers. Private client stockbrokers typically execute trades through market makers, the retail service providers, or directly through a trading platform.

In addition to trade execution, private client stockbrokers normally also offer custodian and settlement services to their retail clients—retail clients typically do not have separate arrangements with a custodian.

5.3.7 Pricing structure retail brokerage services

Retail brokers typically charge an ad valorem fee (percentage of the value of the transaction) or operate on a fee-per-transaction basis. The level of the fee may depend on the value of the trade and/or the volume of transactions during a certain period. The fee covers trade execution, clearing and settlement.

The custody service and corporate actions are usually charged separately.

5.3.8 Services purchased by retail brokerage firms

Retail brokerage firms purchase services from the following agents in the value chain:

– exchanges, other trading platforms, and brokers. Brokers can execute trades in a number of ways—eg, by using traditional stock exchanges or alternative trading platforms; by trading with another broker (including local branches of the brokerage firm in other European countries) on a bilateral basis; or by internalising the trade;
– custodians (settlement and custody services);
– CCPs (counterparty risk clearing services);
– CSDs (clearing, settlement and custody services);

Brokerage firms may have access to exchanges, custodians, CCPs, and CSDs in a number of countries.

Dealers

5.3.9 Trading services for fixed income securities

The value chain for trading and post-trading services is, to a large extent, similar for both equities and fixed income securities. A key distinction relates to the execution of trades. In particular, although in a significant proportion of fixed income securities trading can be done both on-exchange and in the over-the-counter markets, unlike equities, most of the trading in fixed income securities is carried out in the over-the-counter markets. In other words, trades are agreed and executed bilaterally between trading parties.

The essential characteristics of the fixed income markets can be described as follows.

– Fund managers request quotes from dealers, describing the size of the order, type of fixed income security and whether it is a sell or buy order.

– Dealers respond to these requests for quotes by posting bid or ask prices simultaneously and independently. These quotes are firm, and fund managers can execute the order that is most attractive.

Notably, the prices given by dealers to the fund managers and other investors include direct transaction costs as well as implicit transaction costs (ie, market impact). Dealers are not rewarded by commissions, and their bid and ask prices are net prices, which implicitly factor in the compensation of their dealership services. In other words, when deciding what price to quote to the customers, the dealer would take into account implicit factors (eg, risks and availability of securities) as well as the explicit costs associated with execution of a given trade.

These differences in trade execution in equity and fixed income markets also have implications for the methodology for measuring prices, costs and volumes in these markets. Unlike the equity markets, where fund managers and other investors face an explicit brokerage fee, in the fixed income markets an explicit brokerage fee is generally not available. Therefore, with the exception of a small proportion of trading activity where such a fee is available, estimation of the all-inclusive trading and post-trading costs facing investors in the form described in this section is not feasible. For fixed income securities, the methodology will only measure the post-trading costs.

5.4 Trading platforms

5.4.1 Services offered by exchanges and other trading platforms

The core service offered by exchanges and trading platforms is trade execution. An additional source of revenue is the provision of information and data services. A large number of exchange users receive the information and data services indirectly through vendors such as Reuters and Bloomberg.

5.4.2 Pricing structure and user profiles

The different types of fee can be classified as follows.

– **Initial one-off fees**. Most exchanges do not charge a one-off fee. For exchanges that do charge such fees (eg, a membership admission fee or a fee for the technical connection to the stock exchange), the fee is relatively small and amounts to less than 1% of their revenues.

– **Transaction-related fees**. There is considerable variation in pricing structures across exchanges. Some exchanges charge a combination of a flat fee per transaction and a trading fee that depends on the size of the transaction, while other exchanges make a distinction between order execution and order management (eg, new order, modification, deletion, etc). Minimum and maximum fees and various discount schemes typically apply. Some exchanges have specific fees for reporting off-order book transactions to the exchange.

– **Other ongoing fees**. These can include, for example, annual or monthly membership fees, connection fees, and fees for information and data services.

5.4.3 Services purchased by exchanges from other agents in the value chain

Exchanges typically do not purchase any trading or post-trading services from other agents in the value chain.

5.5 CCPs

As explained in section 4, counterparty risk clearing is distinct from clearing—ie, the clearance and settlement instruction. Whereas clearing is provided by CSDs, counterparty risk clearing is provided by CCPs.

5.5.1 Services offered by CCPs

There are three core services that are provided by CCPs: counterparty risk clearing, risk management and fail management.

– **Counterparty risk clearing**. The provision of the core counterparty risk clearing services, which include the clearance and netting of transactions and, in the case of CCPs, novation prior to the settlement instruction.

– **Risk management**. CCPs require their clearing members to post collateral. The CCPs provide services for the calculation and holding of this collateral. In addition, they provide services collateral management and margin calls to ensure that there is sufficient collateral.

– **Fail management**. This refers to the handling of clearing members' failed transactions.

– **Additional services**. CCPs also provide a number of additional services, such as the provision of data and reports.

5.5.2 Pricing structure

The different types of fee can be classified as follows.

– **Membership and connection fees**. These are standardised flat periodic fees paid for membership and/or connection to the clearing house. These fees may vary depending on the type of membership or the type of connectivity. Some clearing houses also charge a one-off joining fee.

– **Counterparty risk clearing**. These are standardised transaction-based fees that may be subject to volume-based rebates. They may also include standardised delivery fees for settlement charged by the CSD, although these may be passed on to clearing members separately.

– **Risk management**. There is usually no charge for the holding of collateral, although some CCPs will remunerate clearing members for the holding of collateral deposits. Clearing members are also charged a standardised transaction fee for margin calls and collateral management.

– **Fail management**. Fees for fail management include both a fixed fee (to cover the fixed operational costs of handling the fail) and ad valorem fees (to cover the variable costs of handling the fail). The ad valorem fees are reimbursed to clearing members on a fair allocation basis.

– **Additional services**. In this study these additional services are considered insignificant. Some CCPs will provide these services alongside clearing, while others may charge standardised transaction fees for them.

5.5.3 Services received by CCPs

Clearing houses do not receive many services from other market participants in the value chain. The costs of those services incurred by clearing houses are usually passed through to their clients.

– **Delivery, settlement or fail fees**. CSDs charge a standardised fee for delivery, settlement or failed transactions, and for processing the transaction. The CCPs pass these charges on to their clearing members for each transaction.

5.6 Custody service providers

The provision of custody services is undertaken by a large number of market participants—ie, custody services can be provided by custodians, (I)CSDs and numerous other banks. As explained in section 4, the provision of custody services can create complex networks, where different participants provide custody services to other market participants in the value chain. This section focuses on the description of the services provided and purchased by custodians—ie, third-party custody service providers.

5.6.1 Services offered by custodians

Institutional investors commonly employ the services of a custodian to administer their securities. Custodians provide a wide range of services, in three main areas.

– **Safekeeping**. These are the core custody services that are provided by custodians. As described in section 4, these custody services can be separated into a number of

activities—ie, book-entry registry, account provision, asset servicing, securities lending and borrowing, collateral management and credit provision.

– **Settlement**. Arrangements for delivery and receipt of cash and securities to support settlement of the investor's trading activities. As explained in section 4, this is commonly distinguished from central settlement (ie, settlement that takes place at the CSD).

– **Additional services**. Custodians may also provide a range of additional services, such as portfolio monitoring or risk management services.

As noted above, there are a large number of providers of custody services, leading to complex custody networks. The potential market structures for these custody networks are described in section 4. However, it is also necessary to distinguish between the services offered by global custodians and sub-custodians.

Global custodian

A global custodian provides investment administration, settlement and safekeeping for investors for domestic and cross-border transactions. Some global custodians maintain an extensive international network of branches and can meet the local custody needs of their investor clients by employing their own branches as local custody providers. In countries where a global custodian does not have its own branch, it usually appoints an external agent bank to provide local custody services.

Sub-custodian

A sub-custodian is employed by a global custodian as its local agent to provide settlement and custody services for assets that it holds on behalf of investors in a foreign market. A global custodian may select one of its own branches, a local custodian that specialises in providing sub-custody in the market concerned, or a multi-market custodian that can offer sub-custody to the global custodian across a range of markets either in a region or internationally.

Sub- or local custodians are typically also used by brokerage firms for settlement and custody in foreign financial centres. While brokerage firms usually have access to the CSD in their home country, some of them will not have access to the local CSDs in other financial centres and will therefore use local settlement agents.

5.6.2 Pricing structures

In general, investors or intermediaries pay for custodian services in the following ways:

– an annual ad valorem fee—a fee charged against the value of assets that the investor holds with the custodian;
– a transaction fee per settlement.

Furthermore, custodians also generate revenues by handling clients' foreign exchange requirements. Investors hold a current account with the custodian, which normally pays interest on positive balances. To the extent that the interest rate is lower than the interest investors would receive when holding money in, for example, a normal savings account, the interest forgone could be considered an additional revenue stream for the custodian and a cost to the investor. The cost would amount to the difference between the interest rate applied by the custodian and a benchmark for a competitive interest rate.

For additional value-added services (eg, securities lending, performance and risk analysis, proxy voting services), supplementary charges may be added, or core and value-added services may be offered in a bundle.

In particular, the pricing of custody service contracts is negotiated according to a number of factors, such as the size of the assets under custody, the number of transactions, the degree of competition, and the general broader relationship between the custodian and the client.

5.6.3 Services purchased by custodians

Custodians purchase a range of services, either from other custody services providers or from CSDs. In particular, custodians pay for access to and settlement in the CSD.

5.7 Central securities depository

The CSD is distinct from intermediaries as a result of its provision of the primary book-entry register for securities. However, as has already been identified, CSDs also provide custody services.

5.7.1 Services offered by CSDs

CSDs establish and maintain a book-entry register of securities, which records all the holdings of those securities in different securities accounts. Although this is not provided as a service to clients, the maintenance of the book-entry register of securities facilitates the provision of other services. These other services can be considered as falling into three groups: account provision and asset servicing; clearing and settlement; and additional custody services.

– **Account provision and asset servicing**. These are the stock-related activities pertaining to the holding and servicing of securities held by the CSD. Custodian banks (and some retail banks, fund managers and institutional investors) will hold securities accounts with the CSD. Account provision is closely related to the provision of safekeeping of securities. In addition to safekeeping, the CSD will provide investors with asset servicing, which includes the processing of corporate actions, certificates, coupons, compensations and tax services. CSDs also provide corporate action processing to issuers.

– **Clearing and settlement**. These are the flow-related activities concerning the verification, clearing and settlement of transactions. CSDs provide services throughout the clearing and settlement value chain, from trade matching for OTC trades, to clearance and netting of trade positions and book-entry settlement. The extent to which these services are provided by the CSD, as opposed to other participants in the value chain, depends on the type of security and the trading location for any given transaction.

– **Additional custody services**. These include those services that CSDs provide in addition to their core services of account provision, asset servicing and clearing and settlement of transactions. These services include credit provision, collateral management, fail management, securities lending and borrowing and information services.

5.7.2 Pricing structures

The different types of fee can be classified as follows.

– **Membership and connection fees**. These are standardised flat periodic fees paid for membership and/or connection to the CSD. Respondents to the questionnaire indicated that they did not charge membership fees, but did charge monthly connection fees. However, membership fees may be charged in other financial centres.

– **Account provision and safekeeping**. Account provision is either free or charged at a nominal fee. Principally, the provision of accounts is bundled with the safekeeping of

securities, which is charged on an ad valorem basis depending on the market and asset class of the securities. These fees also include volume-based rebates based on the overall assets under custody.

– **Asset servicing**. These services, provided both to investors and issuers, are usually priced on a standardised transaction fee basis.

– **Clearing and settlement**. As with asset servicing, these services are usually priced on a standardised transaction fee basis.

– **Additional custody services**. The additional services are usually provided for standardised fees according to the type of service.

5.7.3 Services purchased by CSDs

By acting as an intermediary, CSDs may purchase some services from other CSDs or sub-custodians. These services may include cross-border settlement, fail management and other costs (eg, connectivity) charged on a transaction fee basis, and safekeeping services, charged on an ad valorem basis. Where these services are provided by CSDs, the fees are standardised; where they are provided by sub-custodians, the fees are negotiated.

5.8 Other services

Agents in the value chain purchase a number of additional services from third-party providers. These services, which include, for example, telecommunication services and messaging services provided by companies such as SWIFT, facilitate the execution, clearing and settling of trades.

The costs of these services will only be covered to a limited extent. First, fees for trading and post-trading services will cover some of the costs of these additional services. However, the interviews and the survey among infrastructure providers and intermediaries indicate that these services form a relatively small part of total costs incurred by an individual agent. Second, agents that do not use external messaging services will incur some internal costs. Agents deciding to outsource these activities are likely to see a reduction in internal costs. Third, automation and standardisation of message transfer may reduce the number of failures, thereby resulting in lower fail management costs.

The methodology will monitor the usage and costs of the telecommunication and messaging services through a number of high-level indicators.

5.9 Summary of services in the value chain

Table 5.1 summarised the typical relationships between the agents in the value chain in terms of services provided and purchased. The following conclusions can be drawn about the services and pricing structures.

– In most cases, as a result of a volume discount, the number and/or value of transactions is an important determinant of the average fee paid. Capturing the experiences of different users therefore requires the design of user profiles for investors and agents of different sizes.

– Prices do not appear to vary according to the domicile of the user. In other words, if cross-border transactions are more expensive than domestic transactions, this is not because of the characteristics of the charging structure. As shown in section 4, higher costs for cross-border transactions may be a result of the fact that they often require an

additional number of layers in the value chain. The methodology will therefore will need to identify the different layers used for domestic and cross-border transactions, and to track the costs through these different channels.

– Infrastructure providers have begun to unbundle their services and provide standard prices for individual services. Intermediaries often provide services in a bundle. For some of the individual services, separate prices, or at least proxies, are available (eg, brokerage services), while for other services (particularly those provided by custodians), prices for individual services may not be available.

6 Practical approaches to measuring prices and volumes through user profiles

6.1 Introduction

This section describes the approach to measuring prices and volumes through user profiles. A user profile describes the characteristics of a particular user in the value chain, and indicates the channels for trading, clearing and settling a trade; the different infrastructure providers and intermediaries used; the number and type of services purchased; and the prices paid for these services.

For example, the user profile of an institutional brokerage firm would specify the channels used for executing, clearing and settling trade in equities and bonds domiciled in the selected financial centres; the services purchased from exchanges; other trading platforms and brokerage firms; CCPs and CSDs in all selected financial centres; and the prices paid for these services. User profiles will be designed and measured from both an upstream and downstream perspective. In the example of the user profile for a brokerage firm, this means that the firm would be asked to describe its own profile by providing data on the volume and prices of services purchased from trading platforms, custodians, CSDs and CCPs, while all of these providers would be asked to describe the general profile of their own users (including brokerage firms).

The main advantage of collecting data from an upstream perspective is that it provides an insight into the different channels used by intermediaries for executing, clearing and settling transactions. Infrastructure providers confirmed to Oxera that, in general, from their perspective (ie, the downstream perspective), it is difficult, if not impossible, to determine what channels are used for particular transactions. For example, a UK investor may settle a transaction in Spanish equity by using a global custodian, which in turn uses a local custodian to access the CSD in Spain. In this example, the CSD in Spain would only see the local custodian as its client and would not usually be able to identify the underlying investor as a client, or the channel used for settling the transaction. Data on volume and prices of using a global and local custodian and the CSD in Spain can be obtained from the investor and custodians. Furthermore, obtaining data from an upstream and downstream perspective allows for cross-checking and assessing the consistency of data, which contributes to the robustness of the analysis.

The implication of this approach is that intermediaries would be asked to provide data on the volumes and prices of the services they sell and purchase, and infrastructure providers on the volumes and prices of services they sell.[30]

6.2 Designing user profiles from an upstream perspective (investors and intermediaries)

The users of trading and post-trading services are custodians, brokerage firms, fund managers and investors. They will be asked to provide data on the channels they typically use for trading, clearing and settling trades in equities and bonds domiciled in the selected

[30] In general, infrastructure providers do not purchase services from each other in the value chain. The exception is CCPs which, in some financial centres, may purchase certain services from CSDs.

financial centres; the volume of trading and post-trading services they purchase; and the prices they pay for these services.

The methodology distinguishes between types of investor (retail investor, small institutional investor, large institutional investor and hedge funds), fund management firms (small and large fund management firm), and brokerage firms (retail brokerage firm, small and large institutional brokerage firm).

An institutional investor usually has a contractual arrangement with a fund management firm and a custodian, and pays a fee for the services provided. Furthermore, the investor pays the brokerage firm a commission rate for trade execution. However, as the contractual arrangement is between the fund management firm and broker, the commission rates are usually determined by the profile of the fund management firm rather than by the profile of the investor.

Hedge funds typically have a different profile in terms of type of securities traded and the mix of services purchased (eg, prime brokerage services), and therefore require a user profile that is separate from small and large institutional investors.

A retail investor normally has an account with its bank, a traditional stockbroker or an online broker. The number of trades per client is much lower than for institutional investors. Furthermore, as explained in section 5, a retail investor typically purchases the fund management, trading, clearing, settlement and custody services from one and the same provider. The profiles for these different types of investor and intermediary will be defined in Lot 2 through detailed questionnaires among investors and intermediaries in the selected financial centres.

6.3 Designing user profiles from a downstream perspective

6.3.1 Users of infrastructure providers

The main users of exchanges, CCPs and CSDs are custodians, brokerage firms, fund management firms and investors. The objective of the design of user profiles is to capture the full range of possible user experiences of intermediaries and investors.

The first step is to identify the dimensions that affect the price users pay on a per-transaction or per-service usage basis. For example, since exchanges and CSDs typically apply volume discounts, it is relevant to distinguish between users of different sizes (eg, small, medium-sized, and large). For the purposes of this methodology, small users are defined as those that fall into the lower 40% by revenue; medium users as those that fall into the middle 40%; and large users as those that fall into the top 20% by revenue. Other factors on the basis of which users could be distinguished may be the mix of services users purchase.

The second step is preparing the profiles for each type of user by measuring the average annual values of the price-relevant dimensions for each service (the pricing structures are described in section 5). For example, if the price of order book trading depends on the annual value and number of trades, the average annual value and number of trades for users falling into the small, medium and large categories will be measured.

Applying the profile to the prices results in the total costs incurred by a particular type of user. Every time the methodology is applied, the profiles will be updated and applied to both current and old prices. As explained in section 2, this allows price and volume effects to be identified.

In the questionnaires, infrastructure providers were asked to identify different types of user, and to prepare profiles for these users. Overall, the responses indicate that infrastructure providers have sufficient data to undertake a user profile analysis.

– **Exchanges**. Exchanges apply volume discounts, implying that the level of the transaction-related fees is affected by the size of the user. In the questionnaire, most exchanges indicated that they cannot distinguish between users on the basis of any other dimension.[31] The majority of users purchase a wide range of services. It is therefore not possible to distinguish between users on the basis of the mix of services they purchase. Exchanges indicated that they have sufficient data to prepare profiles for small, medium-sized and large users.

– **CCPs**. The questionnaires indicate that, in general, CCPs currently do not apply a volume discount and are not able to distinguish between different types of user on the basis of any other dimension. All users are charged the same (listed) fees. This means that there will be one profile for users of CCP services.

– **CSDs**. CSDs apply volume discounts, implying that the level of the transaction-related fees is affected by the size of the user. In the questionnaire, most exchanges CSDs indicated that they cannot distinguish between users on the basis of any other dimension. The majority of users purchase a wide range of services. It is therefore not possible to distinguish between users on the basis of the mix of services they purchase. CSDs indicated that they have sufficient data to prepare profiles for small, medium-sized and large users.

6.3.2 Users of intermediaries

Two approaches will be used for the design of the profiles of the users of custodian, brokerage and fund management services.

Bespoke prices using hypothetical and actual user profiles

Intermediaries would be asked to provide prices for certain profiles of transaction.

– **Hypothetical profiles**. Intermediaries would be asked to provide indications of the prices they would pay and the prices they would be charged for certain services based on typical user profiles. For example, fund management firms would be asked to indicate what commission rate they typically pay for an annual volume of trades of £500m, £250m and £100m. Similarly, brokers would be asked to give an indication of their typical commission rates for certain volumes of trades.

– **Actual profiles**. Intermediaries would be asked to provide price and volume information about their largest, medium and smallest suppliers and clients. For example, fund management firms would be asked to provide data on commission rates negotiated with their largest, medium and smallest brokers, together with volume of trade and other relevant factors. Similarly, brokers would be asked to provide data on the commission rates they have negotiated with their three largest, medium-sized and smallest clients together with user profile data for these clients.

Bespoke prices using actual user profiles for the whole firm

Under this approach, intermediaries would be asked to provide data on total fees and volumes relating to their trading and post-trading activities. For example, a broker would be asked to provide data on the total commissions charged and the characteristics of all the trades executed.

This approach may identify certain trends and developments that might be overlooked when measuring the costs on the basis of the first approach. Comparison of the outcomes under

[31] In principle, the purchasers of information and data services could be considered a second group of user. However, data vendors are considered beyond the scope of this study.

the first and second approaches could, for example, be used to assess the extent to which the different user profiles employed under the first and second approaches are representative of the whole market.

6.4 Measuring prices for individual services

As explained in section 5, most of the agents in the value chain provide more than trading and post-trading services, and some of these additional services are often bundled with trading and post-trading services. Prices for individual services can be measured in a number of ways, as described below.

6.4.1 Unbundling of services as a result of regulatory developments

A number of regulatory developments and industry initiatives are likely to result in an unbundling of services. For example, as discussed in section 1, the industry code of conduct will contribute to the unbundling of services provided by infrastructure providers. New initiatives related to soft commission and bundled brokerage arrangements in the UK are likely to lead to separate prices for trade execution and research.

6.4.2 Services that are typically sourced from external suppliers

Brokers source a number of activities from external parties, such as matching utilities, clearing agencies and clearing houses. Therefore, there are market prices available for these services. These prices can be used to break down the bundled prices set by fund managers, brokers and custodians into the relevant components.

6.4.3 Proxies and/or benchmarks

Services may be unbundled by using proxies, for example:

– **proxy for split between trade execution and research**—the way in which brokers in the UK allocate the commission rate between trade execution and research may be used as a proxy to allocate the costs of brokers in other countries to trade execution and research;

– **custodian services**—as described in section 5, custodians offer a wide range of services to fund managers. The range offered to brokers (typically by local custodians) is often more limited and may be used to estimate the prices of the relevant custodian services to fund managers.

6.4.4 Cost allocation

Where prices for individual services are not available and the aforementioned tools are not suitable, market participants may be asked to allocate costs themselves. Costs can be allocated using standard cost allocation methods, such as activity-based costing.

7 Indicators for monitoring the prices and costs of trading and post-trading activities

The building blocks described in this report result in a large range of indicators which measure prices and volumes of trading and post-trading activities along a number of dimensions:

– the type of security (equity or fixed income);
– the typical user profiles of the various agents in the value chain;
– the level in the value chain at which the (trading or post-trading) activity is undertaken;
– the channels through which trades are executed, cleared and settled;
– the financial centre.

The focus of this study is the change in prices and volumes over time, which can be measured by applying the methodology at different points in time. In addition to these price and volume indicators, a number of supporting indicators will be measured to inform an understanding of some of the drivers of the changes in prices and volumes over time.

This section summarises the relevant indicators for monitoring the prices and costs of trading and post-trading activities, and identifies the data-gathering requirements.

7.1 What will be measured?

7.1.1 Main indicators

The source of most of the information required to operationalise the methodology and assign a value to the indicators is transactions, particularly the prices and quantities of services as sold to an entity, or the prices and quantities of services that have been bought by one entity from another. The careful aggregation of this transaction data creates indicators that can track the changes in volumes and prices for the categories of domestic, cross-border (by country pair) and type of security, through time.

The transactional basis of the indicators means that the source of most information will be those involved in the transactions. They will be asked to provide information about transactions with respect to their actual prices and volumes (from a buyer and seller perspective), and/or with respect to the prices they would charge a hypothetical customer(s) (from a seller perspective).

Table 7.1 presents the indicators that the methodology is designed to measure for each financial centre. These indicators capture changes in all-inclusive prices, in the prices of different services in the value chain, in activity through different channels of transaction, and in the characteristics of typical agents. The middle column shows the type of core activity for which prices and volumes will be measured: trading, clearing, settlement or custody at different levels in the value chain. The columns on the left indicate how the volumes and prices will be measured from an upstream perspective, and the columns on the right show the volumes and prices from a downstream perspective.

For example, indicator 16 measures (from the upstream perspective) the prices and volumes of custody and settlement services purchased by different types of brokerage firm (retail brokerage firm, small institutional brokerage firm, and large institutional brokerage firm) from custodians in the country where the brokerage firms are located, as well as a number of foreign countries. From the downstream perspective, the volumes and prices of custody and

settlement services sold by custodians are measured; where possible, the custodian will indicate the extent to which certain characteristics such as size affect the price and volume.

As explained in sections 4 and 5, certain types of activity are carried out at different levels in the value chain, and the exact nature of these activities differs across the value chain. For example, both brokerage firms and trading platforms provide trade execution. However, trade execution offered by a brokerage firm typically includes the costs incurred by the broker in clearing and settling the transaction, the costs of the transaction method applied by the broker, and the cost of using a trading platform, whereas trade execution offered by a stock exchange normally includes only the pure trade execution service. Similarly, both custodians and CSDs provide different types of custody and settlement services, the difference being that custodians act as intermediaries, provide access to a CSD or various CSDs, and may provide additional value-added services. CSDs, on the other hand, form the final place where securities are transferred and held.

Furthermore, at certain levels in the value chain, some of these services are offered in a bundle together with other services which may be irrelevant to the costs of trading, clearing, settlement and custody. As explained in section 6, where possible, the costs of these services will be excluded from the analysis of trends through time.

The indicators measure the end-to-end costs of trading, clearing and settling a transaction (including the costs of custody) as well as the costs of the individual activities at different levels in the value chain:

– **End-to-end costs**. These consist of the commission rate paid for brokerage services plus the fees paid for custody and settlement services.[32]

– **Costs broken down into relevant components**. The end-to-end costs can be broken down into trading, clearing, settlement and custody cost components at different levels in the value chain such as trading costs at the level of brokerage firms and trading platforms, and settlement costs at the level of custodians and CSDs. The monitoring of prices and volumes at different levels in the value chain provides the explanation of the changes in the end-to-end costs.

The application of the methodology allows for the identification of different channels, and measurement of the costs, related to trading, clearing, settlement and custody for these channels. For example, in order to execute a trade, a fund management firm may use a broker, and the broker may use a stock exchange. This channel is measured by the combination of indicators 3 and 12. Indicator 3 measures the prices of trade execution to the fund management firms/investors, whereas indicator 12 measures the costs of trade execution on an exchange to a brokerage firm. Similarly, the brokerage firm may execute the trade on a bilateral basis with another broker, rather than on an exchange. This is measured by indicator 9 (in the case of a domestic trade) or indicator 11 (in the case of a cross-border trade).

By applying the methodology to different financial centres and identifying the channels through which cross-border transactions can take place, the costs of cross-border transactions through different channels can also be measured. For example, to settle a cross-border transaction, a fund management firm/investor may use a global custodian, which in turn uses a foreign (local) custodian to obtain access to the local CSD. In Table 7.1, this channel can be measured by the combination of indicators 4, 18 and 19. To measure these indicators data is required from investors/fund management firms, global custodians, local custodians and CSDs. By combining the data from these agents, the costs of

[32] As explained in section 5, fund management firms may also incur some costs in the middle and back offices related to trading, clearing and settlement. These costs are likely to be small compared with the other costs of trading, clearing and settlement in the value chain and not easily identifiable as a separate costs. Therefore, these costs are in principle beyond the scope of the main indicators but within the scope of the supporting indicators.

settlement through this particular channel can be measured and broken down into individual components.

It should be noted that, in comparing different channels for domestic and cross-border transactions (over time), the complete channels should be taken into account. For example, in comparing the channel of a brokerage firm with direct access to a CSD with the channel of a brokerage firm using a custodian to access a CSD, the costs incurred by the brokerage firm in obtaining access to the CSD (consisting of internal back-office costs, communication and messaging services, etc) should be taken into account. Furthermore, additional checks will have to be made to ensure that the services are strictly identical. The fact that the primary service has the same name does not necessarily demonstrate that the service offered is identical, or that customers would have the same internal or additional costs in accessing the primary services in different channels. As explained below, there are different proxies available for these internal or additional costs.

Table 7.1 Main indicators for monitoring prices and volumes of trading and post-trading services

	Upstream		Transaction		Downstream	
	Profile and prices to be measured	**Institution**	**Type of price**	**Relevant activities**	**Institution**	**Profile and prices to be measured**
1	Actual profile and prices – small institutional investor – large institutional investor – hedge fund	Institutional investor	Negotiated	**Settlement and custody services**	Custodians – domestic – abroad	Total revenues for services provided to fund investors/ management firms, total number of transactions and value of assets in custody Total revenues and value of assets and number of transactions for a number of large and medium-sized contracts with investors/fund management firms Prices for hypothetical profiles
2	Actual profile and prices Profile will be defined in terms of characteristics relevant to pricing schedule	Institutional Investor	Price list	**Settlement and custody services**	CSDs – domestic – abroad	Total revenues for services provided and number of transactions and value of securities in custody, broken down for small, medium-sized and large users
3	Actual profile and prices Profile characteristics – volume of annual trading – type of equity – domicile of equity	Fund management firm	Negotiated	**Trade execution**	Brokerage firms – domestic – abroad	Total commission revenues and value of trades, all clients (broken down by asset class and where relevant by domicile of security) Total commission revenues and value of trades of three largest clients and three medium-sized clients (fund management firms) Commission rates for hypothetical profile
4	Actual profile and prices	Fund management firm	Negotiated	**Custody and settlement**	Custody services providers – domestic – abroad	Total revenues for services provided to fund management firms, total number of transactions and value of assets in custody Total revenues and value of assets and number of transactions for a number of large and medium-sized contracts Prices for hypothetical profiles
5	Actual profile and prices	Fund management firm	List prices	**Custody and settlement**	CSDs (domestic and abroad) – domestic – abroad	Total revenues and value of assets in custody and number of transactions settled, all clients Total revenues and value of assets in custody and number of transactions settled. Large, medium-sized and small clients (fund management firms)

	Upstream		Transaction		Downstream	
	Profile and prices to be measured	**Institution**	**Type of price**	**Relevant activities**	**Institution**	**Profile and prices to be measured**
6	Actual profile and prices	Fund management firm	List prices	**Trade execution**	Exchanges (direct access)	Total revenues and value and number of assets traded, all clients Total revenues and value and number of assets traded, for large, medium-sized and small clients (fund management firms)
7	Actual profile and prices	Fund management firm	List/ negotiated prices	**Trade execution**	Trading platforms (direct access)	Total revenues and value and number of assets traded, all clients Total revenues and value and number of assets traded, for large, medium-sized and small clients (fund management firms)
8	Actual profile	Brokerage firm	Internal costs	**Internalisation**	Same brokerage firm	Cost data may not be available
9	Actual profile and prices	Brokerage firm	Negotiated	**Trade execution**	Other brokerage firms domestic	Total revenues and value and number of assets traded, all clients
10	Actual profile and prices	Brokerage firm	Negotiated	**Trade execution**	Other brokerage firms abroad (within same group)	Total revenues and value and number of assets traded, all clients
11	Actual profile and prices	Brokerage firm	Negotiated	**Trade execution**	Other brokerage firms, abroad	Total revenues and value and number of assets traded, all clients
12	Actual profile and prices	Brokerage firm	List prices	**Trade execution**	Exchanges	Total revenues and value and number of assets traded, all clients, for large, medium-sized and small clients (brokerage firms)
13	Actual profile and prices	Brokerage firm	List/ negotiated prices	**Trade execution**	Trading platform	Total revenues and value and number of assets traded, all clients, for large, medium-sized and small clients (brokerage firms)
14	Actual profile and prices	Brokerage firm	Negotiated	**Counterparty risk clearing**	Clearing agent	Total revenues and value and number of assets traded, all clients, for large, medium-sized and small clients (brokerage firms)
15	Actual profile and prices	Brokerage firm	List prices	**Counterparty risk clearing**	CCPs	Total revenues and value and number of assets traded, all clients, for large, medium-sized and small clients (brokerage firms)
16	Actual profile and prices	Brokerage firm	Negotiated	**Custody and settlement**	Custodians	Total revenues and value and number of assets traded, all clients, for large, medium-sized and small clients (brokerage firms)

	Upstream		Transaction		Downstream	
	Profile and prices to be measured	Institution	Type of price	Relevant activities	Institution	Profile and prices to be measured
17	Actual profile and prices	Brokerage firm	List prices	Custody and settlement	CSDs	Total revenues and value and number of assets traded, all clients, for large, medium-sized and small clients (brokerage firms)
18	Actual profile and prices	Custodian	Negotiated	Custody and settlement	Custodians (abroad)	Total revenues and value and number of assets traded, all clients, for large, medium-sized and small clients
19	Actual profile and prices	Custodian	List prices	Custody and settlement	CSDs (domestic and abroad)	Total revenues and value and number of assets traded, all clients, for large, medium-sized and small clients
20	Actual profile and prices	CSD	List prices	Custody and settlement	CSDs (abroad)	Total revenues and value and number of assets traded, all clients

Source: Oxera.

7.1.2 Interpreting the indicators

The purpose of the methodology is not only to monitor prices and volumes over time, but also to understand the drivers behind these changes. Two aspects of the methodology will be useful in understanding the changes in the costs of trading, clearing, settlement and custody over time.

– **User profiles**. As explained in section 2, the use of user profiles allows for breaking down the changes in the costs incurred by investors in using trading, clearing, settling and custody services into price and volume (user profile) effects. For example, average trading costs may fall as a result of an increase in the use of cheaper transaction methods such as programme and algorithm trading; this is a user profile or volume effect rather than a direct price effect.

– **Supporting indicators**. A number of additional indicators will be measured, which will help in understanding some of the drivers of the changes in prices and volumes over time. For example, one of the additional indicators is the number of transactions per trade order, which may affect the settlement costs per order. Splitting the order into more transactions in order to reduce market impact costs may result in higher clearing and settlement costs since more transactions per order will have to be settled. Furthermore, where available, data on trends in prices and volumes will be taken into account.

A selection of supporting indicators is presented in Table 7.2. This list is not exhaustive—more indicators will be added in Lot 2 based on a more detailed analysis of possible drivers of infrastructure providers', intermediaries' and investors' costs.

Table 7.2 Supporting indicators

Indicator	Explanation
Fund management fees	Fund management firms incur some costs related to trading, clearing and settlement. These costs may increase, for example, as a result of an increase in the use of direct access to exchanges (without using brokerage firms)
Number of transactions per order	The number of trade executions per order will affect the costs of an order. The higher the number of trade executions per order, the higher the costs of clearing and settlement per order—each execution will have to be cleared and settled separately
Proportion of trades completed on a commission basis	This methodology focuses on trades completed on a commission basis, and excludes trades completed on a 'net' basis (ie, trades for which no commission rate is charged). The proportion of trades conducted on a 'net' basis is relatively small and the competitive conditions for these two types of trade execution service are likely to be similar, implying that measuring only one of them will suffice. However, if trade on a 'net' basis becomes more significant over time, inclusion of this type of trade may be considered. The proportion of these types of execution service therefore needs to be monitored
Interest revenues received by CSDs and custodians and interest spread	Users of CSDs hold cash accounts to enable the settlement of securities transactions. CSDs may pay an interest rate on positive balances. This indicator measures the interest revenues and interest spread over time
Usage of fail management services and number of failures	Fail management services add to the total costs of settlement
Degree of netting	The higher the degree of netting, the lower the number of transactions that need to be settled, and therefore the lower the settlement costs per transaction (pre-netting)
Costs of telecommunication and messaging services	Changes in the costs of telecommunication and messaging services may affect prices of post-trading services to some extent. Furthermore, current practice is that users pay for the telecoms services (ie, connecting to the infrastructure providers). Any changes to this may affect prices set by infrastructure providers

Source: Oxera.

7.2 How will the indicators be measured?

7.2.1 Different ways of measuring volumes and prices

As explained in section 6, the prices and volumes of these activities can be measured in a number of ways.

First, prices and volumes can be measured from both an upstream and downstream perspective. For example, prices and volumes related to trade execution services provided by brokers are measured from both the fund management firms' perspective and the brokerage firms' perspective. Similarly, prices and volumes of settlement and custody services provided by CSDs are measured from the CSD perspective and the custodians' and brokerage firms' perspectives. This means that all users (ie, investors, brokerage firms, and custodians) provide prices and volumes related to their relationships with all intermediaries and infrastructure providers. For example, brokerage firms provide data on prices and volumes related to services purchased from all stock exchanges, CSDs, CCPs, and custodians used. Similarly, fund management firms provide data on prices and volumes related to services provided by all custodians and brokerage firms.

Second, prices and volumes are measured at varying levels of detail.

– **Aggregate prices and volumes**. Intermediaries will be asked to provide data on the total spent per activity (ie, trading, clearing, settlement and custody) and the related number of transactions (or value of securities in custody held in the case of custody

services). By dividing the total spent by the number of transactions (or value of securities in custody), a unit price can be obtained. Similarly, intermediaries and infrastructure providers will be asked to provide data on the total revenues per activity and the number of transactions processed (or the value of securities). Dividing the former by the latter results in a unit price.

– **User profiles**. By having a range of intermediaries in the sample, unit prices will be obtained for different user profiles (eg, users of different sizes and with different portfolios of transactions and securities under management). To understand the differences between unit prices paid by different types of intermediary and, more importantly, to understand the changes in these prices over time, data on the characteristics of users is required. For example, the profile of a fund management firm can be described in terms of the mix of transaction methods, asset class, markets, volume of trading per year and the value of research and other additional services consumed. Information relevant to a particular user profile can be obtained by seeking information on what is sold to, or bought by, actual customers (in which case the customer's profile is the user profile), or by asking sellers to provide the prices they would charge a user with a particular user profile. In the former case, the underlying data is real—it is based on what actually happened—but the user profile is likely to change from one time period to the next. In the latter case, the user profile can, in principle, be kept constant from one time period to the next, but the underlying data relies on the intermediaries being able to predict accurately what they would charge a particular customer with that profile. Some sellers have indicated that this may be difficult, and it is likely that both approaches will need to be employed. Where prices are governed by a price list, the calculation of the price for a particular user profile is straightforward. The problem arises when prices are determined by individual negotiations.

– **Combining user profiles with prices**. Comparing changes in unit prices in combination with an analysis of the changes in user profiles allows for an assessment of the extent to which changes in unit prices are due to price and volume (user profile) effects. Depending on the amount of data available, at certain levels in the value chain it may be possible to undertake a more detailed analysis and quantify the price and volume effects. The user profile is first defined explicitly in terms of the mix of services purchased and the characteristics of the transactions. The user profile is subsequently applied to the prices for these services. Dividing these total costs by the total number of transactions (traded, cleared, settled or value of securities under management) results in the weighted average unit price. Following the methodology set out in section 2, when it is applied at various points in time, a user profile analysis can be undertaken to quantify the price and volume effects.

A full user profile analysis (as illustrated in section 2) requires specific data and some degree of standardisation of prices. It can therefore be applied at the level of infrastructure providers and is more difficult to apply at the level of intermediaries where prices are not standardised but individually negotiated.

7.2.2 Data requirements

Application of the methodology, designed in line with the requirements specified by the Commission, results in certain data requirements for investors, intermediaries, and infrastructure providers, as summarised as follows:

– **investors**—prices and volumes of services purchased from custodians;
– **fund management firms**—prices and volumes of services purchased from brokerage firms and custodians;
– **brokerage firms and custodians**—prices and volumes of services sold and purchased;
– **trading platforms exchanges, CCPs, and CSDs**—prices and volumes of services sold.

In all cases the level of disaggregation is type of security (equity, bonds) and the financial centres in question (domestic transaction for all 18 financial centres, cross-border pairs for the six major financial centres and cross-border pairs from three major centres to the six secondary centres).

In addition, as explained above, investors and intermediaries will be asked to provide information on their user profile, and infrastructure providers about the user profile of their own users.

The data will be collected through a questionnaire among a representative sample of investors, intermediaries, and infrastructure providers. Since most financial centres have only one or very few infrastructure providers, the representative sample would consist of all infrastructure providers–ie, a complete census.

7.2.3 Confidentiality of data

Price data from intermediaries is likely to be confidential and commercially sensitive. For these entities, the sample should be sufficiently large to make it possible to present data on prices in aggregated format in a public domain report without making it possible to identify the prices and volumes of individual providers of services.

If the sample is not sufficiently large—for example, for certain specific activities or certain channels, other options will be considered. First, where appropriate, the prices and volumes may be added to those of other services or channels for which data from more agents is available. Second, the prices and volumes may simply not be published, and may be confidential. If, in the application of the methodology at future points in time, data from more intermediaries is available, the prices and volumes may then be published.

7.2.4 Coverage: institutions and activities

As explained in sections 4 and 5, for the purposes of this report, the nature of the organisation that offers the trading and post-trading services is not relevant—the methodology focuses on the *activity,* irrespective of the type of organisation that is providing that service. This means, for example, that in this report the terms ‘brokerage firms’ and ‘custodians’ refer to those firms that provide brokerage services and custody (and settlement) services. Brokerage and custody services can be provided by a range of firms. For example, custody services may be provided by global custodians, banks or CSDs (ie, CSDs acting as a intermediary by providing access to a CSD in another financial centre). Similarly, brokerage services may be provided by investment banks, retail banks, or full-services brokerage houses or execution-only brokerage firms. There are also a large number of firms that offer both brokerage and custody services.

Where firms provide more than one service, they will be considered for each service they provide, and are therefore likely to be asked for information with respect to all the relevant services they provide. These firms are likely to receive a number of different information requests (in the form of questionnaires).

7.2.5 Mixed activities: in-house and bought in

In practice, some agents may undertake some activities in-house while others source them from other agents in the value chain. For example, a large number of banks (providing brokerage services) may not use custodians but instead undertake custody and settlement activities in-house, particularly for domestic securities, while for foreign securities, a custodian in the foreign financial centre may be used.

The information about where the services are sourced (ie, bought in or undertaken in-house) will be generated by the questionnaires asking providers what they sell to their customers and what they buy in from other providers. If any particular entity in the value chain sells a

service to its customers, but does not buy that service from others, the organisation is consequently seen to be providing that service in-house. Where the entity buys services in from an independent third party (eg, another custody bank in a different financial centre), it will be quite clear where prices are changing in that particular channel. The prices charged/paid will represent the market price of those services.

If the activity is undertaken in-house, there are a number of ways to obtain price data. First, these agents may set internal transfer prices for custody services. If these transfer prices are market-based, they can be used as a proxy price for custody services. Second, these agents may not only undertake the activity for their own in-house clients (eg, custody and settlement activities for their own securities) but also offer settlement and custody services to external parties such as smaller or foreign brokerage firms. The prices charged for these services provided to others can then be taken as a proxy for the price charged internally. Third, in the absence of transfer prices or prices charged to third parties, data on the prices of those services provided by others in the market in question can be obtained from other independent agents that do supply these services.

7.2.6 Sample design

To facilitate a comparison of prices and volumes over time, the preference would be to undertake a panel survey. This means that the participating investors and intermediaries would be the same every year, or at least a sub-set of the investors and intermediaries in the sample would stay the same. Prices and volumes would therefore be less likely to change as a result of changes in the sample of survey participants. Thus a panel survey would result in 'cleaner' data. Where the sample is a census—in particular, for infrastructure providers—this will automatically deliver a panel data set.

7.2.7 Practical example of data requirements

The data required for monitoring prices and volumes will be obtained through detailed questionnaires to investors, intermediaries and infrastructure providers. These will be developed in detail in Lot 2.

As an illustration, this section provides a practical example of the type of data on equities that would be required from a brokerage firm in the UK. A similar data request would be developed for bonds.

Section 3 classifies the UK as one of the main financial centres. This means that the methodology will measure the UK domestic transactions and cross-border transactions with the other five major financial centres (France, Germany, Italy, Spain, and Switzerland), as well as the cross-border transactions with the six secondary financial centres (Belgium, Greece, the Netherlands, Norway, Poland, and Sweden).

A UK brokerage firm would be asked to provide data on both relevant services sold and services purchased. The following data on services sold to UK-domiciled fund management firms and fund management firms domiciled in foreign countries (in all aforementioned financial centres or a sub-set of these) would be required:

Data on services sold

- total commission revenues for trade in securities domiciled in aforementioned financial centres and the total number of transactions (ie, trade undertaken on a commission basis);
- total commission revenues for trade in domestic UK securities and total number of transactions (ie, trade undertaken on a commission basis);
- total commission revenues for trade in French securities and total number of transactions (ie, trade undertaken on a commission basis);

– total commission revenues for trade in German securities and total number of transactions (ie, trade undertaken on a commission basis);
– same for the other financial centres;
– total commission revenues for two largest and two medium-sized clients with transactions in domestic and other European transactions and number of transactions;
– description of profile of these clients;
– same for transactions in French, German, and other equities.

Data on services purchased

– identification of main channels used for trading, clearing and settling transactions, split by domestic and (individually if necessary) cross-border activities relating to equities domiciled in the other financial centres;
– identification of activities undertaken in-house and main suppliers of services bought in, split in the same way;
– total amount of money paid to exchanges and trading platforms for executing transactions in UK equities and total number of transactions;
– total amount of money paid to exchanges and trading platforms for executing transactions in French securities and total number of transactions;
– same for transactions in German, Spanish and other equities;
– total amount of money paid to a clearing agent for clearing transactions in UK equities and total number of transactions;
– total amount of money paid to a CCP for risk clearing and netting transactions in UK equities and total number of transactions;
– same for transactions in French, German, and other equities;
– total amount of money paid to custodians for settling transactions in UK equities and total number of transactions;
– total amount of money paid to CSD in the UK for settling transactions in UK equities and total number of transactions;
– same for transactions in French, German, and other equities.

Furthermore, a number of supporting indicators would be measured to give an understanding of changes in prices over time.

7.3 Concluding remarks

The methodology is designed to measure a large number of indicators. The extent of the indicators is a reflection of both the complexity of the industry and the scope of the methodology as defined by the European Commission. The complexity of the industry means that, to be able to understand the changes in the end-to-end costs incurred by investors over time, measurement of user profiles, as well as indicators of prices and volumes at different layers in the value chain, is required. The scope of the methodology implies that it is designed to be applied to a large number of financial centres and cross-border relationships.

Although the methodology is broad in scope, there are a number of factors that limit it, keep its application manageable and, as far as possible, limit the burden on infrastructure providers and intermediaries.

– First, it should be emphasised that the large number of indicators is to some extent a result of the large number of financial centres and cross-border relationships covered. The number of indicators for each financial centre is more limited.

– Although within each financial centre detailed information about user profiles is obtained where possible, and supporting indicators are measured to help understand the changes in prices and volumes over time, the main focus is on the trends in prices and volumes at different levels in the value chain.

– Although some indicators may require some unbundling of services and prices, in general, the methodology does not measure costs (ie, costs incurred internally by providers of services, which are typically more difficult to measure) but focuses on prices (which are, by their very nature, available and measurable).

– In the application of the methodology, the number of channels through which transactions are traded, cleared and settled can be limited by focusing on the main channels; these can be identified and measured in terms of the number of transactions traded, cleared and settled at the beginning of Lot 2 (ie, the application of the methodology).

– The methodology covers a wide range of cross-border relationships. However, in practice, there may not be significant differences between some of the country pairs. For example, the cost of settling a transaction in Spanish equity in Spain incurred by a brokerage firm in Germany using a local custodian in Spain may not differ significantly from the costs incurred by a brokerage firm in the UK using a local custodian in Spain. This means that the analysis of cross-border transactions can be simplified.

– Finally, although a large number of indicators are measured, these are obtained from many individual organisations. In other words, the richness of information is not delivered by the individual indicators, but by combining them, thereby providing a picture of different channels for transactions and the whole value chain. This means that the burden of data requirements is shared by a large number of organisations.

Appendix 1 Glossary

Account providing	The Draft Working Document on Post-trading Services defines account provision as 'the maintenance of securities accounts'
Algorithmic trading	Trading in which buy or sell orders of a defined quantity are determined by a quantitative model that automatically generates the timing and size of trade orders
Asset servicing	The Draft Working Document on Post-trading Services defines account provision as 'securities administration activities performed for others—eg, processing of corporate actions, tax reclaims and portfolio valuation'
BIS	Bank of International Settlements
Book-entry register	This records all the holdings of a security in different securities accounts in a book-entry form. See also the 'Primary book-entry register'
Broker	These intermediaries provide trading services on behalf of their clients
CCP	See 'Central counterparty'
Central counterparty (CCP)	The provider of central counterparty clearing, which may be combined with netting of transactions
Central counterparty clearing	The Draft Working Document on Post-trading Services defines central counterparty clearing as 'the process by which a third party interposes itself, directly or indirectly, between the transaction counterparties in order to assume their rights and obligations, acting as the direct or indirect buyer to every seller and the direct or indirect seller to every buyer'
Central securities depository (CSD)	Provides clearing, settlement and custody services. CSDs can either provide the primary book-entry register (ie, for securities issued into the CSD), or serve as a custody service provider (for securities issued into another CSD)
CESR	Committee of European Securities Regulators
Clearance	The process of ensuring that the transaction counterparties have the monies and securities available for settlement. This is sometimes referred to as the 'resource check'
Clearing	The Draft Working Document on Post-trading Services defines clearing as 'the process of establishing settlement positions, including the calculation of net positions, and the process of checking that securities, cash or both are available'. Clearing may involve netting, clearance and the settlement instruction
Clearing member	The members of counterparties or central counterparties that provide access to counterparty risk clearing
Code of conduct	See 'Industry code of conduct'
Collateral management	The process of managing the use of collateral in the trading and post-trading value chain
Competitive clearing	New models of counterparty risk clearing are being developed in which more than one CCP compete to provide counterparty risk clearing
Core trading	Trading that involves the use of traders to manage the execution process. Core trading may involve the provision of capital by the broker
Corporate bonds	Fixed income securities issued by corporates
Counterparty	The provider of counterparty clearing
Counterparty clearing	The Draft Working Document on Post-trading Services defines counterparty clearing as 'the process by which a third party interposes itself, directly or indirectly, between the transaction counterparties in order to assume their rights and obligations'

Counterparty risk clearing	While the Draft Working Document on Post-trading Services refers to (central) counterparty clearing, this report uses the common industry term 'counterparty risk clearing' to indicate that this activity is focused on counterparty risk. As such, counterparty risk clearing is the same as (central) counterparty clearing
Credit provision	The extension of credit to ensure the clearing and settlement of transactions
Cross-border transaction	A transaction in which one or both parties is located in a different financial centre to the jurisdiction of the security
CSD	See 'Central securities depository'
Custodian	A specific custody services provider that provides custody services (and other additional services) as a third party
Custody agent	A custodian that provides and maintains the primary book-entry register for Eurobonds
Custody services	Although there are several interpretations of 'custody services', for the purposes of this report, custody services are the six core stock-related activities
Custody services provider	A provider of custody services—may refer to several types of custodian, broker or CSD
Dealer	These intermediaries provide trading services by trading on their own account
Delivery versus payment (DvP)	The settlement of a transaction in which the transfer of monies and the transfer of securities occurs simultaneously
Direct market access (DMA)	A means of investors accessing regulated markets directly, using either the market's software or a broker's software
DMA	See 'Direct market access'
Domestic transaction	A transaction in which both counterparties are located in the same financial centre as the jurisdiction of the security
DvP	See 'Delivery versus payment'
EACH	European Association of Central Counterparty Clearing Houses
ECB	European Central Bank
ECSDA	European Central Securities Depositories Association
EFAMA	European Fund and Asset Management Association
Equities	Securities that are shares in a company
Establishing securities in book-entry form	The Draft Working Document on Post-trading Services defines this as 'the initial representation and subsequent maintenance of securities in book-entry form through initial credits and subsequent credits or debits to securities accounts, on the basis of: (a) the information provided by the issuer or its agent; or (b) the number of securities on deposit'
Eurobonds	Fixed income securities issued across national borders into ICSDs
Exchange	A trading platform where securities are listed and trading takes place according to specified rules, providing a liquid market for trading
Failed trade	A transaction that does not settle because one of the settlement parties has not met the settlement conditions
Fail management	A service to actively reduce the number of failed trades, and to efficiently manage any failed trades
FESE	Federation of European Securities Exchanges
Financial centre	For the purposes of this study, financial centres are the countries in (and between) which securities transactions take place
Flow-related services	Those activities that arise from securities transactions. There are four flow-related activities: trading, counterparty risk clearing, clearing and settlement

Fund manager	A fund manager manages the funds of other investors, making investment decisions for the funds in accordance with the agreed mandate of the fund
Giovannini barriers	These are the 15 barriers identified by the Giovannini Group as causes of fragmentation and inefficiencies in the provision of cross-border post-trading activities in Europe
Global custodian	A specific custody services provider offering custody services across many financial centres, usually to investors or fund managers
Government bonds	Fixed income securities issued by national governments
ICSD	See 'International central securities depository'
(I)CSD	Both CSDs and ICSDs
Industry code of conduct	FESE, EACH and ECSDA prepared a code of conduct on clearing and settlement activities that was signed by all their members. This focused on three main areas: transparency, access and interoperability and unbundling
Infrastructure providers	The stock exchanges, CCPs and CSDs that provide the infrastructure to facilitate trading and post-trading activities. These are also the market participants that have signed the industry code of conduct
Institutional broker	An intermediary, usually but not exclusively an investment bank, that executes trade orders on behalf of investors or fund managers
Institutional investor	An intermediary that invests institutional funds—eg, the pension fund of a company. Institutional investors may hire a (or several) fund managers to manage their funds and make investment decisions, or may have internal fund management teams
Institutional side	The institutional side of a transaction is that between the investor and the broker
Intermediaries	These market participants provide trading and post-trading activities, such as brokers and dealers providing trade execution, or custodians providing custody services
International central securities depository (ICSD)	Provides clearing, settlement and custody services for Eurobonds. ICSDs can either provide the primary book-entry register (ie, for securities issued into the ICSD), or serve as a custody service provider (for securities issued into another CSD)
Investor	The entity that makes investment decisions. This may be the institutional investor or an appointed fund manager
Issuer	The entity (either corporates or governments) that issues securities into a CSD
Local custodian	A specific custody services provider offering access to local securities markets and post-trading infrastructure
Matching utility	An intermediary that provides verification, usually on the institutional side of a transaction
MiFID	Markets in Financial Instruments Directive
MTF	See 'Multilateral trading facility'
Multilateral trading facility (MTF)	A trading platform, other than an exchange, which provides trading in securities
Multi-market custodian	A specific custody services provider offering access to several local securities markets and post-trading infrastructure
Netting	The process of bundling multiple transactions into a single clearing and settlement order
OTC	See 'Over-the-counter trading'
Over-the-counter trading	A form of off-exchange trading in which brokers/dealers trade directly with one another
Primary book-entry register	The book-entry register that is established and maintained by the CSD into which the issuer has issued the securities

Prime brokerage	A bundled package of services offered by investment banks, usually offered to hedge funds
Prime brokers	The providers of prime brokerage
Programme trading	A form of trading in which trade orders in multiple securities are bundled into a single trading package, agreed and placed with a broker on common terms
Regulated market	The MiFID term for an exchange
Resource check	See 'Clearance'
Retail broker	An intermediary (sometimes referred to as a private client broker) that specialises in providing brokerage services to retail investors. They may access markets directly, or more commonly via a retail service provider
Retail investor	An individual who invests securities in their own account
Safekeeping	The core provision of custody services. Although a common industry term, due to the absence of a common definition, the term is used sparingly in this report
Securities borrowing	In the post-trading value chain, this refers to fail management arrangements to borrow securities to ensure the clearing and settlement of an agreed transaction
Securities lending	The process of making unutilised securities available for borrowing (for either short-selling or fail management) to generate additional revenue
Settlement	The Draft Working Document on Post-trading Services refers to book-entry settlement, which is defined as 'the act of crediting and debiting the transferee's and transferor's accounts respectively, with the aim of completing a transaction in securities'. Settlement is complete only when the transfer of both monies and securities is achieved, final and irrevocable
Settlement agent	An intermediary, usually a local custodian or CSD that provides access to the CSD providing the primary book-entry register
Settlement instruction	The processing of matched and netted positions to be sent for settlement
Stock-related activities	Those activities related to the existence of the securities, rather than transactions involving those securities. These services would be provided regardless of whether the security had been traded. There are six core stock-related activities: establishing securities in book-entry form, account provision, asset servicing, credit provision, collateral management and securities lending and borrowing
Street side	The street side of a transaction is that between the broker/dealer and the market, either via a trading platform or directly to another broker/dealer
Sub-custodian	A specific custody services provider that provides custody services in (several) local securities markets for other custodians
Systematic internaliser	A form of trading in which a broker internalises trade orders between its own clients, or where it takes the opposite side to a transaction
Trading	The execution of a transaction, from the point at which a trade order is received by a broker/dealer to the point at which execution is completed
Trading platform	The location of trading, which may refer to an exchange or to an MTF
UCITS	Undertakings for Collective Investments in Transferable Securities
Verification	The Draft Working Document on Post-trading Services defines verification as 'the process of comparison and reconciliation of transaction or settlement details, to ensure that there is agreement on these details'
WFE	World Federation of Exchanges

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