Oxera

Monitoring prices, costs and volumes of trading and post-trading services

(MARKT/2007/02/G)

Report prepared for
European Commission
DG Internal Market and Services

July 2009

This study has been conducted in cooperation with national and European trade associations, intermediaries and infrastructure providers. Assistance has also been provided by staff members of the Financial Market Infrastructure Unit of DG Internal Market and Services, national financial services authorities and regulators, and the Committee of European Securities Regulators (CESR).

Oxera is grateful for their contribution and assistance.

Executive summary and conclusions

Objectives and remit

DG Internal Market and Services has commissioned Oxera to undertake a price monitoring study across 18 financial centres in Europe using the methodology developed by Oxera in 2007.[1] The methodology paper is referred to by the European Commission as Lot 1, while the first application of that methodology, the results of which are presented in this report, is referred to as Lot 2. The objective is to monitor the prices, costs and volumes of trading and post-trading activities for equities and fixed income securities in Europe over time for providers across the whole value chain of trading and post-trading services; namely intermediaries—institutional fund managers, institutional brokers, and custodians; and infrastructure providers—trading platforms, central counterparties (CCP), and central securities depositories (CSD). It is the Commission's intention to apply this methodology a number of times in order to monitor changes in these indicators over time.

The purpose of this report is threefold.

– To describe how the data for the year 2006 was collected and to assess the extent to which the challenges identified in the methodology paper have been overcome to enable a comparison of costs, prices and volumes over time. The application of the methodology involved an extensive survey among providers of trading and post-trading services. The data for the year 2006 forms the baseline against which the data from subsequent surveys will be compared.

– To present an illustration of how the methodology can be applied, showing evidence on changes in prices, costs and volumes between 2006 and 2008 for a limited segment of the value chain—namely the infrastructure providers (trading platforms, CCPs and CSDs). While this study was initially focusing on 2006, for data confidentiality reasons, it was not possible to provide evidence on absolute levels of prices, costs and volumes at the individual financial centre level for 2006 for this segment of the value chain. Therefore, infrastructure providers were asked to supply data for 2008 as well, so that for each individual financial centre evidence could be provided on the changes in prices, costs and volumes of different services.

– For the full value chain, to present an initial picture of the markets for trading and post-trading on the basis of an analysis of the baseline for 2006. This provides answers to the following key questions.

  – What channels do investors and intermediaries typically use to trade, clear and settle?

  – What are the costs of trading and post-trading activities in Europe?

  – Are the costs of cross-border transactions higher than those of domestic transactions, and if so by what order of magnitude?

[1] The Commission requested a classification of three types of financial centre: major, secondary, and other. Major: France, Germany, Italy, Spain, Switzerland, and the UK. Secondary: Belgium, Luxembourg, the Netherlands, Norway, Poland, and Sweden. Other: Austria, Czech Republic, Denmark, Greece, Ireland and Portugal. These financial centres were selected as part of the analysis in the methodology paper—see Oxera (2007), 'Methodology for Monitoring Prices, Costs and Volumes of Trading and Post-trading Activities', prepared for DG Internal Market and Services (hereafter referred to as 'the methodology paper'), section 3. Available at http://ec.europa.eu/internal_market/financial-markets/docs/clearing/oxera_study_en.pdf.

Main findings on the application of methodology

This study has resulted in a large set of data from a very large number of intermediaries and infrastructure providers operating in the trading and post-trading value chain in Europe. The industry's commitment to this European Commission project, despite extreme capital market turbulence which affected all players in the industry, and the assistance provided by the national and European trade associations, have resulted in robust overall market coverage across the value chain in the selected 18 financial centres in Europe for the purpose of a comparison of indicators over time.

This study provides the Commission with an understanding of the overall trading and post-trading value chain, and with valuable data on the evolution of the prices, costs and volumes of trading and post-trading services over time. In line with principles of better regulation, this will enable the Commission to assess some of the effects of its current policies and industry initiatives, and to determine public policy on the basis of both sound analysis and a thorough understanding of the market.

Overall, more than 40 fund management firms participated in the survey, covering around 23% of the market in terms of value; close to 40 brokers, consisting of a large number of global (or multi-market) firms and a smaller number of local firms, covering around 32% of the market in terms of value of equity trading; and around 60 custodians, covering around 86% of the market in terms of value of assets held.[2] Almost all trading platforms, CCPs and CSDs included in the survey completed the questionnaires.

The application of the methodology revealed a number of challenges and practical difficulties, some of which were already sufficiently addressed in the design of the methodology, while others were addressed by simplifying the questionnaires. These simplifications place some limitations on the way in which certain indicators can be measured, and the level of detail at which the analysis can be undertaken.

Overall, the impact of these limitations is not particularly significant compared with what can be measured, and, bearing in mind that the focus of the data collection was the major and secondary financial centres, should not materially affect the Commission's overall objective of this study, namely to monitor changes in costs, prices, and volumes of trading and post-trading activities over time.

Summary of the baseline results

The main analysis and results are expected when data over time across the entire value chain is available, this study only provides the baseline against which trends will subsequently be measured. It is important to bear this in mind in interpreting the usefulness of the results of the baseline surveys.

Nevertheless, taking all the baseline results, and recognising that there are both significant variations in the results between financial centres and that this methodology is not designed to illuminate differences between financial centres, some general patterns emerge from the baseline analysis.

– As expected from the work undertaken to develop the methodology, the 'simple' operation of investors transacting or holding securities is underpinned by a complex structure and transaction flow to carry out these operations in practice. In particular, there are numerous ways in which investors can access a particular market to undertake

[2] In most financial centres there are sufficient survey responses from intermediaries to allow for changes over time to be monitored (in either indices or absolute terms). However, there are exceptions—for example, in Belgium, Denmark, Poland, Sweden and Switzerland, where there were either no fund managers or only one that participated in the survey.

a transaction or hold the security domiciled in a particular financial centre. This underlying complexity of processes presents a significant challenge to measuring what is actually happening in the marketplace, and for the (future) interpretation of trends.

– The analysis shows that, in general, the costs of the trading and post-trading activities are higher for cross-border transactions than for domestic transactions at different levels in the value chain. A wide range of factors may explain such differences, such as variations in the volume of transactions and specific barriers to cross-border transactions (for example, differences in laws and tax systems).

– Notwithstanding some home bias[3], there is significant 'cross-border' activity, including specialisation at the international level—for example, Luxembourg and Ireland. Infrastructures and intermediaries generally have significant numbers of cross-border clients, and they transact a considerable amount of business with them. However, the general pattern is that the proportion of business (measured by value or number of transactions) transacted is smaller than the proportion of clients, implying that the volume per client is smaller for cross-border clients than for domestic clients.

– There is some evidence of apparent economies of scale at the transaction level, the firm level and the financial centre level. For example, in the case of custodians both the providers' descriptions of what determines price and the results of the analysis of price data suggest a reasonably strong relationship between size of client and unit prices (which, from the purchaser's perspective, translates into an economy of scale).

– It is therefore highly likely that part of the explanation of the differences observed in the costs/prices of cross-border versus domestic transactions and holdings is the result of these economies of scale. Investors investing in cross-border markets will generally have lower levels of activity in those markets compared with their domestic market. Thus one component of the differential will be the size effect.

Sections 5–7 of the report set out detailed evidence underlying these general patterns.

Changes in activity and costs over time for infrastructure providers: illustration

An initial analysis of the data provided by infrastructure providers has allowed some discernible patterns to be identified—further analysis may be conducted in future studies.

– An increasing proportion of members on trading platforms, CSDs and, to a lesser extent, CCPs originate from outside the domicile of infrastructures. This rise in the proportion of cross-border members has also been broadly reflected in growth in the proportion of activity by these members on infrastructures. Overall, between 2006 and 2008 there appears to have been a trend towards increasing use of infrastructures in other financial centres.

– Across financial centres, there appears to be a reduction in the proportion of trading activity in cross-border equities[4] on trading platforms. In other words, for a majority of financial centres, a decreasing proportion of trading is reflected by activity in cross-border equities. At the same time, in the case of CCPs and CSDs, there does not appear to be a distinct trend: some financial centres have shown an increase, and others a decrease in the proportion of activity in cross-border securities.

[3] Evidence obtained as part of this study shows that both institutional and retail investors tend to allocate a disproportionately large—compared with 'optimal' international allocation—part of their investment portfolios to domestic securities.
[4] Cross-border equities are defined as equities from countries outside the domicile of the infrastructure.

– Across financial centres, there has been a reduction in on-book trading costs expressed in terms of costs per transaction. In other words, in most financial centres, the average cost per trade incurred by market participants in 2008 was significantly lower than in 2006. At the same time, expressed in terms of cost per value of trading (ie, costs expressed in basis points of the value of trading), the pattern of changes is different; using this measure, the trading costs that investors face have not systematically decreased (or increased). The overall costs (ie, the combined on-book trading and on-book order management costs) appear to exhibit similar trends to those observed for the on-book trading.

– Across financial centres, there has been a significant reduction in central counterparty clearing costs, and the overall costs of CCPs. In other words, in most financial centres with CCPs, the average CCP cost per transaction incurred by market participants in 2008 was significantly lower than that in 2006. In addition, although data on other services is somewhat limited, the overall costs (ie, the combined costs of central counterparty clearing, risk management, fail management, and settlement instructions) also appear to have declined between 2006 and 2008.

– The data on CSDs across financial centres does not reveal a systematic trend in the costs of account provision and servicing, and clearing and settlement services. In particular, there are a significant number of financial centres where these costs have increased and a significant number where they have decreased.

Overall, this data analysis reveals strong patterns in the changes in the nature of the activity and costs that market participants face. However, it provides only first insights into the changes. A more detailed analysis of existing and further data could provide additional valuable insights into changes in other factors: for example, considering changes in the relative costs for cross-border securities (in comparison with the costs for domestic securities), and the drivers of these changes. It would also be valuable to consider the changes in CCPs' costs expressed in terms of costs per value of transactions cleared and the changes in CSDs' costs expressed in terms of costs per value of transactions settled.

Section 4 of the report sets out detailed evidence underlying these general patterns.

Future studies

This report summarises the dataset for the baseline year of 2006, the first year used to monitor prices, costs and volumes in trading and post-trading services. It also summarises the data obtained from infrastructure providers for the year 2008, and the changes in prices, costs and volumes that are indicated by that dataset.

The Commission intends to repeat this exercise and collect data for future years. These studies would then provide an analysis of trends over time between the baseline year 2006 and the years used for the purposes of such prospective studies. These studies would set out changes in the prices, costs and volumes for all individual parts of the value of chain, as far as possible at the individual financial centre level (which is different from the aggregated analysis for the baseline year developed in this report).

Contents

List of tables

List of figures

1 Introduction

1.1 Objectives and remit

DG Internal Market and Services has commissioned Oxera to undertake a price monitoring study across 18 financial centres in Europe using the methodology developed by Oxera in 2007.[5] The methodology paper is referred to by the European Commission as Lot 1, while the first application of that methodology, the results of which are presented in this report, is referred to as Lot 2. The objective is to monitor the prices, costs and volumes of trading and post-trading activities for equities and fixed income securities in Europe over time for providers across the whole value chain of trading and post-trading services; namely intermediaries—institutional fund managers, institutional brokers, and custodians; and infrastructure providers—trading platforms, central counterparties (CCP), and central securities depositories (CSD). It is the Commission's intention to apply this methodology a number of times in order to monitor changes in these indicators over time.

– To describe how the data for the year 2006 was collected and to assess the extent to which the challenges identified in the methodology paper have been overcome to enable a comparison of costs, prices and volumes over time. The application of the methodology involved an extensive survey among providers of trading and post-trading services. The data for the year 2006 forms the baseline against which the data from subsequent surveys will be compared.

– To present an illustration of how the methodology can be applied, showing evidence on changes in prices, costs and volumes between 2006 and 2008 for a limited segment of the value chain—namely the infrastructure providers (trading platforms, CCPs and CSDs). While this study was initially focusing on 2006, for data confidentiality reasons, it was not possible to provide evidence on absolute levels of prices, costs and volumes at the individual financial centre level for 2006 for this segment of the value chain. Therefore, infrastructure providers were asked to supply data for 2008 as well, so that for each individual financial centre evidence could be provided on the changes in prices, costs and volumes of different services.

– For the full value chain, to present an initial picture of the markets for trading and post-trading on the basis of an analysis of the baseline for 2006. This provides answers to the following key questions.

  – What channels do investors and intermediaries typically use to trade, clear and settle?

  – What are the costs of trading and post-trading activities in Europe?

  – Are the costs of cross-border transactions higher than those of domestic transactions, and if so by what order of magnitude?

This study has resulted in a large set of data from a very large number of intermediaries and infrastructure providers operating in the trading and post-trading value chain in Europe. The industry's commitment to this European Commission project, despite extreme capital market turbulence which has affected all players in the industry, and the assistance provided by the

[5] Oxera (2007), 'Methodology for Monitoring Prices, Costs and Volumes of Trading and Post-trading Activities', prepared for DG Internal Market and Services (hereafter referred to as 'the methodology paper'). Available at http://ec.europa.eu/internal_market/financial-markets/docs/clearing/oxera_study_en.pdf.

national and European trade associations, have resulted in very good overall market coverage across the value chain in the selected 18 financial centres in Europe for the purpose of a comparison of indicators over time.

This study provides the Commission with an understanding of the overall trading and post-trading value chain, and with valuable data on the evolution of the prices, costs and volumes of trading and post-trading services over time. In line with principles of better regulation, this will enable the Commission to assess some of the effects of its current policies and industry initiatives, and to determine public policy on the basis of both sound analysis and a thorough understanding of the market.

1.2 Why a price monitoring 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. It is therefore essential that arrangements for trading and post-trading are both safe (ie, allowing transactions without failures) and efficient. Research indicates that the emergence of such arrangements at the European level has been impeded by a number of obstacles.[6]

Purely domestic trading and post-trading activities in the EU are considered relatively cost-effective and low-risk, whereas cross-border arrangements are regarded as complex and fragmented, possibly resulting in much higher costs, risks and inefficiencies. The Giovannini Group identified 15 barriers as the main causes of fragmentation and inefficiencies, relating to technical or market practice, tax procedures, and legal aspects.[7] It concluded that, until these barriers are eliminated, the EU clearing and settlement environment would continue to comprise domestic, non-integrated markets.

The European Commission's stated objective is to foster an EU-wide securities clearing and settlement environment that is safe and efficient, and ensures a level playing field for all providers.[8] In its May 2006 draft working document, it summarised its overall policy objectives and approach to post-trading activities.[9]

The Commission has also launched several policy initiatives, ranging from specific measures to remove the Giovannini barriers, to an industry Code of Conduct.[10] This price monitoring study was commissioned as a complement to these policy initiatives. It is intended to provide the Commission with a solid understanding of the overall trading and post-trading value chain, and to offer valuable data on the evolution of prices, costs and volumes, thereby enabling an assessment of the effects of its policies and industry initiatives.[11]

1.2.2 Going beyond previous studies on trading and post-trading activities

Compared with previous studies on the costs of clearing and settlement, this study is broader in scope, with greater coverage in terms of both different types of cost and intermediaries

[6] See Giovannini Group (2001), 'Cross-Border Clearing and Settlement Arrangements in the European Union', November; Giovannini Group (2003), 'Second Report on EU Clearing and Settlement Arrangements', April.

[7] Ibid.

[8] European Commission (2002), 'Clearing and Settlement in the European Union: Main Policy Issues and Future Challenges', May.

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

[10] 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 which was signed by all their members. The measures detailed in the Code address three main areas: transparency of prices and services; access and interoperability; and unbundling of services and accounting separation. FESE, EACH and ECSDA (2006), 'European Code of Conduct for Clearing and Settlement', November. European Commission (2006), 'Clearing and Settlement: Commissioner McCreevy Welcomes Industry's New Code of Conduct', IP/06/1517, press release, November.

[11] For an overview of the work done by the European Commission and industry in the area of trading and post-trading, see the CESAME (2008), 'Solving the industry Giovannini Barriers to post-trading within the EU', November 28th.

and financial centres, and better access to detailed data on prices and volumes.[12] Most previous studies have focused solely on the costs incurred (or prices charged) by infrastructure providers of clearing and settlement services, based on data available in the public domain.[13]

In contrast, in this study the end-to-end costs of trading and post-trading activities to investors are measured along the entire value chain, based on a detailed survey among intermediaries and infrastructure providers.

One previous study did cover different layers in the value chain, but was more limited in terms of the number of intermediaries and financial centres. It measured the prices of trading and post-trading services in France, based on a survey of a sample of fund management firms.[14] The sample used for the current study includes intermediaries and infrastructure providers across 18 financial centres in Europe.

1.3 Structure and content of the report

1.3.1 Presentation of data and analysis

The analysis presented in this report is necessarily limited because, for most of the value chain, it presents only the baseline results, rather than a comparison over time, and does this in aggregated form across major, secondary and other financial centres, rather than at the level of individual financial centres. For infrastructure providers, time-series data is available, but only a limited and preliminary analysis has been conducted. The full comparison of indicators over time at the level of individual financial centres would be presented in the future studies. This is further explained in sections 2 and 3.

This study does not seek to identify directly the drivers behind the apparent differences between financial centres, the current pattern of prices and volumes, or the changes in prices and volumes over time. A wide range of factors may drive such changes, including competitive forces, regulatory changes, and specific public and private sector initiatives to remove barriers to cross-border trading and post-trading.

Nevertheless, as explained above, infrastructure providers also supplied data for 2008, allowing indicators of changes in prices, costs and volumes to be calculated at this stage of the monitoring process. The evidence on the changes in prices, costs and volumes between 2006 and 2008 for the infrastructure providers for individual financial centres illustrates how the methodology is designed to obtain relevant indicators over time when applied to successive years, assuming consistency of the methodology over those time periods.

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

[13] 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; Giovannini Group (2001), op. cit.; Giovannini Group (2003), op. cit.; and NERA (2004), 'The Direct Costs of Clearing and Settlement: An EU–US Comparison', Corporation of London, June.

[14] 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'.

1.3.2 Structure

This report is structured as follows.

Part 1: Methodology

– Section 2 describes the research activities undertaken and the methodological aspects that are crucial to understanding the price monitoring study.

– Section 3 details how the data for the year 2006 was collected and assesses the extent to which the challenges identified in the methodology paper have been overcome to enable a comparison of costs, prices and volumes over time.

Part 2: Comparison of data over time (infrastructure providers)

– Section 4 summarises the results of the analysis of the data provided by the trading platforms, CCPs and CSDs. In particular, it shows changes in indicators of prices, costs and volumes over 2006–08 at the *individual financial centre* level.

Part 3: Baseline (intermediaries and infrastructure providers)

– Section 5 presents analysis of the channels used by fund managers and brokers for trade execution and post-trading activities, and a high-level assessment of the degree of market integration by measuring the holdings of institutional and retail investors of securities in domestic and foreign financial centres.

– Section 6 identifies the trends and factors that affect the costs and pricing of trading services offered by intermediaries. It also analyses the costs of domestic and cross-border trading and the differences between them. Section 7 does this for post-trading services.

The appendices contain an assessment of more detailed methodological issues and of the customer profile approach adopted to measure the changes in prices of services provided by custodians (Appendices 1 and 2); an analysis of the costs of fund management services (Appendix 3); a detailed description of the methodology for calculating changes in prices, costs and volumes for trading platforms, CCPs and CSDs between 2006 and 2008 (Appendix 4); a summary of the aggregated analysis of changes in the activity and costs of infrastructure providers over time (Appendix 5); and a glossary of terms (Appendix 6).

The conclusions of this study can be found in the section ‘Executive summary and conclusions’ at the beginning of this report.

Part 1 Methodology

2 Methodological aspects, scope and research activities

This section describes the research activities conducted for this price monitoring study and the methodological aspects that are crucial to understanding the study.

2.1 Methodological aspects

2.1.1 How are domestic and cross-border transactions defined?

The Commission requested analysis of domestic and cross-border transactions on a financial centre basis. For the purpose of this study, a 'domestic' transaction is defined as one where the domicile of the investor and the domicile of the security are the same, and a cross-border transaction as one where the domicile of the investor is different from that of the security. Therefore, in order to monitor the prices, costs and volumes of trading and post-trading services for domestic and cross-border transactions, two financial centre perspectives are critical: the domicile of the investor and the domicile of the security.

In addition, to explain any changes in the indicators for domestic and cross-border transactions, it is necessary to identify the financial centre in which the activities were undertaken. That said, certain participants at different layers in the value chain (eg, brokers and custodians) operate across multiple financial centres, making it difficult for them to identify the activities undertaken in a particular financial centre and to report their activities on that basis. Where firms have been unable to provide the financial centre breakdown, the survey monitors the provision of trading and post-trading services by reference to domestic providers and multi-market or global providers.

The domicile of the investor is determined by the domicile of the fund management firm, and the domicile of a security by the domicile of the issuer (I)CSD where the security is ultimately domiciled (ie, initially issued). In practice, survey respondents were advised to use proxies for this because, again, securities were often not identified in their information systems along these precise lines. For equities, the preferred proxy of the domicile of securities was the financial centre of the primary market in which the equities are listed. For fixed income securities, the preferred proxy of the domicile of securities was the country code in the international securities identification number (ISIN) of the security.[15]

Executing, clearing and settling a trade normally require services from a number of intermediaries and infrastructure providers. Thus, a cross-border transaction typically involves several 'sub-transactions' between the different types of firm in the value chain. Some of these are cross-border in nature, while others are domestic and will also be perceived as domestic transactions by the firm providing the trading or post-trading services. For example, if a local fund management firm hires a brokerage firm in another financial centre, which then sends the trade order to the local exchange, the transaction between the fund management firm and brokerage firm has a cross-border element, while the transaction between the foreign brokerage firm and trading platform is domestic in nature.

[15] The proxy for the domicile of the investor may result in discrepancies between the conceptual definition of cross-border transactions and how they are measured in practice. However, the impact of this is limited, as explained in Appendix 1.

This study measures both the end-to-end costs of a transaction that has a cross-border element and the costs of the domestic and cross-border 'sub-transactions'. The end-to-end costs of domestic and cross-border transactions are measured from a fund management firm perspective, while those of sub-transactions are measured at each layer in the value chain. Because there is not a one-to-one mapping of overall end-to-end transactions and sub-transactions, it is not possible simply to add together each sub-transaction in the value chain to arrive at an end-to-end price. However, since sub-transactions are inputs into the end-to-end price, movements in their prices (and their volumes) will influence this end-to-end price. Understanding this relationship is one of the objectives of this study.

2.1.2 Comparison over time rather than across financial centres

Although this price monitoring project covers a large number of financial centres, its purpose is not to compare prices between them. A price comparison across financial centres would necessitate a different methodology, requiring, for example, a higher degree of consistency in the definition of services, and a larger sample of survey participants in order to ensure that the analysis of a financial centre is fully representative.

The focus of this project is on identifying trends in the prices and costs of transactions in securities, by comparing the prices of transactions (both domestic and cross-border) undertaken by the same firms in the same financial centre, over time.

In applying the methodology to the selected financial centres, a balance needs to be struck between, on the one hand, obtaining sufficient responses to the survey (contributing to the representativeness of the study for the individual financial centres and resulting in more precise estimates of the level of the indicators for the year 2006), and, on the other hand obtaining sufficient detailed data per individual firm to allow for an analysis of changes in the indicators over time. Since the purpose of this study is to monitor costs, prices, and volumes over time, and not to compare their levels across financial centres at a particular point in time, it is important to measure the changes in the indicators on a consistent basis over time instead of attempting to estimate precisely their levels at a particular point in time. The consistency in indicators over time is supported by tracking the same firms in subsequent surveys (panel analysis) and collecting sufficient detailed information at the firm level to be able to understand the changes over time and to make appropriate adjustments for firm-specific factors.

The survey results indicate that, in general, there is a high degree of price variation for trading and post-trading services across firms and financial centres due, for example, to differences in the mix of services and client requirements. The estimates of the costs of trading and post-trading services presented in this report should be considered rough estimates, and may be affected by the profile of the survey participants.

For most trading and post-trading services, data on costs is measured from both sides (ie, buyers and sellers of services) for any level in the value chain. There are likely to be differences in the data from both sides. For example, while data provided by CSDs on the price of clearing and settlement services is based on the use of these services by all their clients, the data provided by brokers on clearing and settlement services purchased from CSDs represents only a limited subset of the users. This will therefore result in differences between the price measured on these two sides of the value chain. This report does not discuss these differences in detail because they are simply a reflection of the sample. However, in the second (and any subsequent) report, changes in prices on one side at any level in the value chain will be cross-checked against changes in prices on the other side. For example, such an analysis would check whether reductions in infrastructure providers' prices have resulted in changes in the prices paid by brokers.

2.2 Scope

2.2.1 Prices and costs

In this report, prices generally refer to the analysis done where respondents are reporting the prices they charge, while costs generally refer to the external costs incurred by buyers of services. Unless explicitly stated, costs refer to costs from the purchaser's perspective, and do not refer to the internal costs incurred by a supplier or purchaser.

2.2.2 Types of firm and service

The study covers trading and post-trading services provided by the following types of intermediary and infrastructure provider.

- **Providers of institutional fund management services**. Fund management firms that manage the funds of other investors, making investment decisions for the funds in accordance with the agreed mandate of the fund.

- **Providers of institutional brokerage services**. Intermediaries—usually, but not exclusively, investment banks—that execute trade orders on behalf of investors or fund management firms. An institutional brokerage firm may also execute trades on its own account ('proprietary trade').

- **Providers of retail brokerage services**. Firms that provide brokerage services to private individuals. This may include retail banks, online brokers and specialised retail brokerage firms.

- **Providers of custodian services**. Firms that provide custody services (and other additional services) as a third party to institutional clients, such as funds, fund management firms, brokerage firms, and other custodians. This study follows the definitions used in the literature, which identifies three types of custodian. A *local custodian* specialises in its home market and offers domestic and foreign customers access to a single, local securities market and post-trading infrastructure.[16] A *multi-market custodian* offers access to several local securities markets and post-trading infrastructure, typically by obtaining direct membership in each market's CSD. A *global custodian* offers custody services across many financial centres, usually to investors or fund managers. It typically appoints intermediaries to access many markets.

- **Providers of trading platforms**. These include exchanges, multilateral trading facilities and crossing networks.

- **Providers of CCP services**. A CCP can be defined as an entity that 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.[17]

- **Providers of CSD 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). In the case of the former, they are described as the *issuer CSD*, defined as the CSD that has established securities of a certain issue in book-entry form and that provides the account; in the latter, they are described as the *investor CSD*, defined as the CSD that holds an account with an issuer CSD.[18]

[16] Chan, D., Fontan, F., Rosati, S. and Russo, D. (2007), 'The Securities Custody Industry', European Central Bank, August.

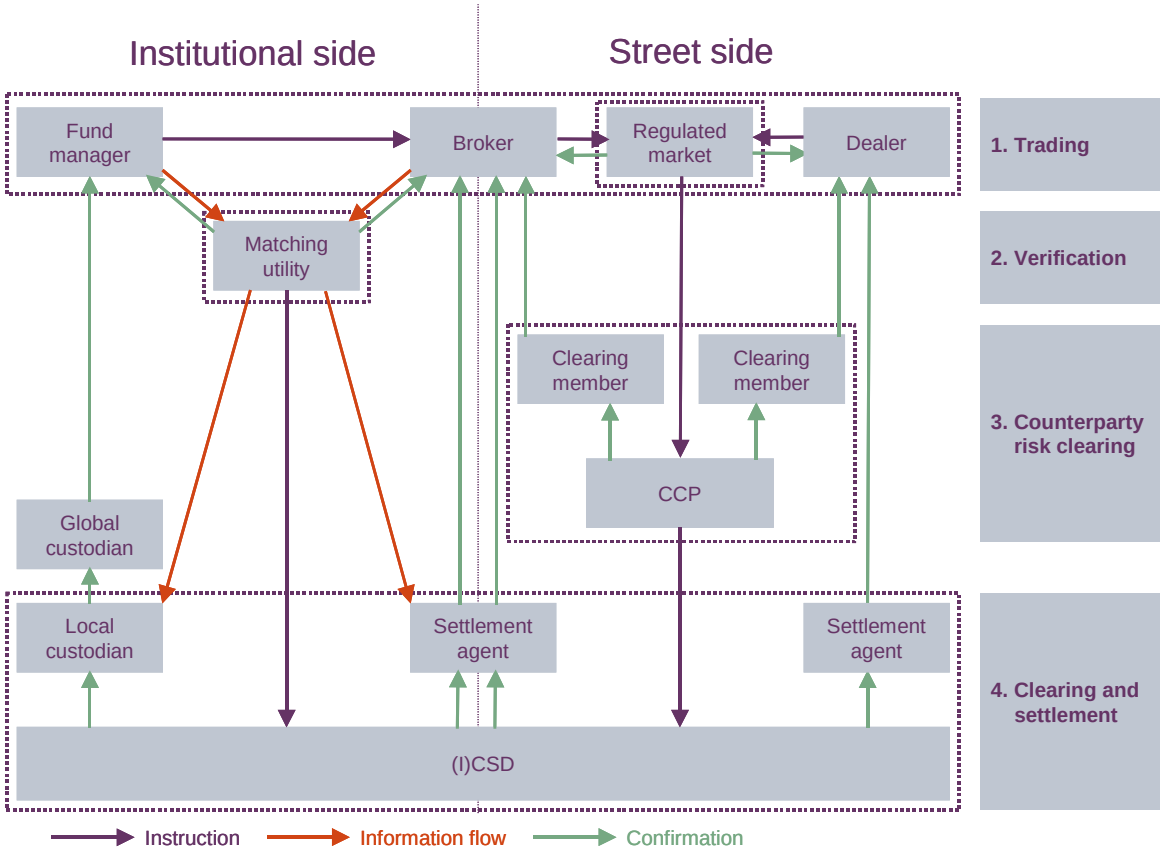
[17] ECSDA (2007), 'Glossary—Definitions of Services Relevant to the Code of Conduct', December. This draws on many definitions in European Commission DG Internal Market and Services (2006), 'Draft Working Document on Post-trading Activities', May.

[18] ECSDA (2007), op. cit.

This study covers different types of fees charged for trading and post-trading services, such as membership, access and connectivity, and transaction-related fees.

Figure 2.1 presents a stylised illustration of the value chain for the provision of trading and post-trading services for equities.[19] 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 (or other trading channels); 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 do so only on the institutional side.[20] Figure 2.1 shows how the value chains for these two transactions interact. The transaction starts with the trade order from the investor; the broker then executes it on the street side, and with the investor on the institutional side. However, only one possible structure for each of the two sides of the transaction is depicted in Figure 2.1. For a description of alternative trading and post-trading channels, see section 4 of the Oxera methodology paper.

Figure 2.1 Stylised illustration of the value chain for trading and post-trading transactions



Note: This is a stylised illustration combining a regulated market with a 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.
Source: SWIFT and Oxera.

[19] This refers to flow-related activities—ie, transactions involving securities. The value chain for stock-related activities (eg, custody services) is different; see section 4 of the methodology paper (Oxera 2007, op. cit).

[20] 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).

2.2.3 Types of security

This study covers equities and fixed income securities in dematerialised or immobilised form.[21] Only (equity) trades undertaken on a commission basis are included—the survey indicates that around 97% of trading (measured in terms of value) in equities on behalf of clients in Europe is conducted on a commission basis.

For the purpose of the study, equities are defined as securities that are shares in a listed company or listed investment company. This excludes derivatives structured to have equity-like returns—eg, contracts for difference or certificates.

Fixed income securities are defined as securities that provide a predetermined return (fixed or variable), comprising both periodic payments and return of the principal. This includes government bonds and non-securitised corporate bonds, and excludes derivatives structured to have fixed income returns—eg, certificates.

2.2.4 Financial centres

The Commission requested a classification of three types of financial centre: major, secondary, and other:

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

These financial centres were selected as part of the analysis in the methodology paper (section 3 of that paper describes the selection process). The Commission requested that the data collection focus on the major and secondary financial centres, although firms in the 'other' financial centres were also invited to participate in the survey.

2.3 Research activities

The application of the Oxera methodology involved the following activities.

- **Formulating high-level data requirements and designing high-level output tables**. On the basis of the methodology paper, data requirements were identified and high-level output tables were designed, summarising the indicators to be measured.

- **Assessing the availability of data**. The data requirements were used to assess the availability of data within firms and the ease with which they could compile it internally. Meetings were held with a number of intermediaries and infrastructure providers.

- **Designing questionnaires and output tables**. Taking into account the objectives of the study and the availability of data, the questionnaires for fund management firms, brokerage firms, custodians, and infrastructure providers were designed, with input from national and European trade associations and a large number of market participants. Some aspects were simplified to ensure that respondents would be able to compile the data, and to minimise the costs of completing the questionnaires, while maintaining the required scope of the study.

- **Designing handbooks**. To assist the respondents, a handbook was supplied alongside the questionnaires, with a guide to each question, a glossary, and answers to frequently asked questions.

[21] The methodology is designed to measure the 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/trading platforms are measured. The measurement of implicit costs, such as the market impact, is beyond the scope of this study.

– **Round-table meetings**. In addition to meetings with individual intermediaries and infrastructure providers, round-table meetings were held with a number of fund management firms, brokerage firms and custodians to obtain further input into the design of the questionnaires. These meetings were held in France, Germany, Italy, the Netherlands, Switzerland and the UK.

– **Designing the Non-disclosure Agreement (NDA)**. Most of the data requested in the survey is not typically available in the public domain and is considered confidential. The data provided has therefore been covered by an NDA, which sets out the terms and conditions under which any of the data supplied can be presented to the European Commission and used in public domain reports, and includes processes for clearing public release with the data providers. In accordance with the NDA, this report presents survey respondents' data in aggregated form only (ie, aggregated across firms and, at some levels in the value chain, across financial centres). Where there are few survey respondents (fewer than four in the case of intermediaries and three in the case of infrastructure providers), no data in absolute terms can be presented. However, to allow for comparison over time, the data will be presented in relative terms (in an index form) in the second and any subsequent reports. To present results of the baseline in this report, some data is aggregated across financial centres, and some is presented in ratios and indices. The name of survey participants is not disclosed. For infrastructures where time-series data is available, only the magnitude of the changes over time is reported on a financial centre basis. Since this information may relate to only one supplier, and the identification of the data subject may be obvious, checks have been undertaken to ensure that the data provider is willing for the information to be included, in accordance with the NDA.

– **Preparing the survey sample**. The sample of intermediaries was selected according to the data supplied by the associations and/or financial regulators. As changes in the indicators will be monitored over time, the same firms will be tracked and the analysis of changes will be undertaken at the level of individual firms, with identified changes then aggregated across the firms within a financial centre for presentation in a public domain report.[22] Given that firms have different user profiles and vary in size, and may define services and transactions in different ways, if subsequent surveys are based on a different sample of firms than that used for the baseline survey, the results and findings could be affected (unless the analysis were to control for changes in the sample through other means).

– **Undertaking the survey**. Questionnaires were sent to around 40 infrastructure providers, 200 fund management firms, 240 institutional and retail brokerage firms, and 75 custodians (the response rate is reported in section 3). A helpdesk was set up to assist firms in completing the questionnaires and to answer queries.

– **Validating the data in completed questionnaires**. All completed questionnaires were checked for completeness, internal consistency, outliers, etc. Where queries arose, these were followed up with the survey participants by email and/or conference calls.

– **Measuring indicators**. Validated questionnaires were exported to a database, from which the indicators were measured.

– **Undertaking an additional survey among infrastructure providers**. Following discussions with infrastructure providers, it was agreed that a second survey would be undertaken, and data was requested for calendar year 2008. The questionnaire for calendar year 2006 was used, and the survey was undertaken among the infrastructure

[22] Mergers and acquisitions may require some changes to the sample. However, the aim is to track the same firms over time as far as possible. In the case of infrastructure providers, a single firm's data may be presented in index form, with data aggregated across a number of financial centres where absolute results are presented.

providers that were also invited to participate in the first survey. New infrastructure providers (ie, those that had entered the market more recently) were not included in the sample. The survey was undertaken in the period January to May 2009.

The draft results of this study were discussed with trade associations, infrastructure providers and intermediaries at a seminar in Brussels on May 15th 2009 organised by the European Commission. The following associations were represented:

– European Credit Sector Associations (ECSAs) (comprising the European Banking Federation (EBF), European Savings Banks Group (ESBG), and European Association of Co-operative Banks (EACB));
– Dutch Advisory Committee Securities Industry (DACSI);
– Luxembourg Bankers' Association;
– London Investment Banking Association; Federation of European Securities Exchanges (FESE);
– European Association of Central Counterparty Clearing Houses (EACH);
– European Central Securities Depositories Association (ECSDA); and
– European Fund and Asset Management Association (EFAMA).

3 First application of methodology

This section assesses the extent to which the challenges identified in the methodology paper have been sufficiently overcome to enable the costs, prices and volumes of trading and post-trading activities to be compared over time.

As described in section 2, the financial centres have been classified into three categories—major, secondary, and other—and the Commission emphasised that data collection should focus on the major and secondary financial centres. The Terms of Reference for this study requested the establishment of a set of indicators to monitor the following over time.

- The costs and prices of trading and post-trading activities:
  - the costs and prices of clearing, settlement and custody activities for both equities and bonds;
  - allowing for the separation of the costs and prices charged by infrastructures and by intermediary banks;
  - distinguishing at least three profiles of investor: retail, small wholesale, and large wholesale;
  - providing evidence of the relevance of the selected costs, prices and financial products, and allowing for a comparison of domestic and cross-border trends.
- The volume of cross-border transactions for both equities and bonds for each of the profiles defined.

3.1 Addressing challenges

Collecting the required data through a survey of intermediaries and infrastructure providers and creating the dataset resulted in a number of challenges. The providers assessed internally within their organisations the availability of data and the ease with which certain data elements could be compiled. Although the majority of the data required to meet the objectives of the study was available in some form, many providers found it difficult to break down the data on prices and volumes of trading and post-trading services by domicile of client. Moreover, for some firms, a breakdown by domicile of security and/or type of security was not readily available. It was therefore agreed with the Commission to simplify the questionnaires by removing requests for certain breakdowns of data and by indicating priorities for the most crucial requirements, enabling firms to focus on the most important elements. These and other challenges are assessed below.

3.1.1 Practical approach to comparability of data

The type of service provided at the same layer in the value chain may vary from firm to firm, which raises the question of how data from different firms can be aggregated. A number of observations can be made.

First, while the study did not attempt to harmonise the definition of services, a degree of consistency was provided by taking into account work undertaken on the definition of services (for example, by the Commission and the task forces set up by FESE and ECSDA), and by defining up front some of the high-level services and other terminology used in the questionnaire.[23]

[23] European Commission (2006), 'Draft Working Document on Post-trading Activities', May; CESAME Sub-Group on Definitions (2005), 'Commission Services Working Document on Definition of Post-trading Activities', MARKT/SLG/G2(2005)D15283;

Second, differences in the definitions of services provided by survey participants do not present a significant challenge. Provided that participants define their services consistently, the data supplied in the base year and any subsequent years will allow the indicators to be compared over time. In addition, the study allows for an assessment of the extent to which definitions of services and other data elements in the questionnaire are consistent across firms and over time.

Third, the handbooks (accompanying the questionnaires) indicated the preferred definition for the requested data. Where considered not practicable, survey participants were given the option to provide their own definition, allowing an assessment of the degree to which the data provided is consistent across firms and over time.

Although the completed questionnaires did not, in general, indicate significant variation in the definitions used across firms and financial centres, there were relevant differences in some areas. For example, in some financial centres, brokerage firms offer trade execution in a bundle together with other services, such as research, making it difficult to identify the costs of trade execution only. In other financial centres (eg, the UK and France), there is a trend towards unbundling the costs of non-trade execution services, which makes it easier to capture 'pure' trade execution costs.[24] The questionnaires requested some information on this, and this will be used in subsequent studies to track changes in execution costs.

Fourth, the firms were asked to describe their services and categorise them into predefined high-level services. For future studies, the information on services provided will allow an assessment of whether these services have been consistent over time for each firm supplying data.

3.1.2 Measuring how costs are distributed along the value chain

The questionnaires requested data that would enable measurement of how costs are distributed along the value chain. These costs have been measured as a proportion of the value of transactions rather than the number of transactions. The number of transactions (or orders) is not consistent throughout the value chain, and changes depending on factors such as the number of trading transactions per order (which varies across firms and over time), and the degree of netting by CCPs. The value of transactions is in principle consistent throughout the value chain, and cost as a proportion of the value of transactions is therefore a more appropriate measure.

This analysis could be undertaken only if intermediaries provided sufficient data on their use of channels and the costs of trading and post-trading services, and provided both trading and post-trading data on a consistent basis (or explained any inconsistencies so that adjustments could be made).

In principle it is possible to undertake the analysis at the level of fund management and brokerage firms. However, the number of respondents that provided sufficient and consistent data for all their trading and post-trading activities was relatively limited. As a result, the results of the analysis undertaken should be considered as indicative and an illustration only.

3.1.3 Can the cost of domestic and cross-border transactions be measured?

The Commission requested an analysis of domestic and cross-border transactions on a financial centre basis. This requires information about the domicile of the investor (or client of the service provider) and the security.

ECSDA (2007), 'Glossary—Definitions of Services Relevant to the Code of Conduct', December; FESE, EACH, ECSDA (2006), 'European Code of Conduct for Clearing and Settlement', November; Chan, D., Fontan, F., Rosati, S. and Russo, D. (2007), 'The Securities Custody Industry', European Central Bank, August.

[24] Oxera (2009), 'Soft Commissions and Bundled Brokerage Services: Post-implementation Review', prepared for the Financial Services Authority.

– **Fund management firms** may have offices in more than one financial centre. In this study, the domicile of a fund management firm is defined as the financial centre where the funds are managed and trading decisions are made. Therefore, it was relatively straightforward for fund management firms to identify their domicile.

  A significant number of fund management firms provided data on trading and post-trading activities broken down by domestic and non-domestic securities rather than by individual financial centre. Therefore, for each financial centre, changes over time in the costs and volumes of *domestic* and *cross-border* transactions can be estimated. However, it may not be possible to monitor the costs of trading and post-trading activities for some pairs of financial centres (ie, the cost incurred by an investor in financial centre X trading in equities domiciled in financial centre Y).

– **Brokerage firms**. Rather than completing a separate questionnaire for each financial centre where these firms have operations, it was agreed to give them the option to provide the data on a consolidated basis (covering all their activities across Europe) and most of the global (or multi-market) firms took up this option. To some extent, this affects the ability to distinguish between domestic and cross-border trading transactions from a brokerage perspective. This is explained in more detail in section 6.

– **Custodians**. The original questionnaires for custodians were simplified. The request for breakdowns of actual data by different customer characteristics was replaced by a request for price data for predefined customer profiles, complemented by aggregate data on actual revenues. Although further refinement may be desirable, the approach was appropriate (see Appendix 2). It allows changes in the costs of domestic and cross-border transactions to be measured, but not in the costs of trading and post-trading activities for pairs of financial centres. As with brokers, a large number of custodians act as multi-market or global firms and are therefore domiciled in several financial centres, making it more appropriate to analyse custodians aggregated across financial centres.

– **Infrastructure providers**. It was agreed not to ask for detailed breakdowns of data by domicile of client. This data was not readily available as it did not form any basis for pricing. The questionnaires did, however, allow the costs relating to securities domiciled in different financial centres to be measured.

3.1.4 Analysis per individual financial centre

This report presents an analysis per financial centre for the infrastructure providers and to a very limited extent for intermediaries; in most cases, the data for intermediaries is aggregated across financial centres. To some extent, this reflects market reality, whereby larger firms, in particular, operate in a number of financial centres and completed questionnaires on a consolidated basis. Furthermore, the relatively small number of survey respondents in certain financial centres meant that data had to be aggregated across financial centres to be able to present it in the report. In further studies, it is still the underlying data at individual financial centre level that would be compared over time.

3.1.5 Blended rates

A large number of intermediaries set ‘blended prices’ for domestic and cross-border transactions. For example, fund managers may agree with a global broker a single commission rate for all trades in European equities, or three separate commission rates for UK equities, continental western European equities, and eastern European equities. In other words, where the commission rate(s) agreed cover more than one financial centre, these rate(s) do not necessarily seem to vary explicitly by the domicile of the security. Similarly, fund managers may pay custodians one and the same fee for settlement and safekeeping services, irrespective of the domicile of the specific securities to which these services relate. This practice makes it more difficult to estimate the costs of domestic and cross-border transactions simply by looking at the explicit prices charged for services.

Although firms may set blended rates for their services that, for each customer, are the same irrespective of the domicile of the security, the underlying costs may still vary. In setting a blended rate, providers therefore typically take into account the client's (expected) profile of transactions and the underlying costs. For example, if a fund manager has many transactions in equities which are relatively expensive, and a few in equities with a relatively low cost, all else being equal, this fund manager is likely to be charged a higher blended rate than one with many 'cheap' transactions and a few 'expensive' transactions. This would be expected to occur in competitive markets. Thus, a pattern of prices is observed where there is no apparent differential by domicile of security from the client's perspective, but there are price differentials between different clients, depending on the pattern of their demand.

This study has sought to use the blended rates in combination with a profile of transaction volumes to estimate costs for transactions in securities domiciled in a particular financial centre. In other words, where there is sufficient data on transaction volumes per domicile of security, blended rates are broken down into rates for domestic and cross-border transactions.

3.2 Survey response rate and quality of data

The survey response rate and quality of data can be assessed by financial centre and type of firm.

– **Fund management firms**. More than 40 firms participated in the survey, covering around 23% of the market in terms of value.[25] While the study makes a distinction between retail and institutional investors, it is not possible to distinguish in all financial centres between small and large institutional investors. In almost all financial centres there were sufficient survey responses to allow for changes over time to be monitored (in either indices or absolute terms). The exceptions are in Belgium, Denmark, Poland, Sweden and Switzerland, where there were either no survey participants or just one. For these financial centres, no individual price monitoring can take place or be presented.

  In the UK and Spain, there were sufficient responses to allow the results on trading activities to be presented in the report in *absolute* terms. Although in most financial centres the survey sample is limited, the markets for fund management services are relatively concentrated. Thus, even a sample of two or three large firms can still provide an indication of changes over time in the market.

  The quality and quantity of data provided by fund managers varies. In general, there is more data on the use and costs of trading compared with post-trading services.

– **Brokerage firms**. Close to 40 firms participated in the survey, consisting of a large number of global (or multi-market) firms and a smaller number of local brokerage firms. They cover around 32% of the market in terms of value of equity trading.[26] Local brokers in the sample include firms domiciled in Germany, Spain, Belgium, Sweden, Austria, the Czech Republic and Greece. The lack of local brokers is due in part to a relatively low response rate among local brokers, and in part to the way local brokers were defined—ie, as a firm with an office in one financial centre. Firms with operations in only two or three financial centres were therefore classified as global rather than local brokers, which explains why in some major and secondary financial centres in particular, the survey sample does not contain any local brokers. However, as shown in section 6, this does not materially affect the analysis.

[25] Market coverage was proxied by dividing the value of assets under management by the survey participants by the value of assets managed by the whole industry (source: EFAMA and the Investment Management Association).

[26] Market coverage was proxied by dividing the value of trading in equities undertaken by survey participants by the value of on-book and off-book trading in equity, as reported by the infrastructure providers in the 18 financial centres.

The fact that a high number of larger, global firms participated in the survey means that the sample can indeed provide an indication of changes in the market over time.

As fixed income trading is not typically conducted on a commission basis, institutional brokerage firms did not provide any data on the cost of such trading. More generally, intermediaries provided more, and better quality, data on equities than on fixed income securities.

– **Retail brokerage firms**. Forty firms participated in the survey. In most financial centres there were sufficient survey responses to allow changes over time to be monitored (in either indices or absolute terms). The exceptions are in the Czech Republic, Denmark, Greece, Luxembourg, Norway, Poland, and Switzerland.

– **Custodians**. Around 60 custodians participated in the survey, covering around 86% of the market in terms of value of assets held.[27] The approach to analysing custodian data is assessed in Appendix 2.

– **Infrastructure providers**. Almost all infrastructure providers completed the questionnaires. For data confidentiality reasons, it was not possible to present evidence on prices, costs and volumes at the individual financial centre level for 2006 for this segment of the value chain. As such, infrastructure providers were asked to supply data for 2008 so that, for each individual financial centre, evidence could be provided on the changes in costs and volumes of different services. The NDA allows the data to be presented in indices over time, or in absolute terms aggregated across financial centres. Section 4 explains how, within the constraints imposed by the NDA, Oxera analysed the data supplied.

3.3 Concluding remarks

The survey among infrastructure providers and intermediaries has resulted in a large set of data on the prices and volumes of trading and post-trading services offered and purchased along the entire value chain in most of the 18 financial centres in Europe, with part of the value chain covered in the remaining financial centres. Collection of the next set of data (in further studies) would allow in-depth analysis of changes over time in the prices, costs and volumes of trading and post-trading services.

The application of the methodology revealed challenges and practical difficulties, some of which had already been sufficiently addressed in the design of the methodology, while others were addressed by simplifying the questionnaires. These simplifications, together with the NDA, place some limitations on the way in which certain indicators can be measured and presented, and the level of detail at which the analysis can be undertaken.

– For most financial centres, changes in the costs and volumes of *domestic* and *cross-border* transactions can be measured over time. Owing to the lack of availability of data on trading and post-trading broken down by domicile of security for some firms, it might not be possible to monitor the costs of trading and post-trading activities for pairs of financial centres.

– The study makes a distinction between retail and institutional investors, but it is not possible to distinguish between small and large institutional investors in all financial centres.

[27] Market coverage was estimated by using market share data from Institutional Investor (http://www.iimagazinerankings.com/globalcustody/GlobalCustodyRanking.asp). This data refers only to assets held outside the investor's domicile—ie, assets in the investor's home financial centre are not included. The total market share should therefore be considered a proxy for the actual market share.

– Owing to a lack of data, it is not possible to cover fixed income securities in full at all levels of the value chain.

– The low response rate at some levels in the value chain in some financial centres means that certain price indicators cannot be measured in a number of financial centres.

Overall, the impact of these limitations is not particularly significant compared with what can be measured, and, bearing in mind that the focus of the data collection was the major and secondary financial centres, should not materially affect the Commission's overall objective of this study, namely to monitor changes in costs, prices, and volumes of trading and post-trading activities over time. The evidence on the changes in prices, costs and volumes between 2006 and 2008 for the infrastructure providers for individual financial centres illustrates how the methodology delivers relevant indicators over time when applied to successive years, assuming consistency of the methodology over those time periods.

The low response rate at some levels in the value chain, in combination with the NDA, affects what can be presented in terms of the baseline analysis. In particular, given that, in most of the financial centres, a limited number of fund managers and retail brokers participated, the results can only be presented (in absolute terms) aggregated across financial centres. However, this does not prevent the indicators being monitored over time at the level of the individual financial centre in any subsequent reports.

In line with the Terms of Reference for this study, provided that those that responded this time participate in the next stage, the changes in costs can be estimated along the following dimensions: domestic and cross-border transactions, at the level of infrastructure providers and separately at the level of intermediaries, and for different types of investor (retail and wholesale).

The database also allows changes in several additional indicators to be measured that are relevant to the European debate on the markets for trading and post-trading services.

– The costs of trading and post-trading at different levels in the value chain.

– The degree of integration between financial centres within Europe.

– The use of different channels for trading and post-trading for domestic and cross-border transactions.

– The database contains a number of supporting indicators to assess the quality and consistency of data supplied. These could also be used in subsequent analyses to understand the changes over time.

– Finally, some of the indicators are measured from both sides for any level in the value chain. For example, commission rates for trade execution services are measured on the basis of what fund management firms pay and what brokerage firms charge, and costs for CCP services are measured using data from CCPs (ie, what they charge) and brokerage firms (ie, what they pay). This would allow the changes measured over time to be cross-checked in the second and any subsequent report, and further adds to the robustness of the study.

Part 2 Comparison of data over time (infrastructure providers)

This part of the report sets out the approach to the comparison over time of data for the infrastructure providers (trading platforms, CCPs and CSDs) and summarises the results of the analysis of the changes in indicators over time—in index form—at the *individual financial centre* level. A summary of the results of the analysis of the data in absolute terms and *aggregated* across financial centres is provided in Appendix 5. The analysis is carried out based on the data for 2006 and 2008.

The collection of 2008 data was not originally envisaged for this stage of the price monitoring study—the intention was to collate data for the baseline only (the year 2006). For data confidentiality reasons, it was not possible to present evidence on absolute levels of prices, costs and volumes at the individual financial centre level for 2006 for this segment of the value chain. As such, infrastructure providers were also asked to supply data for 2008 so that, for each individual financial centre, evidence could be provided on the *changes* in prices, costs and volumes of different services. This forms the first element of further studies—ie, the second application of the methodology and a comparison with the baseline (Lot 2).

The analysis of data over time is presented without any explanation of the factors that may have contributed to the changes, for example. Further context and background to the changes would be provided in further studies following collection of additional data from intermediaries.

4 Changes in indicators over time

Changes in the key indicators over time (from 2006 to 2008) for the trading platforms, CCPs and CSDs are set out in this section.

While a significant amount of data for the infrastructure providers has been obtained for 2006 and 2008, and changes in prices, costs and volumes can be reported in this study, more analysis would be conducted at the next stage of the monitoring process. This reflects both issues of timing (ie, limited time available for completion of this analysis), and the fact that the full richness of the data analysis cannot be realised until time-series data is available from the rest of the value chain (ie, from the intermediaries).

Overall, this data summary provides an indication of the trends in the distribution of members (domestic versus cross-border), and average (unit) costs.

The methodology is applied, to the extent possible, consistently across the financial centres. Notwithstanding this, and in accordance with the overall methodology design, direct comparisons between financial centres are not necessarily valid for differences in trends.

For this analysis, and in accordance with the NDA, trends at the individual financial centre level are deliberately calculated such that the absolute levels cannot be calculated. As a result, if one trend is a 20% increase in the proportion of non-domestic members, for example, this could be because the proportion of cross-border members has risen from 2% to 2.4% of members, or from 30% to 36%, or even 83.3% to 100%. Where a percentage point change is reported (eg, five percentage points), this could be from 0% to 5%, or from 20% to 25%, etc.

This section presents the results for changes in indicators observed in individual financial centres. Further analysis of the data aggregated across all financial centres is presented in Appendix 5.

4.1 Approach to estimating changes over time

For each type of infrastructure provider (trading platforms, CCPs, and (I)CSDs), the following changes are calculated.

– changes in the distribution of activity of domestic and cross-border members;
– changes in the distribution of activity in domestic and cross-border securities (ie, where the securities are domiciled in a financial centre other than the domicile of the infrastructure provider); and
– changes in the costs of services.

These calculations apply to both the individual financial centres and the aggregate results tables presented in the report. For the purposes of aggregated analysis, changes in relative costs of services in cross-border and domestic securities are also calculated.

Appendix 4 describes in detail how each of the indicators was calculated.

Distribution of activity

These indicators capture how ‘cross-border activity’ has changed between 2006 and 2008, providing an indication of whether the European market is becoming more integrated.

The specific indicators used are as follows.

– The relative activity of cross-border members over 2006–08, defined in terms of:

  – the proportion of members that are domiciled outside the domicile of the infrastructure provider;
  – the proportion of activity (eg, trading value) of members that are domiciled outside the domicile of the infrastructure.

– The relative activity in cross-border securities, defined in terms of the proportion of activity (eg, trading value) in securities from financial centres outside the domicile of the infrastructure.

The calculations are undertaken for total securities (equities and fixed income securities combined), equities, and fixed income securities, where data is available.

Costs of services

The indicators on the costs of services capture how costs have changed between 2006 and 2008 for different services. The specific indicators vary between type of infrastructure firm, and are summarised below.

For trading platforms, the indicators state changes in the costs of trading services between 2006 and 2008 as follows:

– changes in the costs of on-book trading;
– changes in the costs of on-book order management;
– changes in the total costs of on-book (ie, the sum of on-book trading and order management);
– changes in the costs of off-book trading.

These are the calculated by dividing revenue by the number and value of transactions (for on-book and off-book trading as appropriate), to give a cost per transaction and per value of trading respectively for both years.

For CCPs, the indicators state changes in the costs of services offered by CCPs between 2006 and 2008:

– changes in the costs of central counterparty clearing;
– changes in the costs of risk management services;
– changes in the costs of settlement instructions;
– changes in the costs of fail management;
– changes in the total cost.

These are the calculated by dividing revenue from the specific service by the number of clearing transactions, to give a cost per transaction for both years.

For CSDs, the indicators state changes in costs of services offered by CSDs between 2006 and 2008:

– changes in the costs of account provision and asset servicing;
– changes in the costs of clearing and settlement services.

For account provision and asset servicing, revenues are divided by the value of securities held, and for clearing and settlement they are divided by the number of transactions.

The ratio of cross-border to domestic costs

This indicator expresses the change in the ratio of cross-border to domestic costs for each specific service between 2006 and 2008. This analysis provides an indication of how the relative costs for transactions in domestic and cross-border securities are changing. The

results for this analysis are provided on an aggregated basis across financial centres only (see sections 6 and 7, and Appendix 5).

For each service, costs were calculated for domestic securities (ie, securities with the same domicile as the infrastructure provider) using revenues associated with these securities and the number of transactions and the value of transactions or value of securities held (as appropriate) of these securities. The same calculations were performed for cross-border, or non-domestic securities. The ratio of costs for cross-border and domestic securities was then computed for both years. The changes in relative cross-border costs reported in the tables represent a percentage change in this ratio over time.

4.2 Individual financial centre analysis

4.2.1 Interpretation of results

The analysis in this section focuses on how the *unit costs* faced by users of relevant services changed between 2006 and 2008. For example, CSDs' clearing and settlement costs are expressed in terms of costs per transaction, and show an average unit cost to buyers of this service in a particular financial centre. By considering unit costs rather than fees from the price lists, this assessment provides direct insights into changes in the *effective* trading and post-trading costs in the selected financial centres.

Changes in the costs of trading and post-trading services reported in this section may be driven by not only changes in infrastructures' prices or pricing structures, but also by, for example, changes in the nature of users' activities. The factors affecting costs include the following.

– **Changes in fees/prices or fee/price structure**. All else equal, a reduction in the price list fees charged by infrastructures results in lower costs. At the same time, changing the fee/price structure (eg, by introducing volume discounts) would also affect the costs to users.

– **Changes in the average size of users**. If pricing schedules include a sliding scale (whereby greater activity by a user is rewarded with lower fees), a reduction in the average size of users would result in an increase in unit costs, even if the pricing schedule remains unchanged.

– **Changes in the types of service purchased**. The costs of services can also be affected by the changes in types of service purchased by users. For example, for CSDs, a shift from delivery versus payment (DVP) settlement to free of payment (FOP) settlement (or vice versa) would result in unit changes in the costs of services.

– **Change in the mix of securities**. If the mix of services required for different securities differs then changes in the mix can result in changes in unit costs even if the pricing schedule remains unchanged. For example, if the settlement rates of large and medium/small stocks differ then any increase in the proportion of activity in medium/small stocks can affect the fail management costs per transaction, even if there are no changes in fees or fee structure.

– **Change in market values of securities**. The costs of services can also be affected by changes in the market values of securities. For example, with the market value of securities falling and costs per transaction remaining unchanged, this may result in an increase in the unit cost per value of transactions.

A number of other factors can affect costs, including total size of activity across the market (if, for example, rebates are given based on total activity in the market), changes in the average size of transactions, and mergers between infrastructures.

When interpreting the results presented here, it is therefore important to recognise that they provide an indication of changes in the costs that users face, not changes in infrastructure providers' prices.

In addition, the results are presented per transaction, per value of transactions, or per value of securities held. Future studies need to consider how the costs of CCPs and CSDs have evolved when expressed in terms of the costs per value of clearing on CCPs and per value of settlements on CSDs—this has already been done for trading platforms. In doing so, this analysis would enable an assessment, for example, of whether trends observed on a per transaction basis also translate into similar trends expressed on a per value of trading basis.

Similarly, changes in activity—ie, the proportion of activity carried out by cross-border members, and relative activity in cross-border and domestic securities—reported in this section may be driven by several factors, including changes in:

– the number of cross-border and domestic members, and the number of domestic and cross-border securities;

– the relative velocity of trading of cross-border and domestic members, and in domestic and cross-border securities;

– the relative prices of domestic and cross-border securities. Over time, for example, prices of equities in domestic market may exhibit a significant drop, while securities in other financial centres show an increase in prices, resulting in a measured change in the relative activity.

Furthermore, in view of how infrastructures compiled data, several methodological issues need to be recognised when interpreting the results.

– Some of the firms provided revenue estimates for a combination of services (eg, on- and off-book trading; or clearing and settlement for equity and for fixed income securities). In these cases, the apparent changes in average costs for the combined services can be affected by changes in the mix of services used by members (eg, a relative increase in on-book trading compared with off-book trading, or changes in the proportion between equities and fixed income securities).

– In several cases, where firms provided revenue estimated for a combination of services, measures of activity in these services have been used to break down revenues across the services on a pro-rata basis. In these cases, the apparent changes in the costs of each individual service can be affected by changes in the relative mix of these different services.

– Where infrastructure firms are domiciled in more than one financial centre, domestic members are those members in any of the financial centres in which the infrastructure provider is domiciled. Therefore, the interpretation of results may differ between a firm in one financial centre and one in multiple financial centres.

4.2.2 Reporting of data

The results are presented consistently across the financial centres. In the presentation of results, Oxera has used 'n/a' to indicate one of the following:

– no data was provided for a particular part of the value chain in a given financial centre;
– there was insufficient data to estimate a given indicator (even if data for that part of the value chain in a given financial centre was provided);
– changes over time could not be estimated because in one or both years the indicator was equal to zero;
– infrastructures in a given financial centre do not provide a particular type of service (eg, there is no off-book trading);

– infrastructures in a given financial centre do not charge separately for a particular service.

4.3 Main trends

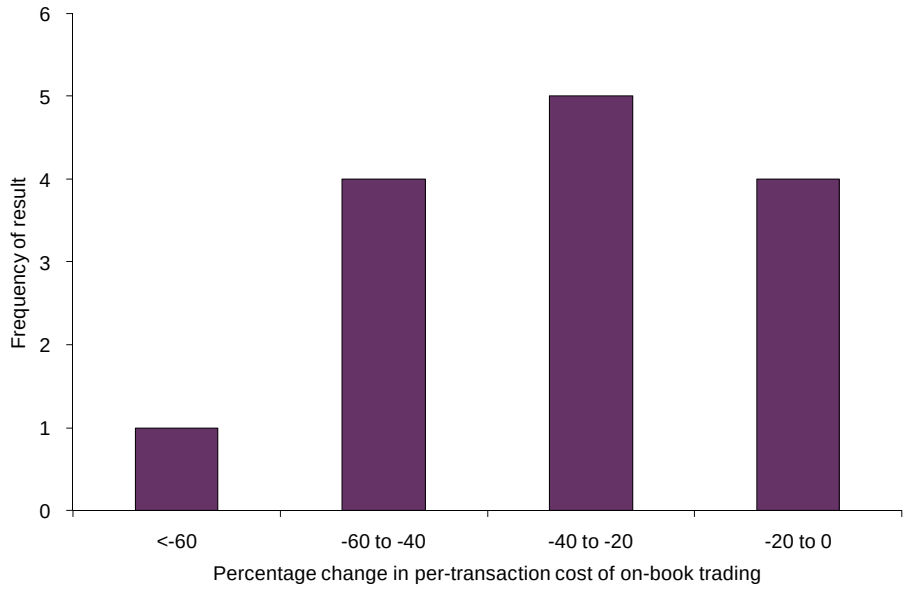
The evidence on changes in activity and costs in various individual financial centres provides a number of insights.

An increasing proportion of members on trading platforms, CSDs and, to a lesser extent, CCPs originate from outside the domicile of the infrastructures. This rise in the proportion of cross-border members has also been broadly reflected in growth in the proportion of activity by these members on infrastructures. Overall, between 2006 and 2008 there appears to have been a trend towards increasing use of infrastructures in other financial centres. A more comprehensive dataset, including data on changes in brokerage firms' behaviour over time, would be required to provide a more detailed interpretation of the observed results.

Across financial centres, there appears to be a reduction in the proportion of activity in cross-border or non-domestic equities on trading platforms. In other words, for the majority of financial centres, a decreasing proportion of trading is represented by activity in cross-border equities. At the same time, in the case of CCPs and CSDs, there does not appear to be a distinct trend: some financial centres have shown an increase, and others a decrease in the proportion of activity in cross-border securities. More in-depth analysis of these changes, including an assessment of the absolute growth of activity in cross-border and domestic securities, could provide more detailed insights into the factors underlying these changes.

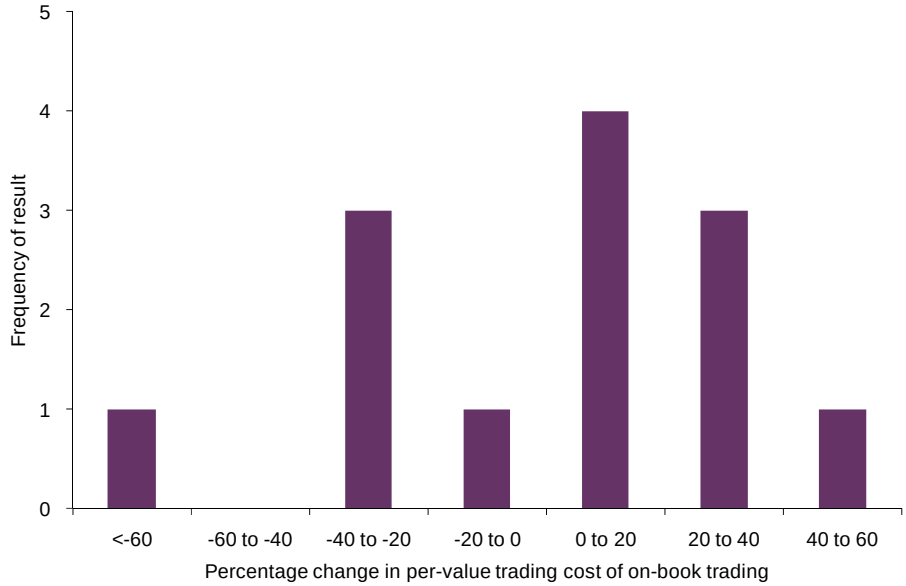
Across financial centres, there has been a reduction in on-book trading costs expressed in terms of costs per transaction (see Figures 4.1 and 4.2 below). In other words, in most financial centres, the average cost per trade incurred by market participants in 2008 was significantly lower than in 2006. At the same time, expressed in terms of cost per value of trading, the pattern of changes is different; using this measure, the trading costs facing investors have not systematically decreased (or increased). The overall costs (ie, the combined on-book trading and on-book order management costs) appear to exhibit similar trends to those observed for the on-book trading. More detailed analysis, including an assessment of whether these differences in changes based on different measures can be explained by changes in the average trade size, could provide more detailed insights.

Figure 4.1 Changes in on-book trading costs between 2006 and 2008 (per number of transactions)



Source: Trading platform questionnaire, and Oxera analysis.

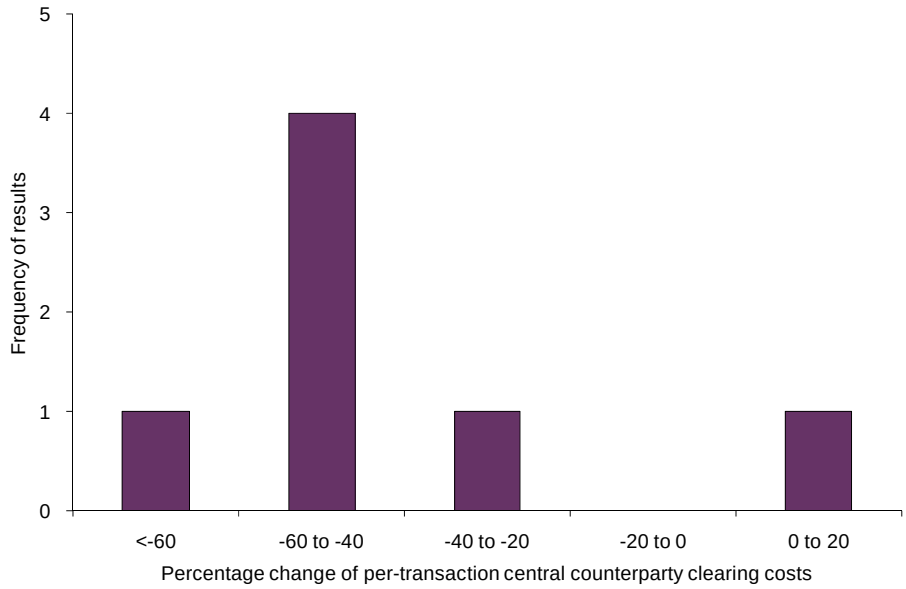
Figure 4.2 Changes in on-book trading costs between 2006 and 2008 (per value of transactions)



Source: Trading platform questionnaire, and Oxera analysis.

Across financial centres, there has been a significant reduction in central counterparty clearing costs, and the overall costs of CCPs (see Figure 4.3). In other words, in most financial centres with CCPs, the average central counterparty clearing cost per transaction incurred by market participants in 2008 was significantly lower than in 2006. In addition, although data on other services is somewhat limited, the overall costs (ie, the combined costs of central counterparty clearing, risk management, fail management, and settlement instructions) also appear to have declined significantly between 2006 and 2008.

Figure 4.3 Changes in central counterparty clearing costs between 2006 and 2008

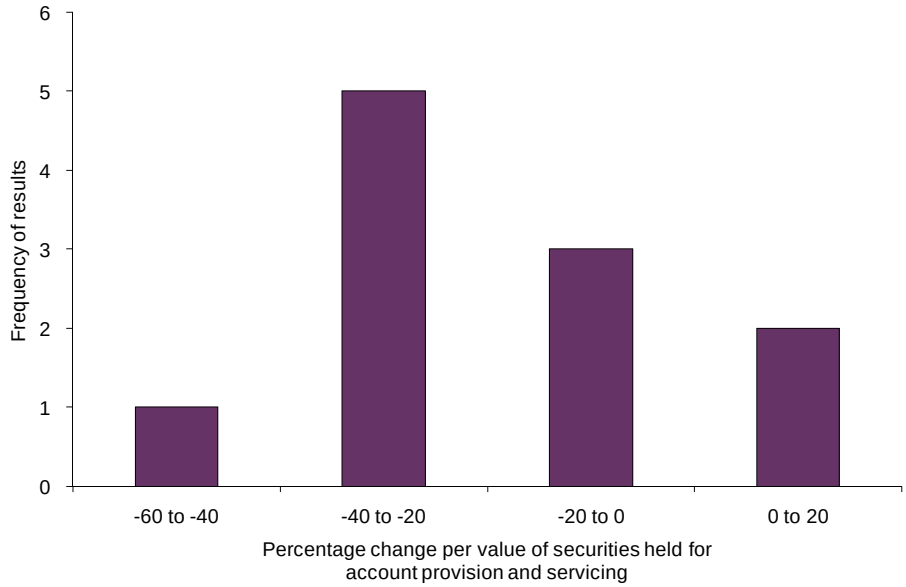


Source: CCP questionnaire, and Oxera analysis.

The data on CSDs across financial centres does not reveal a systematic trend in the costs of account provision and servicing, and clearing and settlement services (see Figures 4.4 and 4.5). In particular, there are a significant number of financial centres where these costs have increased and a significant number where they have decreased. More detailed analysis,

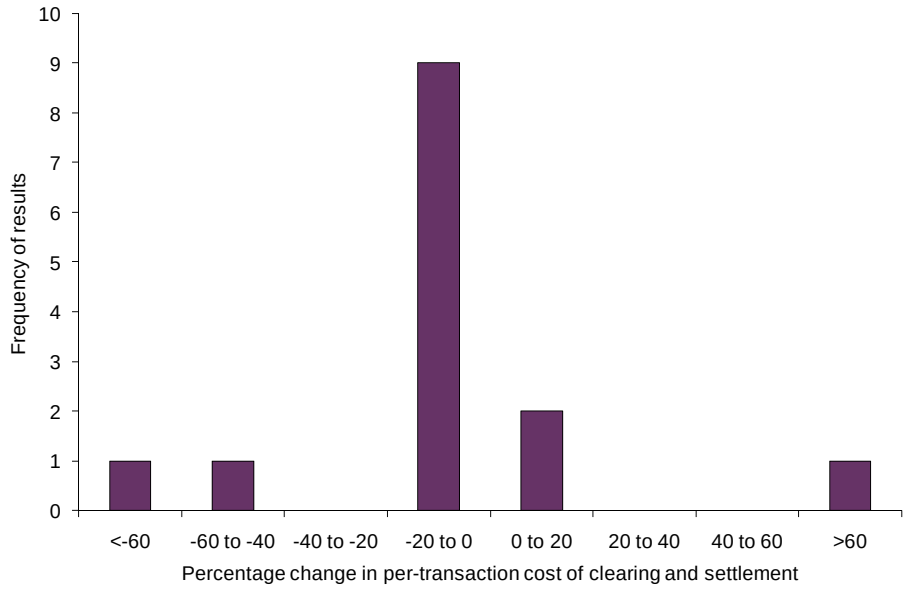
including an assessment of whether these changes can be explained by changes in the mix of services offered, could provide more insight into the drivers of these changes. (Some of the data required for this analysis has been collated as part of this study.)

Figure 4.4 Changes in account provision and servicing costs between 2006 and 2008



Source: CSD questionnaire, and Oxera analysis.

Figure 4.5 Changes in clearing and settlement costs between 2006 and 2008



Source: CSD questionnaire, and Oxera analysis.

Overall, this data analysis reveals strong patterns in the changes in the nature of the activity and costs that market participants face. However, it provides only first insights into the changes. A more detailed analysis of existing data (and further data collected from the intermediaries) could provide additional valuable insights into changes in other factors: for example, considering changes in the relative costs for cross-border securities (in comparison with the costs for domestic securities), and the drivers of these changes.

4.4 Changes across financial centres

4.4.1 Austria

Distribution of activity

Table 4.1 shows the percentage change in relative activity of cross-border members over the period 2006–08.

Table 4.1 Changes in activity of cross-border members over 2006–08: ratio of cross-border to all members

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By number of members	37	17	9
By equity activity	31	n/a	
By fixed income activity	n/a	n/a	
By total activity			15

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs).
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Table 4.2 shows the percentage change in relative activity in cross-border securities over the period 2006–08.

Table 4.2 Changes in activity in cross-border securities over 2006–08: ratio of cross-border to all securities

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By equity activity	–36	n/a	–30
By fixed income activity	–27	n/a	–24
By total activity	n/a	n/a	n/a

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs).
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Costs of services

Table 4.3 shows changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–08. The trading platform does not charge for on-book order management separately, and does not offer any off-book trading services.

Table 4.3 Changes in costs, equities

	bp costs per value of trading (% change)	€ costs per transaction (% change)
On-book trading	6	–41
On-book order management	n/a	n/a
On-book total	6	–41
Off-book trading	n/a	n/a

Note: For on-book trading, on-book order management and on-book total, bp costs are calculated with reference to the value of on-book trading; € costs per transaction are calculated with reference to the number of on-book transactions. For off-book trading, bp costs are calculated with reference to the value of off-book trading; € costs per transaction are calculated with reference to the number of off-book transactions.
Source: Trading platform questionnaire, and Oxera analysis.

Table 4.4 shows changes in the costs of CCP services for total securities (equity and fixed income securities combined) over the period 2006–08.

Table 4.4 Changes in costs, total securities

	€ costs per transaction (% change)
Central counterparty clearing	–54
Risk management services	n/a
Settlement instructions	n/a
Fail management	n/a
Total	–54

Note: € costs per transaction calculated with reference to the number of clearing transactions.
Source: CCP questionnaire, and Oxera analysis.

Table 4.5 shows changes in account provision and asset servicing, and clearing and settlement costs for total securities (equities and fixed income securities combined) over the period 2006–08.

Table 4.5 Changes in costs, total securities

	€ costs per transaction (% change)	bp costs per value of securities held (% change)
Account provision and asset servicing		21
Clearing and settlement	–11	

Note: bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held. € costs per transaction for clearing and settlement are calculated with reference to the number of clearing and settlement transactions.
Source: CSD questionnaire, and Oxera analysis.

4.4.2 Belgium

The trading platform and CCP for Belgium has multiple domiciles; therefore, the results are the same as those presented for France, the Netherlands and Portugal.

Distribution of activity

Table 4.6 shows the percentage change in relative activity of cross-border members over the period 2006–08.

Table 4.6 Changes in activity of cross-border members over 2006–08: ratio of cross-border to all members

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By number of members	12	29	1
By equity activity	11	n/a	
By fixed income activity	–8	n/a	
By total activity			55

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs).
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Table 4.7 shows the percentage change in relative activity in cross-border securities over the period 2006–08.

Table 4.7 Changes in activity in cross-border securities over 2006–08: ratio of cross-border to all securities

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By equity activity	n/a	1,211	57
By fixed income activity	n/a	–4	n/a
By total activity	n/a	n/a	n/a

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs).
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Costs of services

Table 4.8 shows changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–08.

Table 4.8 Changes in costs, equities

	bp costs per value of trading (% change)	€ costs per transaction (% change)
On-book trading	36	–18
On-book order management	n/a	n/a
On-book total	36	–18
Off-book trading	162	0

Note: For on-book trading, on-book order management and on-book total, bp costs are calculated with reference to the value of on-book trading; € costs per transaction are calculated with reference to the number of on-book transactions. For off-book trading, bp costs are calculated with reference to the value of off-book trading; € costs per transaction are calculated with reference to the number of off-book transactions.
Source: Trading platform questionnaire, and Oxera analysis.

Table 4.9 shows changes in the costs of CCP services for equities over the period 2006–08.

Table 4.9 Changes in costs, equities

	€ costs per transaction (% change)
Central counterparty clearing	–58
Risk management services	n/a
Settlement instructions	–38
Fail management	–33
Total	–57

Note: € costs per transaction are calculated with reference to the number of clearing transactions.
Source: CCP questionnaire.

Table 4.10 shows changes in account provision and asset servicing, and clearing and settlement costs for total securities (equities and fixed income securities combined) over the period 2006–08.

Table 4.10 Changes in costs, total securities

	€ costs per transaction (% change)	bp costs per value of securities held (% change)
Account provision and asset servicing		24
Clearing and settlement	73	

Note: bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held. € costs per transaction for clearing and settlement are calculated with reference to the number of clearing and settlement transactions.
Source: CSD questionnaire, and Oxera analysis.

4.4.3 Denmark

Distribution of activity

Table 4.11 shows the percentage change in relative activity of cross-border members over the period 2006–08.

Table 4.11 Changes in activity of cross-border members over 2006–08: ratio of cross-border to all members

	Trading platforms (% change)	CSDs (% change)
By number of members	37	n/a
By equity activity	12	
By fixed income activity	n/a	
By total activity		n/a

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); and value of securities held (CSDs).
Source: Trading platform and CSD questionnaires, and Oxera analysis.

Table 4.12 shows the percentage change in relative activity in cross-border securities over the period 2006–08.

Table 4.12 Changes in activity in cross-border securities over 2006–08: ratio of cross-border to all securities

	Trading platforms (% change)	CSDs (% change)
By equity activity	–43	n/a
By fixed income activity	–8	n/a
By total activity	n/a	n/a

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); and value of securities held (CSDs).
Source: Trading platform and CSD questionnaires, and Oxera analysis.

Costs of services

Table 4.13 shows changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–08. (Since the revenue for trading services was provided on an aggregated basis—across on- and off-book trading—the number of on- and off-book transactions was used to break the revenues down into those related to on- and off-book activity, introducing an approximation).

Table 4.13 Changes in costs, equities

	bp costs per value of trading (% change)	€ costs per transaction (% change)
On-book trading	–23	–50
On-book order management	n/a	n/a
On-book total	–23	–50
Off-book trading	15	–50

Note: For on-book trading, on-book order management and on-book total, bp costs are calculated with reference to the value of on-book trading; € costs per transaction are calculated with reference to the number of on-book transactions. For off-book trading, bp costs are calculated with reference to the value of off-book trading; € costs per transaction are calculated with reference to the number of off-book transactions.
Source: Trading platform questionnaire, and Oxera analysis.

Table 4.14 shows changes in account provision and asset servicing, and clearing and settlement costs for total securities (equities and fixed income securities combined) over the period 2006–08.

Table 4.14 Changes in costs, total securities

	€ costs per transaction (% change)	bp costs per value of securities held (% change)
Account provision and asset servicing		–4
Clearing and settlement	–3	

Note: bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held. € costs per transaction for clearing and settlement are calculated with reference to the number of clearing and settlement transactions.
Source: CSD questionnaire, and Oxera analysis.

4.4.4 France

The trading platform and CCP for France has multiple domiciles; therefore the results are the same as those presented for Belgium, the Netherlands and Portugal.

Distribution of activity

Table 4.15 shows the percentage change in relative activity of cross-border members over the period 2006–08.

Table 4.15 Changes in activity of cross-border members over 2006–08: ratio of cross-border to all members

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By number of members	12	29	10
By equity activity	11	n/a	
By fixed income activity	–8	n/a	
By total activity			72

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs).
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Table 4.16 shows the percentage change in relative activity in cross-border securities over the period 2006–08.

Table 4.16 Changes in activity in cross-border securities over 2006–08: ratio of cross-border to all securities

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By equity activity	n/a	1,211	–12
By fixed income activity	n/a	–4	10
By total activity	n/a	n/a	40

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs).
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Costs of services

Table 4.17 shows changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–08.

Table 4.17 Changes in costs, equities

	bp costs per value of trading (% change)	€ costs per transaction (% change)
On-book trading	36	–18
On-book order management	n/a	n/a
On-book total	36	–18
Off-book trading	162	0

Note: For on-book trading, on-book order management and on-book total, bp costs are calculated with reference to the value of on-book trading; € costs per transaction are calculated with reference to the number of on-book transactions. For off-book trading, bp costs are calculated with reference to the value of off-book trading; € costs per transaction are calculated with reference to the number of off-book transactions.
Source: Trading platform questionnaire, and Oxera analysis.

Table 4.18 shows changes in the costs of CCP services for equities over the period 2006–08.

Table 4.18 Changes in costs, equities

	€ costs per transaction (% change)
Central counterparty clearing	–58
Risk management services	n/a
Settlement instructions	–38
Fail management	–33
Total	–57

Note: € costs per transaction are calculated with reference to the number of clearing transactions.
Source: CCP questionnaire.

Table 4.19 shows changes in account provision and asset servicing, and clearing and settlement costs for total securities (equities and fixed income securities combined) over the period 2006–08.

Table 4.19 Changes in costs, total securities

	€ costs per transaction (% change)	bp costs per value of securities held (% change)
Account provision and asset servicing		17
Clearing and settlement	11	

Note: bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held. € costs per transaction for clearing and settlement are calculated with reference to the number of clearing and settlement transactions.
Source: CSD questionnaire, and Oxera analysis.

4.4.5 Germany

Distribution of activity

Table 4.20 shows the percentage change in relative activity of cross-border members over the period 2006–08. (The data relevant to trading platforms in Germany does not include German regional stock exchanges or floor trading.)

Table 4.20 Changes in activity of cross-border members over 2006–08: ratio of cross-border to all members

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By number of members	1	–7	4
By equity activity	10	12	
By fixed income activity	–19	n/a	
By total activity			13

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs). The data relevant to trading platforms in Germany does not include German regional stock exchanges or floor trading.
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Table 4.21 shows the percentage change in relative activity in cross-border securities over the period 2006–08.

Table 4.21 Changes in activity in cross-border securities over 2006–08: ratio of cross-border to all securities

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By equity activity	28	–47	n/a
By fixed income activity	–91	n/a	n/a
By total activity	n/a	n/a	n/a

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs). The data relevant to trading platforms in Germany does not include German regional stock exchanges or floor trading.
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Costs of services

Table 4.22 shows changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–08.

Table 4.22 Changes in costs, equities

	bp costs per value of trading (% change)	€ costs per transaction (% change)
On-book trading	0	–36
On-book order management	n/a	n/a
On-book total	0	–36
Off-book trading	–56	–24

Note: For on-book trading, on-book order management and on-book total, bp costs are calculated with reference to the value of on-book trading; € costs per transaction are calculated with reference to the number of on-book transactions. For off-book trading, bp costs are calculated with reference to the value of off-book trading; € costs per transaction are calculated with reference to the number of off-book transactions. The data relevant to trading platforms in Germany does not include German regional stock exchanges, nor does it include floor trading.
Source: Trading platform questionnaire, and Oxera analysis.

Table 4.23 shows changes in the costs of CCP services for equities over the period 2006–08.

Table 4.23 Changes in costs, equities

	€ costs per transaction (% change)
Central counterparty clearing	–42
Risk management services	n/a
Settlement instructions	–26
Fail management	n/a
Total	–42

Note: € costs per transaction calculated with reference to the number of clearing transactions.
Source: CCP questionnaire, and Oxera analysis.

Table 4.24 shows changes in account provision and asset servicing, and clearing and settlement costs for total securities (equities and fixed income securities combined) over the period 2006–08.

Table 4.24 Changes in costs, total securities

	€ costs per transaction (% change)	bp costs per value of securities held (% change)
Account provision and asset servicing		–4
Clearing and settlement	–13	

Note: bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held. € costs per transaction for clearing and settlement are calculated with reference to the number of clearing and settlement transactions.
Source: CSD questionnaire, and Oxera analysis.

4.4.6 Greece

Distribution of activity

Table 4.25 shows the percentage change in relative activity of cross-border members over the period 2006–08. There was little fixed income activity on the trading platform.

Table 4.25 Changes in activity of cross-border members over 2006–08: ratio of cross-border to all members

	Trading platforms (% change)	CSDs (% change)
By number of members	78	429
By equity activity	381	
By fixed income activity	n/a	
By total activity		n/a

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); and value of securities held (CSDs).
Source: Trading platform and CSD questionnaires, and Oxera analysis.

Table 4.26 shows the percentage change in relative activity in cross-border securities over the period 2006–08. There was very little fixed income activity on the trading platform.

Table 4.26 Changes in activity in cross-border securities over 2006–08: ratio of cross-border to all securities

	Trading platforms (% change)	CSDs (% change)
By equity activity	416	n/a
By fixed income activity	n/a	n/a
By total activity	n/a	n/a

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); and value of securities held (CSDs).
Source: Trading platform and CSD questionnaires, and Oxera analysis.

Costs of services

Table 4.27 shows changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–08.

Table 4.27 Changes in costs, equities

	bp costs per value of trading (% change)	€ costs per transaction (% change)
On-book trading	–34	–26
On-book order management	–39	–32
On-book total	–34	–26
Off-book trading	–50	3

Note: For on-book trading, on-book order management and on-book total, bp costs are calculated with reference to the value of on-book trading; € costs per transaction are calculated with reference to the number of on-book transactions. For off-book trading, bp costs are calculated with reference to the value of off-book trading; € costs per transaction are calculated with reference to the number of off-book transactions.
Source: Trading platform questionnaire, and Oxera analysis.

Table 4.28 shows changes in account provision and asset servicing, and clearing and settlement costs for total securities (equities and fixed income securities combined) over the period 2006–08. The fee charged for clearing and settlement in Greece is on a strict ad valorem basis; interpretation of results expressed per number of transactions and per value of transactions should take this into account.

Table 4.28 Changes in costs, total securities

	€ costs per transaction (% change)	bp costs per value of securities held (% change)
Account provision and asset servicing		n/a
Clearing and settlement	–3	–18

Note: bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held. € costs per transaction for clearing and settlement are calculated with reference to the number of clearing and settlement transactions.
Source: CSD questionnaire, and Oxera analysis.

4.4.7 Ireland

Distribution of activity

Table 4.29 shows the percentage change in relative activity of cross-border members over the period 2006–08.

Table 4.29 Changes in activity of cross-border members over 2006–08: ratio of cross-border to all members

	Trading platforms (% change)	CSDs (% change)
By number of members	25	17
By equity activity	200	
By fixed income activity	n/a	
By total activity		–1

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); and value of securities held (CSDs).
Source: Trading platform and CSD questionnaires, and Oxera analysis.

Table 4.30 shows the percentage change in relative activity in cross-border securities over the period 2006–08.

Table 4.30 Changes in activity in cross-border securities over 2006–08: ratio of cross-border to all securities

	Trading platforms (% change)	CSDs (% change)
By equity activity	–52	n/a
By fixed income activity	n/a	n/a
By total activity	n/a	n/a

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); and value of securities held (CSDs).
Source: Trading platform and CSD questionnaires.

Costs of services

Table 4.31 shows changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–08. (Since the revenue for trading services was provided on an aggregated basis—across on- and off-book trading—the number of on- and off-book transactions was used to break the revenues down into those related to on- and off-book activity, introducing an approximation).

Table 4.31 Changes in costs, equities

	bp costs per value of trading (% change)	€ costs per transaction (% change)
On-book trading	n/a	–82
On-book order management	n/a	n/a
On-book total	n/a	–82
Off-book trading	n/a	–82

Note: For on-book trading, on-book order management and on-book total, bp costs are calculated with reference to the value of on-book trading; € costs per transaction are calculated with reference to the number of on-book transactions. For off-book trading, bp costs are calculated with reference to the value of off-book trading; € costs per transaction are calculated with reference to the number of off-book transactions.
Source: Trading platform questionnaire, and Oxera analysis.

Table 4.32 shows changes in account provision and asset servicing, and clearing and settlement costs for total securities (equities and fixed income securities combined) over the period 2006–08. There is no separate charge for account provision and asset servicing.

Table 4.32 Changes in costs, total securities

	€ costs per transaction (% change)	bp costs per value of securities held (% change)
Account provision and asset servicing		n/a
Clearing and settlement	–40	

Note: bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held. € costs per transaction for clearing and settlement are calculated with reference to the number of clearing and settlement transactions.
Source: CSD questionnaire, and Oxera analysis.

4.4.8 Italy

Distribution of activity

Table 4.33 shows the percentage change in relative activity of cross-border members over the period 2006–08. (The data relevant to trading platforms does not include the MTS Group.)

Table 4.33 Changes in activity of cross-border members over 2006–08: ratio of cross-border to all members

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By number of members	29	19	36
By equity activity	26	49	
By fixed income activity	n/a	n/a	
By total activity			–81

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs).
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Table 4.34 shows the percentage change in relative activity in cross-border securities over the period 2006–08.

Table 4.34 Changes in activity in cross-border securities over 2006–08: ratio of cross-border to all securities

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By equity activity	–55	n/a	97
By fixed income activity	10	n/a	61
By total activity	–49	n/a	76

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs).
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Costs of services

Table 4.35 shows changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–08. There was no charge for on-book order management.

Table 4.35 Changes in costs, equities

	bp costs per value of trading (% change)	€ costs per transaction (% change)
On-book trading	32	–2
On-book order management	n/a	n/a
On-book total	32	–2
Off-book trading	n/a	n/a

Note: For on-book trading, on-book order management and on-book total, bp costs are calculated with reference to the value of on-book trading; € costs per transaction are calculated with reference to the number of on-book transactions. For off-book trading, bp costs are calculated with reference to the value of off-book trading; € costs per transaction are calculated with reference to the number of off-book transactions.
Source: Trading platform questionnaire, and Oxera analysis.

Table 4.36 shows changes in the costs of CCP services for equities over the period 2006–08. There was no charge for settlement instruction in either year.

Table 4.36 Changes in costs, equities

	€ costs per transaction (% change)
Central counterparty clearing	11
Risk management services	–25
Settlement instructions	n/a
Fail management	42
Total	16

Note: € costs per transaction are calculated with reference to the number of clearing transactions.
Source: CCP questionnaire.

Table 4.37 shows changes in account provision and asset servicing, and clearing and settlement costs for total securities (equities and fixed income securities combined) over the period 2006–08.

Table 4.37 Changes in costs, total securities

	€ costs per transaction (% change)	bp costs per value of securities held (% change)
Account provision and asset servicing		–1
Clearing and settlement	–6	

Note: bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held. € costs per transaction for clearing and settlement are calculated with reference to the number of clearing and settlement transactions.
Source: CSD questionnaire, and Oxera analysis.

4.4.9 Luxembourg

Distribution of activity

Table 4.38 shows the percentage change in relative activity of cross-border members over the period 2006–08.

Table 4.38 Changes in activity of cross-border members over 2006–08: ratio of cross-border to all members

	Trading platforms (% change)
By number of members	75
By equity activity	1,890
By fixed income activity	317
By total activity	

Note: Equity/fixed income/total activity is defined in terms of transaction volume.
Source: Trading platform questionnaire, and Oxera analysis.

Table 4.39 shows the percentage change in relative activity in cross-border securities over the period 2006–08.

Table 4.39 Changes in activity in cross-border securities over 2006–08: ratio of cross-border to all securities

	Trading platforms (% change)
By equity activity	–99
By fixed income activity	–10
By total activity	n/a

Note: Equity/fixed income/total activity is defined in terms of transaction volume.
Source: Trading platform questionnaire, and Oxera analysis.

Costs of services

Table 4.40 shows changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–08.

Table 4.40 Changes in costs, equities

	bp costs per value of trading (% change)	€ costs per transaction (% change)
On-book trading	–84	–36
On-book order management	n/a	n/a
On-book total	–84	–36
Off-book trading	n/a	n/a

Note: For on-book trading, on-book order management and on-book total, bp costs are calculated with reference to the value of on-book trading; € costs per transaction are calculated with reference to the number of on-book transactions. For off-book trading, bp costs are calculated with reference to the value of off-book trading; € costs per transaction are calculated with reference to the number of off-book transactions.
Source: Trading platform questionnaire.

4.4.10 The Netherlands

The trading platform and CCP for the Netherlands has multiple domiciles; therefore, the results are the same as those presented for Belgium, France, and Portugal.

Distribution of activity

Table 4.41 shows the percentage change in relative activity of cross-border members over the period 2006–08.

Table 4.41 Changes in activity of cross-border members over 2006–08: ratio of cross-border to all members

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By number of members	12	29	2
By equity activity	11	n/a	
By fixed income activity	–8	n/a	
By total activity			17

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs).
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Table 4.42 shows the percentage change in relative activity in cross-border securities over the period 2006–08.

Table 4.42 Changes in activity in cross-border securities over 2006–08: ratio of cross-border to all securities

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By equity activity	n/a	1,211	–20
By fixed income activity	n/a	–4	–14
By total activity	n/a	n/a	n/a

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs).
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Costs of services

Table 4.43 shows changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–08.

Table 4.43 Changes in costs, equities

	bp costs per value of trading (% change)	€ costs per transaction (% change)
On-book trading	36	–18
On-book order management	n/a	n/a
On-book total	36	–18
Off-book trading	162	0

Note: For on-book trading, on-book order management and on-book total, bp costs are calculated with reference to the value of on-book trading; € costs per transaction are calculated with reference to the number of on-book transactions. For off-book trading, bp costs are calculated with reference to the value of off-book trading; € costs per transaction are calculated with reference to the number of off-book transactions.
Source: Trading platform questionnaire, and Oxera analysis.

Table 4.44 shows changes in the costs of CCP services for equities over the period 2006–08.

Table 4.44 Changes in costs, equities

	€ costs per transaction (% change)
Central counterparty clearing	–58
Risk management services	n/a
Settlement instructions	–38
Fail management	–33
Total	–57

Note: € costs per transaction are calculated with reference to the number of clearing transactions.
Source: CCP questionnaire, and Oxera analysis.

Table 4.45 shows changes in account provision and asset servicing, and clearing and settlement costs for total securities (equities and fixed income securities combined) over the period 2006–08.

Table 4.45 Changes in costs, total securities

	€ costs per transaction (% change)	bp costs per value of securities held (% change)
Account provision and asset servicing		13
Clearing and settlement	5	

Note: bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held. € costs per transaction for clearing and settlement are calculated with reference to the number of clearing and settlement transactions.
Source: CSD questionnaire, and Oxera analysis.

4.4.11 Norway

Distribution of activity

Table 4.46 shows the percentage change in relative activity of cross-border members over the period 2006–08.

Table 4.46 Changes in activity of cross-border members over 2006–08: ratio of cross-border to all members

	Trading platforms (% change)
By number of members	19
By equity activity	37
By fixed income activity	166
By total activity	

Note: Equity/fixed income/total activity is defined in terms of transaction volume.
Source: trading platform and CSD questionnaires, and Oxera analysis.

Table 4.47 shows the percentage change in relative activity in cross-border securities over the period 2006–08.

Table 4.47 Changes in activity in cross-border securities over 2006–08: ratio of cross-border to all securities

	Trading platforms (% change)
By equity activity	68
By fixed income activity	1
By total activity	n/a

Note: Equity/fixed income/total activity is defined in terms of transaction volume.
Source: Trading platform and CSD questionnaires, and Oxera analysis.

Costs of services

Table 4.48 shows changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–08.

Table 4.48 Changes in costs, equities

	bp costs per value of trading (% change)	€ costs per transaction (% change)
On-book trading	51	–8
On-book order management	n/a	n/a
On-book total	51	–8
Off-book trading	17	38

Note: For on-book trading, on-book order management and on-book total, bp costs are calculated with reference to the value of on-book trading; € costs per transaction are calculated with reference to the number of on-book transactions. For off-book trading, bp costs are calculated with reference to the value of off-book trading; € costs per transaction are calculated with reference to the number of off-book transactions.
Source: Trading platform questionnaire, and Oxera analysis.

4.4.12 Poland

Distribution of activity

Table 4.49 shows the percentage change in relative activity of cross-border members over the period 2006–08.

Table 4.49 Changes in activity of cross-border members over 2006–08: ratio of cross-border to all members

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By number of members	35	n/a	n/a
By equity activity	337	n/a	
By fixed income activity	n/a	n/a	
By total activity			n/a

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs).
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Table 4.50 shows the percentage change in relative activity in cross-border securities over the period 2006–08.

Table 4.50 Changes in activity in cross-border securities over 2006–08: ratio of cross-border to all securities

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By equity activity	112	170	–8
By fixed income activity	n/a	6,506	356
By total activity	n/a	n/a	5

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs).
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Costs of services

Table 4.51 shows changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–08.

Table 4.51 Changes in costs, equities

	bp costs per value of trading (% change)	€ costs per transaction (% change)
On-book trading	–26	–4
On-book order management	n/a	n/a
On-book total	–26	–4
Off-book trading	–35	–69

Note: For on-book trading, on-book order management and on-book total, bp costs are calculated with reference to the value of on-book trading; € costs per transaction are calculated with reference to the number of on-book transactions. For off-book trading, bp costs are calculated with reference to the value of off-book trading; € costs per transaction are calculated with reference to the number of off-book transactions.
Source: Trading platform questionnaire, and Oxera analysis.

Table 4.52 shows changes in the costs of CCP services for equities over the period 2006–08.

Table 4.52 Changes in costs, equities

	€ costs per transaction (% change)
Central counterparty clearing	–46
Risk management services	n/a
Settlement instructions	n/a
Fail management	n/a
Total	n/a

Note: € costs per transaction are calculated with reference to the number of clearing transactions.
Source: CCP questionnaire, and Oxera analysis.

Table 4.53 shows changes in account provision and asset servicing, and clearing and settlement costs for total securities (equities and fixed income securities combined) over the period 2006–08.

Table 4.53 Changes in costs, total securities

	€ costs per transaction (% change)	bp costs per value of securities held (% change)
Account provision and asset servicing		–31
Clearing and settlement	–15	

Note: bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held. € costs per transaction for clearing and settlement are calculated with reference to the number of clearing and settlement transactions.
Source: CSD questionnaire, and Oxera analysis.

4.4.13 Portugal

The trading platform and CCP for Portugal has multiple domiciles, therefore the results are the same as those presented for Belgium, France, and the Netherlands.

Distribution of activity

Table 4.54 shows the percentage change in relative activity of cross-border members over the period 2006–08.

Table 4.54 Changes in activity of cross-border members over 2006–08: ratio of cross-border to all members

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By number of members	12	29	n/a
By equity activity	11	n/a	
By fixed income activity	–8	n/a	
By total activity			n/a

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs).
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Table 4.55 shows the percentage change in relative activity in cross-border securities over the period 2006–08.

Table 4.55 Changes in activity in cross-border securities over 2006–08: ratio of cross-border to all securities

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By equity activity	n/a	1,211	n/a
By fixed income activity	n/a	–4	n/a
By total activity	n/a	n/a	n/a

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs).
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Costs of services

Table 4.56 shows changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–08.

Table 4.56 Changes in costs, equities

	bp costs per value of trading (% change)	€ costs per transaction (% change)
On-book trading	36	–18
On-book order management	n/a	n/a
On-book total	36	–18
Off-book trading	162	0

Note: For on-book trading, on-book order management and on-book total, bp costs are calculated with reference to the value of on-book trading; € costs per transaction are calculated with reference to the number of on-book transactions. For off-book trading, bp costs are calculated with reference to the value of off-book trading; € costs per transaction are calculated with reference to the number of off-book transactions.
Source: Trading platform questionnaire, and Oxera analysis.

Table 4.57 shows changes in the costs of CCP services for total securities (equity and fixed income securities combined) over the period 2006–08.

Table 4.57 Changes in costs, total securities

	€ costs per transaction (% change)
Central counterparty clearing	–58
Risk management services	n/a
Settlement instructions	–38
Fail management	–33
Total	–57

Note: € costs per transaction are calculated with reference to the number of clearing transactions.
Source: CCP questionnaire, and Oxera analysis.

Table 4.58 shows changes in account provision and asset servicing, and clearing and settlement costs for total securities (equities and fixed income securities combined) over the period 2006–08.

Table 4.58 Changes in costs, total securities

	€ costs per transaction (% change)	bp costs per value of securities held (% change)
Account provision and asset servicing		–11
Clearing and settlement	–13	

Note: bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held. € costs per transaction for clearing and settlement are calculated with reference to the number of clearing and settlement transactions.
Source: CSD questionnaire, and Oxera analysis.

4.4.14 Spain

Distribution of activity

Table 4.59 shows the percentage change in relative activity of cross-border members over the period 2006–08.

Table 4.59 Changes in activity of cross-border members over 2006–08: ratio of cross-border to all members

	Trading platforms (% change)	CSDs (% change)
By number of members	n/a	14
By equity activity	n/a	
By fixed income activity	n/a	
By total activity		288

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); and value of securities held (CSDs).
Source: Trading platform and CSD questionnaires, and Oxera analysis.

Table 4.60 shows the percentage change in relative activity in cross-border securities over the period 2006–08.

Table 4.60 Changes in activity in cross-border securities over 2006–08: ratio of cross-border to all securities

	Trading platforms (% change)	CSDs (% change)
By equity activity	n/a	–16
By fixed income activity	n/a	2
By total activity	n/a	16

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); and value of securities held (CSDs).
Source: Trading platform and CSD questionnaires, and Oxera analysis.

Costs of services

Table 4.61 shows changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–08. (Since the revenue for trading services was provided on an aggregated basis—across on- and off-book trading—the on- and off-book number of transactions was used to break the revenues down into those related to on- and off-book activity, introducing an approximation).

Table 4.61 Changes in costs, equities

	bp costs per value of trading (% change)	€ costs per transaction (% change)
On-book trading	6	–28
On-book order management	n/a	n/a
On-book total	6	–28
Off-book trading	n/a	n/a

Note: For on-book trading, on-book order management and on-book total, bp costs are calculated with reference to the value of on-book trading; € costs per transaction are calculated with reference to the number of on-book transactions. For off-book trading, bp costs are calculated with reference to the value of off-book trading; € costs per transaction are calculated with reference to the number of off-book transactions.
Source: Trading platform questionnaire, and Oxera analysis.

Table 4.62 shows changes in account provision and asset servicing, and clearing and settlement costs for total securities (equities and fixed income securities combined) over the period 2006–08.

Table 4.62 Changes in costs, total securities

	€ costs per transaction (% change)	bp costs per value of securities held (% change)
Account provision and asset servicing		1
Clearing and settlement	–13	

Note: bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held. € costs per transaction for clearing and settlement are calculated with reference to the number of clearing and settlement transactions.
Source: CSD questionnaire, and Oxera analysis.

4.4.15 Sweden

Distribution of activity

Table 4.63 shows the percentage change in relative activity of cross-border members over the period 2006–08.

Table 4.63 Changes in activity of cross-border members over 2006–08: ratio of cross-border to all members

	Trading platforms (% change)	CSDs (% change)
By number of members	6	–1
By equity activity	5	
By fixed income activity	12	
By total activity		11

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); and value of securities held (CSDs).
Source: Trading platform and CSD questionnaires, and Oxera analysis.

Table 4.64 shows the percentage change in relative activity in cross-border securities over the period 2006–08.

Table 4.64 Changes in activity in cross-border securities over 2006–08: ratio of cross-border to all securities

	Trading platforms (% change)	CSDs (% change)
By equity activity	–4	29
By fixed income activity	–48	11
By total activity	n/a	11

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); and value of securities held (CSDs).
Source: Trading platform and CSD questionnaires, and Oxera analysis.

Costs of services

Table 4.65 shows changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–08. (Since the revenue for trading services was provided on an aggregated basis—across on- and off-book trading—the on- and off-book number of transactions was used to break the revenues down into those related to on- and off-book activity, introducing an approximation).

Table 4.65 Changes in costs, equities

	bp costs per value of trading (% change)	€ costs per transaction (% change)
On-book trading	–5	–43
On-book order management	n/a	n/a
On-book total	–5	–43
Off-book trading	–23	–43

Note: For on-book trading, on-book order management and on-book total, bp costs are calculated with reference to the value of on-book trading; € costs per transaction are calculated with reference to the number of on-book transactions. For off-book trading, bp costs are calculated with reference to the value of off-book trading; € costs per transaction are calculated with reference to the number of off-book transactions.
Source: Trading platform questionnaire, and Oxera analysis.

Table 4.66 shows changes in account provision and asset servicing, and clearing and settlement costs for total securities (equities and fixed income securities combined) over the period 2006–08.

Table 4.66 Changes in costs, total securities

	€ costs per transaction (% change)	bp costs per value of securities held (% change)
Account provision and asset servicing		n/a
Clearing and settlement	–13	

Note: bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of transactions. € costs per transaction for clearing and settlement are calculated with reference to the number of clearing and settlement transactions.
Source: CSD questionnaire, and Oxera analysis.

4.4.16 Switzerland

Distribution of activity

Table 4.67 shows the percentage change in relative activity of cross-border members over the period 2006–08.

Table 4.67 Changes in activity of cross-border members over 2006–08: ratio of cross-border to all members

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By number of members	n/a	–6	13
By equity activity	n/a	70	
By fixed income activity	n/a	n/a	
By total activity			18

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs).
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Table 4.68 shows the percentage change in relative activity in cross-border securities over the period 2006–08.

Table 4.68 Changes in activity in cross-border securities over 2006–08: ratio of cross-border to all securities

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By equity activity	–57	–2	–27
By fixed income activity	–4	n/a	93
By total activity	n/a	n/a	17

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs).
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Costs of services

Table 4.69 shows changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–08.[28]

[28] In 2006, an exchange providing trading services in Switzerland had a three-month fee holiday. This resulted in lower measured on-book total costs in 2006 and a higher percentage change in measured on-book total costs over time.

Table 4.69 Changes in costs, equities

	bp costs per value of trading (% change)	€ costs per transaction (% change)
On-book trading	25	–30
On-book order management	n/a	n/a
On-book total	25	–30
Off-book trading	–88	–68

Note: For on-book trading, on-book order management and on-book total, bp costs are calculated with reference to the value of on-book trading; € costs per transaction are calculated with reference to the number of on-book transactions. For off-book trading, bp costs are calculated with reference to the value of off-book trading; € costs per transaction are calculated with reference to the number of off-book transactions.
Source: Trading platform questionnaire, and Oxera analysis.

Table 4.70 shows changes in the costs of CCP services for equities over the period 2006–08.

Table 4.70 Changes in costs, equities

	€ costs per transaction (% change)
Central counterparty clearing	–28
Risk management services	–68
Settlement instructions	n/a
Fail management	498
Total	–32

Note: € costs per transaction are calculated with reference to the number of clearing transactions.
Source: CCP questionnaire, and Oxera analysis.

Table 4.71 shows changes in account provision and asset servicing, and clearing and settlement costs for total securities (equities and fixed income securities combined) over the period 2006–08.

Table 4.71 Changes in costs, total securities

	€ costs per transaction (% change)	bp costs per value of securities held (% change)
Account provision and asset servicing		–11
Clearing and settlement	–64	

Note: bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held. € costs per transaction for clearing and settlement are calculated with reference to the number of clearing and settlement transactions.
Source: CSD questionnaire, and Oxera analysis.

4.4.17 UK

The results for trading platforms include two trading platforms domiciled in the UK. The CSD for the UK has multiple domiciles, therefore the resulted presented here are the same for the Irish CSD.

Distribution of activity

Table 4.72 shows the percentage change in relative activity of cross-border members over the period 2006–08.

Table 4.72 Changes in activity of cross-border members over 2006–08: ratio of cross-border to all members

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By number of members	–3	–25	17
By equity activity	54	41	
By fixed income activity	n/a	n/a	
By total activity			–1

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs).
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Table 4.73 shows the percentage change in relative activity in cross-border securities over the period 2006–08.

Table 4.73 Changes in activity in cross-border securities over 2006–08: ratio of cross-border to all securities

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By equity activity	25	–4	n/a
By fixed income activity	n/a	n/a	n/a
By total activity	n/a	n/a	n/a

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs).
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Costs of services

Table 4.74 shows changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–08.

Table 4.74 Changes in costs, equities

	bp costs per value of trading (% change)	€ costs per transaction (% change)
On-book trading	1	–52
On-book order management	105	–4
On-book total	5	–51
Off-book trading	–79	–75

Note: For on-book trading, on-book order management and on-book total, bp costs are calculated with reference to the value of on-book trading; € costs per transaction are calculated with reference to the number of on-book transactions. For off-book trading, bp costs are calculated with reference to the value of off-book trading; € costs per transaction are calculated with reference to the number of off-book transactions.
Source: Trading platform questionnaire, and Oxera analysis.

Table 4.75 shows changes in the costs of CCP services for equities over the period 2006–08.

Table 4.75 Changes in costs, equities

	€ costs per transaction (% change)
Central counterparty clearing	–71
Risk management services	n/a
Settlement instructions	n/a
Fail management	n/a
Total	–71

Note: € costs per transaction are calculated with reference to the number of clearing transactions.
Source: CCP questionnaire, and Oxera analysis.

Table 4.76 shows changes in account provision and asset servicing, and clearing and settlement costs for total securities (equities and fixed income securities combined) over the period 2006–08. There is no separate charge for account provision and asset servicing.

Table 4.76 Changes in costs, total securities

	€ costs per transaction (% change)	bp costs per value of securities held (% change)
Account provision and asset servicing		n/a
Clearing and settlement	–40	

Note: bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held. € costs per transaction for clearing and settlement are calculated with reference to the number of clearing and settlement transactions.
Source: CSD questionnaire, and Oxera analysis.

4.4.18 International central securities depositories

Table 4.77 shows changes in account provision and asset servicing, and clearing and settlement costs for Eurobonds over the period 2006–08.

Table 4.77 Changes in costs, Eurobonds

	€ costs per transaction (% change)	bp costs per value of securities held (% change)
Account provision and asset servicing		–26
Clearing and settlement	–39	

Note: bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held. € costs per transaction for clearing and settlement are calculated with reference to the number of clearing and settlement transactions. Oxera has computed these figures on the assumption that the data provided by the two ICSDs is consistent.
Source: ICSD questionnaires and Oxera calculations.

4.4.19 Other financial centres

No analysis can be completed for the Czech Republic.

Part 3 Baseline data (infrastructure providers and intermediaries)

This part of the report sets out analysis of the channels used by fund managers and brokers for trade execution and post-trading activities, and a high-level assessment of the degree of market integration by measuring the holdings of institutional and retail investors of securities in domestic and foreign financial centres. It also identifies trends in the costs and pricing of trading services offered by intermediaries and the factors that affect them, and analyses the costs of trading and differences between the costs of domestic and cross-border trading. The analysis is based on 2006 data.

As a result of the way that data has been collected, and in recognition of the required level of aggregation needed to ensure that commercially confidential material is not put into the public domain, for most of the indicators only data aggregated across financial centres has been provided. For the comparison over time in further studies, detailed data for the individual financial centre could be used.

It should be remembered that the methodology is designed specifically to capture changes through time, not absolute differences between financial centres (nor differences between individual providers, intermediaries or infrastructures). As a result, the aggregated baseline data needs to be interpreted with care and should not be used for comparisons across financial centres.

5 Use of channels for trading and post-trading activities

This section considers the channels used by fund managers and brokers in the survey sample for trading and post-trading activities. It provides a high-level assessment of the degree of market integration by measuring the holdings of institutional and retail investors of securities in domestic and foreign financial centres. Most of the analysis in this section is derived from the intermediaries' questionnaires and is therefore limited to a single year's set of data points (the year 2006), and changes over time are not available. Where relevant information comes from the infrastructure providers' data, changes over time may be available.

For the next stage of the project, the indicators derived from the intermediaries' questionnaires summarised in this section would be measured over time. They are useful indicators in themselves to understand changes in the integration of markets and, since costs vary by type of channel, may also help in understanding overall changes in costs of trading and post-trading over time.

5.1 Domestic and cross-border transactions

In measuring the holdings of institutional and retail investors of securities in domestic and foreign financial centres, the survey results show that the investors' portfolios are concentrated in the domestic market.

– In the major financial centres, between 30% and 60% of equity investments (managed by institutional fund managers) are allocated to domestic securities. The data on trading value (as opposed to investment holdings) in relation to the domestic and cross-border activity confirms this home bias.

– The home bias for retail investors in the survey is much stronger: between 70% and 90% of the trading of the retail brokerage firms in the sample is in domestic securities.[29]

– There appears to be a positive correlation between the degree of home bias observed in equity and fixed income holdings. In financial centres where domestic equity investments constitute a relatively large share of the overall equity investment holdings, there is also more likely to be a relatively high proportion of fixed income investments invested domestically.

– The home bias in major financial centres is generally stronger than in smaller financial centres. For example, in Austria, Belgium, Denmark, Luxembourg, and the Netherlands, the proportion of equities invested domestically lies between 10% and 30%. However, there are a few exceptions. In the Czech Republic, Portugal, and Greece, the proportion of domestic investments is higher than 50%, while in Ireland it is lower than 5%; this may be because some fund management firms are located in Ireland for tax reasons and operate a largely international business.

– Most survey participants provided a breakdown of their holdings into domestic and other European securities, and not by individual financial centre. It is therefore not possible to distinguish between financial centres the volumes of cross-border transactions that are more or less significant. However, the data provided indicates that between some pairs

[29] The sample of retail brokerage firms includes mainly traditional retail firms, rather than new Internet brokers that may tend to be used by more 'sophisticated' consumers, who may be more likely to invest in foreign securities. The degree of home bias may therefore have been overestimated.

of financial centres—in particular, neighbouring countries—there is more cross-border activity. Examples include France and Spain, Germany and France, Luxembourg and France, Luxembourg and Germany, and Germany and the Netherlands.

There is extensive literature providing explanations for investors' home bias.[30] Such bias can be due to a combination of factors, such as provisions in the (local) laws and regulations that have an indirect impact on cross-border investment. These include quantitative limits on equity, mutual funds or other asset classes through which international diversification would otherwise be achieved; aversion to currency risk (and impediments to hedging this risk); temporarily favourable domestic market conditions; lack of scale and expertise; taxes; and transaction costs.

To some extent, the home bias in this survey may be due to the way in which the institutional investor 'crosses the border'. Rather than hiring a local fund manager that invests in foreign securities, an institutional investor may cross the border by hiring a foreign fund management firm which invests in securities domiciled where the firm is located (counted in this study as domestic transactions).

The presence of home bias in investment by both institutional and retail investors results in differences in the volume of domestic and cross-border transactions (in particular on a financial centre by financial centre basis). A simple example serves to illustrate this effect. If it is assumed that 20% of the activity of fund managers in a given financial centre is carried out in domestic securities, while the rest is divided between eight other financial centres, on average, the size of domestic activity will be double that of the activity in each of the eight foreign financial centres. As explained above, in the sample covered by this analysis, domestic fund managers' activity in most financial centres constitutes at least 20% (often considerably more) of total activity by value.

This supports the notion that the volume effect may explain some of the difference between domestic and cross-border costs. Because of economies of scale, volume is an important unit cost driver for trading and post-trading services—ie, lower volumes for cross-border transactions may result in higher unit prices. However, although the higher unit price manifests itself with respect to domicile of security, its cause (in this example) is not that the security is foreign, but that the investor is transacting smaller volumes in that market.

5.2 Channels for trading activities

5.2.1 Fund managers' use of channels for trade execution

Trade execution commences with a trade order being sent from the fund manager to the broker, or directly to a trading platform or crossing network. Alternatively, fund managers may cross the trades (of different investors) internally. Table 5.1 shows what proportion of fund managers in the survey sample use these trading routes for transactions in equity and fixed income securities.

[30] Pinkowtiz, Stulz and Williamson (2001), for example, show that while US stocks make up 49% of the world market portfolio, US investors hold 91% of equity investments in domestic (US) equities. Cooper and Kaplanis (1994) and Davis (1995) show that this is consistently observed across developed countries. Pinkowitz, L., Stulz, R. and Williamson, R. (2001), 'Corporate Governance and the Home Bias', NBER Working Paper 8680; Cooper, I. and Kaplanis, E. (1994), 'Home Bias in Equity Portfolios, Inflation Hedging, and International Capital Market Equilibrium', *Review of Financial Studies*, **7**; Davis, E.P. (1995), *Pension Funds, Retirement-income Security and Capital Markets: An International Perspective*, Oxford: Oxford University Press.

Table 5.1 Trading channels used by fund managers

	Fund managers using these channels (%)
Internal crossing[1]	32
External crossing	29
Brokerage firms	100
Trading platforms	34

Note: [1] The survey shows that internal crossing is not generally used for trading in fixed income securities.
Source: Fund management firm questionnaire, and Oxera analysis.

Although there is some variation across financial centres, there does not seem to be a clear pattern. For example, the Italian and Portuguese fund managers in the sample do not use internal crossing, while those from several smaller financial centres do.[31] The use of external crossing is limited to a smaller range of financial centres—particularly France and the UK—but is also evident in smaller financial centres such as Greece. Those that use external crossing networks on average have access to three or four.

Fund managers that use either internal or external crossing are large, on average, relative to the full sample of fund managers that responded to the survey. For example, the average assets held under management by fund managers that internally cross are double those of fund managers that use only brokers.

Fund managers with access to trading platforms typically use them for trading in both equities and fixed income. Most of them have access to several platforms, although there are a few exceptions where fund managers have access only to the trading platform in the financial centre where they are themselves located.

Different fund managers in the survey sample use significantly different numbers of brokers: some use just a few, while others use more than 100. The typical fund manager uses between ten and 20 brokers to handle its significant transaction volumes (for more than 1% of its total trading). Those using multiple brokers may also use those brokers in different ways. There are many fund managers with one (large) transaction channelled through a particular broker in a year, while also channelling up to tens of thousands of transactions during that year through a different broker. Significant specialisation in executing transacting particular trades is evident from the way in which the transaction business is divided up.

Table 5.2 shows the proportion of trading that is sent to the different channels. Although around 30% of fund managers have access to internal and external crossing facilities, they are used for around only 3% of trading on average. Between 7% and 16% of trading is sent to trading platforms and the remainder to brokerage firms.

Survey participants indicated that there is a trend towards using external crossing networks and trading platforms directly. The proportion of trades sent to these facilities may therefore increase in the next few years.

[31] For example, fund management firms from the Czech Republic, Greece, the Netherlands, Belgium and Austria all report the use of internal crossing.

Table 5.2 Use of trading channels by fund managers

	Proportion of trade (%)	
	Equities	Fixed income
Internal crossing	2	0
External crossing	1	<1
Brokerage firms	81–89	84–91
Trading platforms	7–16	9–15

Source: Fund management firm questionnaire, and Oxera analysis.

5.2.2 Brokerage firms' use of channels for trade execution

Brokers can execute a trade on a trading platform, cross the trade internally (internalisation), or trade with another broker bilaterally over the counter (OTC). Table 5.3 shows the proportion of brokers' trading in the survey sample channelled through these trading routes. In the table, local brokers are defined as firms with an office in one financial centre only, and global brokers as firms with offices in more than one financial centre. The following observations can be made in relation to equity trading.

– On average, brokers send around 80% of equity trades to trading platforms. The survey shows that, on average, global brokers have access to ten trading platforms and local brokers to three.

– Local brokers—in particular those domiciled in secondary or other financial centres—send almost all their trades to trading platforms.

– Internalisation is used mainly by local brokers domiciled in major financial centres (for 10% of their trades). The volume of internalisation by global brokers may have been under-reported since a small number indicated that they had insufficient data to provide reliable estimates on this.

– Global brokers appear to be using the OTC market more than local brokers—17% of global brokers' trades are executed in the OTC market.

– There are no significant differences between the use of trading channels for domestic and cross-border transactions. The only difference is that some of the local brokers in major financial centres access trading platforms in other financial centres not directly, but via other brokers' trade execution services. (Some of this is covered under the category 'other'.)

– Brokers indicated that the use of internalisation is likely to increase over time.

Table 5.3 Use of trade execution channels by brokers (% of trades)

	Equity trades	Fixed income trades
All brokers		
Internalisation	4	9
OTC	16	72
Trading platform	80	15
Other	0	4
Global brokers		
Internalisation	3	0
OTC	17	79
Trading platform	80	16
Other	0	5
Local brokers		
Internalisation	10	93
OTC	7	0
Trading platform	80	7
Other	3	0
Major financial centres		
Internalisation	10	95
OTC	5	0
Trading platform	82	5
Other	3	0
Secondary financial centres		
Internalisation	1	–
OTC	0	–
Trading platform	99	–
Other	0	0
Other financial centres		
Internalisation	0	40
OTC	61	4
Trading platform	39	56
Other	–	–

Source: Brokerage firm questionnaire, and Oxera analysis.

The picture for fixed income securities is different.

– On average, brokers send around 15% of fixed income trades to trading platforms, 72% are executed in the OTC market and 9% through internalisation.

– Local brokers in major financial centres use internalisation as their main route for executing trades in fixed income securities, while global brokers send a higher proportion of their trades to trading platforms and the OTC market. Again, the volume of internalisation by global brokers may have been under-reported since a small number indicated that they had insufficient data to provide reliable estimates on this.

– As with the channels for equity trading, there are no significant differences between the use of channels for domestic and cross-border transactions.

5.2.3 Crossing the border

The brokerage firm questionnaire provides insight into the extent to which brokers' clients are domestic or cross-border. Table 5.4 presents the proportion of domestic and cross-border clients from the perspective of brokerage firms.

Table 5.4 Domestic and cross-border clients (% of trading)

	Domestic clients	Cross-border clients
Global brokers	65	35
Local brokers	40	60

Source: Brokerage firm questionnaire, and Oxera analysis.

Of global brokers' total trading, 35% originates from 'cross-border' clients, while for local brokers this is higher, at around 60%. Such a difference is not unexpected since, by definition, global brokers are domiciled in multiple financial centres, while local brokers are active in only one financial centre. This means that all clients in other financial centres are counted as cross-border clients.

A more detailed examination of the survey results reveals that there is some variation across financial centres. In 'other financial centres', a smaller proportion of local brokers' trading comes from cross-border clients (close to 30%).

Brokers' clients include fund managers, hedge funds, other brokers/market counterparties, and other clients such as corporates, governments/sovereign entities, commercial banks, retail/private banks, and insurance companies. Table 5.5 presents a breakdown of the types of client for global and local brokers.

Table 5.5 Type of client (% of trading)

	Institutional funds or fund managers	Hedge funds	Other brokers or market counterparties	Other
Global brokers	50	18	23	9
Local brokers	48	2	17	33

Source: Brokerage firm questionnaire, and Oxera analysis.

The extent to which brokers and fund managers have direct access to trading platforms in foreign financial centres can be analysed by looking at data provided by trading platforms. Table 5.6 shows the proportion of trading platform members that are counted as domestic (local) or cross-border members (ie, not domiciled in the financial centre where the trading platform is located), and the change over the period 2006 to 2008.

Domestic members account for the 64% of trading platform members in 2006, while the proportion is slightly smaller in 2008. Table 5.7 shows the proportion of trades coming from domestic and cross-border members for the same group. This information is available for equities and fixed income trading, and it shows a similar trend.

Table 5.6 Provision of trading platform services for domestic and cross-border members (by number of members)

	Domestic members (%)	Cross-border members (%)
Trading platforms: 2006	64	36
Trading platforms: 2008	60	40

Source: Trading platform questionnaire, and Oxera analysis.

Table 5.7 Provision of trading platform services for domestic and cross-border members (by number of transactions)

	Domestic members		Cross-border members	
	Equities	Fixed income	Equities	Fixed income
Trading platforms: 2006	70	90	30	10
Trading platforms: 2008	61	88	39	12

Source: Trading platform questionnaire, and Oxera analysis.

Table 5.8 shows that, for trading platforms, 87% of members in 2006 and 84% in 2008 are brokers. This indicates that the way in which users access trading platforms is changing. The next stage of this study would provide data on whether the use of direct access to trading platforms (and, indeed, to other methods of trading) is changing.

Table 5.8 Trading platform members by type (%)

	Proportion of clients: 2006	Proportion of clients: 2008
Brokers	87	84
Fund managers	2	3
Other trading platforms	0	0
Other	10	13

Note: 'Other' includes a central bank.
Source: Trading platform questionnaire, and Oxera analysis.

5.3 Channels for post-trading activities

5.3.1 Use of channels by fund managers and brokers

To clear and settle their trades, fund managers and brokers need to access post-trading services. Fund managers may use custodians or have direct access to CCPs and (I)CSDs. Table 5.9 shows that more fund managers use custodians rather than the CSDs directly, with 71% of all fund managers using a custodian for some custody services, while only 43% of fund managers directly use a CSD. In comparison, a similar proportion of fund managers use CCPs directly (21%) and indirectly (18%).

The direct use of infrastructure is not specific to major financial centres. Some fund managers use the CSD directly only for domestic transactions, and custodians for cross-border transactions.

More than 80% of fund managers that use custodians use only one or two. This suggests that, for post-trading services in cross-border securities, they use global or multi-market custodians rather than local custodians based in the financial centres where the securities are domiciled. Multi-market custodians are, on average, domiciled in ten financial centres, and global custodians in around four or five—they use local custodians in those financial centres where they do not have operations themselves.

Table 5.9 Post-trading channels used by fund managers

	Fund managers using these channels by number of respondents (%)
CCPs	21
CSDs	43
Custodians, for any custodian service	71
Agents, for CCP service	18

Source: Fund management firm questionnaire, and Oxera analysis.

Table 5.10 shows the relative use of CSDs and custodians for clearing and settlement services. For equities, the use of each channel is approximately even; however, for fixed income trades, the direct use of CSDs is restricted to a select sample of firms.

Table 5.10 Use of post-trading channels by fund managers (number of transactions)

	Number of transactions (%)	
	Equities	**Fixed income**
Clearing and settlement		
CSDs	42–53	7–10
Custodians	47–58	90–93

Notes: Some fund managers indicated that they used CSDs and custodians, but did not detail the proportion of transactions sent to each. Two approaches were taken to estimate the use of the channels. The first assumes that fund managers that did not provide the data for either type of service provider did not use this type of service provider. This will underestimate the use of service providers where data was reported as 'not available'. The second approach assumes that fund managers that did provide data are representative of fund managers that reported that such data was 'not available'. This could over- or underestimate the use of service providers where data was reported as 'not available'. The range is defined by the results from both approaches.
Source: Fund management questionnaire, and Oxera analysis.

Tables 5.11 and 5.12 show the use of post-trading channels by brokers. It is difficult to identify a clear pattern of use by type of brokerage firm, since brokerage firms of all sizes, and from many financial centres, use CSDs directly as well as indirectly via custodians. There is also no clear distinction between the pattern of use by local or multinational brokerage firms.

The types of service provided by each type of provider do vary. Similar to what is observed from the analysis of fund managers' data, brokers generally use CSDs only for domestically domiciled securities. For example, twice as many brokers domiciled in major financial centres use CSDs for domestically domiciled securities than for cross-border securities. In comparison, the number of brokers that use agents is similar across all domiciles of securities.

Brokers using a CCP directly use an average of three. In comparison, for brokers that use either a CSD or custodian, an average of five for either type is used, with some brokers using up to 12 CSDs or 15 custodians. The use of multiple custodians indicates that brokers use both local and global/multi-market custodians for post-trading services.

Table 5.11 Post-trading channels used by brokers

	Brokers using these channels by number of respondents (%)
CCPs	79
CSDs	79
Custodians, for any custodian service	92
Agents, for CCP service	38
Custodian, for clearing and settlement and custody and safekeeping	83

Source: Brokerage firm questionnaire, and Oxera analysis.

Table 5.12 shows that the relative use of CSDs and custodians is sensitive to the type of security, equity or fixed income. For custody services, CSDs are the dominant providers. This is likely to be due to brokers using CSDs directly for international bonds.

Table 5.12 Use of post-trading channels by brokers (by proportion of volume)

	Number of transactions (%)	
	Equities	Fixed income
Clearing and settlement		
CSDs	35–41	82–88
Custodians	58–65	12–18

Note: This is based on the proportion of clearing and settlement transactions sent to CSDs. Some brokers indicated that they used CSDs and custodians but did not indicate the proportion of transactions sent to them. Two approaches were taken to estimate the use of the channels. The first assumes that brokers that did not provide the data for either type of service provider did not use this type of service provider. This will underestimate the use of service providers where data was reported as 'not available'. The second approach assumes that brokers that did provide data are representative of brokers that reported that such data was 'not available'. This could over- or underestimate the use of service providers where data was reported as 'not available'. The range is defined by the results from both approaches.
Source: Brokerage firm questionnaire, and Oxera analysis.

5.3.2 Crossing the border

Tables 5.13 and 5.14 show the proportion of custodians' clients that are domiciled domestically and across the border. In major financial centres, almost all global/multi-market custodians' clients are domestic clients, while global/multi-market custodians and local custodians in secondary and other financial centres do have a proportion of cross-border clients, which ranges widely between 10% and 90%. The high proportion of 'local' clients is largely a result of local clients being defined here as being in domiciles where the global/multi-market custodian has an office. In most cases, these tend to be larger clients. For example, although local custodians in major financial centres have a small number of clients across the border (<1%), they account for around 37% of their total transactions.

All global/multi-market custodians that also act as local custodians are domiciled in one of the major financial centres and not in any of the secondary and other financial centres.

Table 5.13 Provision of custodian services for domestic and cross-border clients (% of clients)

Types of custodian	Local clients	Cross-border clients
Global/multi-market custodians		
Major financial centres	99	1
Secondary financial centres	90	10
Other financial centres	32	68
Local custodians		
Major financial centres	99	<1
Secondary financial centres	13	87
Other financial centres	86	14
Custodians that act as both local custodians and global/multi-market custodians		
Major financial centres	100	<1
Secondary financial centres	0	0
Other financial centres	0	0

Source: Custodian questionnaire, and Oxera analysis.

Table 5.14 Provision of custodian services for domestic and cross-border clients (value of securities held, %)

Types of custodian	Local clients	Cross-border clients
Global/multi-market custodians		
Major financial centres	94	6
Secondary financial centres	36	65
Other financial centres	21	79
Local custodians		
Major financial centres	63	37
Secondary financial centres	29	71
Other financial centres	55	46
Global/multi-market/local custodians		
Major financial centres	63	37
Secondary financial centres	0	0
Other financial centres	0	0

Source: Custodian questionnaire, and Oxera analysis.

The extent to which brokers and fund managers have access to CCPs and CSDs in foreign financial centres can be analysed by looking at the data provided by CCPs and CSDs. Data provided by CCPs is considered first and set out in Tables 5.15 to 5.17. Similar findings regarding the degree of market integration are derived from analysis of the data provided by CSDs, as Tables 5.18–21 illustrate.

A significant proportion of CCP members are counted as cross-border (see Table 5.15). As explained, cross-border means that they are not domiciled in the same financial centre as the CCP. This proportion is increasing through time. In addition, the proportion of transactions coming from cross-border members to CCPs is significant and is increasing, as shown in Table 5.16.

Notwithstanding the increase in non-domestic customers, Table 5.17 shows that across all CCPs, 4% of securities (by number of clearing transactions) for which services were provided in 2006 were cross-border securities, and that this proportion was increasing through time.

Table 5.15 Provision of CCP services for domestic and cross-border members (% of members)

	Domestic members	Cross-border members
2006	70	30
2008	68	32

Source: CCP questionnaire, and Oxera analysis.

Table 5.16 Provision of CCP services for domestic and cross-border members (by number of clearing transactions in equities, %)

	Domestic members	Cross-border members
2006	81	19
2008	77	23

Source: CCP questionnaire, and Oxera analysis.

Table 5.17 Provision of CCP services by domicile of equity (by number of clearing transactions in equities, %)

	Domicile of equities	
	Domestic	Cross-border
2006	96	4
2008	94	6

Source: CCP questionnaire, and Oxera analysis.

Table 5.18 shows the proportion of a CSD's members that are considered to be domiciled in domestic or cross-border financial centres. Table 5.19 shows the proportion of transactions coming from each type of member, by value of securities held. The table shows that a small proportion of members are not domiciled domestically; the proportion of securities that they hold is also relatively small. As with CCPs, these proportions are increasing.

Table 5.18 Provision of CSD services for domestic and cross-border members (by number of members, %)

	Domicile of member	
	Domestic	Cross-border
2006	98	2
2008	97	3

Source: CSD questionnaire, and Oxera analysis.

Table 5.19 Provision of CSD services for domestic and cross-border members (by value of securities held, %)

	Domicile of member	
	Domestic	Cross-border
2006	88	12
2008	86	14

Source: CSD questionnaire, and Oxera analysis.

Table 5.20 presents the provision of CSD services by domicile of security. It shows that only a very small proportion of the value of securities held comes from cross-border securities. This indicates that clients predominantly use a CSD for securities local to the CSD.

Table 5.20 Provision of CSD services by domicile of security (by value of securities held, %)

	Equities		Fixed income	
	Domestic	Cross-border	Domestic	Cross-border
2006	96	4	90	10
2008	96	4	88	12

Source: CSD questionnaire, and Oxera analysis.

5.4 How are costs distributed along the value chain?

The analysis in this section is based in part on the results presented elsewhere in this report—in particular, the estimates of the relative use and costs of the different channels. In addition, it has been necessary to calculate or estimate the average trade size and velocity of trades at different points along the value chain to enable costs for different services to be considered on a consistent basis, as a proportion of the transaction value or the value of the assets being held.

The analysis is presented at an aggregated level, across all participating financial centres. The cost and use of channels vary significantly between financial centres and firms. Therefore, the summary results presented here are unlikely to match the experience of a particular firm within a particular financial centre. The average size of transactions and trading velocity may also vary considerably across firms and financial centres, further suggesting that these summary results should be taken as indicative illustrations or scenarios rather than precise estimates. In addition, in a number of places in the value chain, the relationship between outputs (what the firm sold) and inputs (what the firm bought in order to make those sales) has been reported on a different basis because the information is not collected in a way that allows this matching. A number of assumptions have been made in those instances.

Despite these caveats, the final results provide a useful illustration of how, conceptually, the costs along the value chain can be analysed. Moreover, many of the data issues will become less important when considering how the distribution of costs along the value chain is changing over time, as opposed to providing a static analysis.

For convenience, some of the range estimates of costs and the use of channels have been replaced by point estimates. The analysis is presented for equities only; institutional brokerage firms typically trade fixed income securities on a net (ie, not commission) basis.

5.4.1 Costs incurred by institutional investors

The costs incurred by funds are generally associated with one of three activities: managing the assets of the fund; holding securities (custody services); or trading securities.

Fund management

Fund management firms undertake activities on behalf of investment funds—in particular, selecting which securities the assets of the fund should be invested into (in accordance with the agreed mandate of the fund). The fund manager will also typically undertake some administrative activities on behalf of the fund, such as monitoring the fund's holdings and performance, and dealing with corporate actions.

In return for these services, the fund management firm is paid a management fee, typically an annual charge based on the value of the fund. From the data reported by fund management firms, the average fee in Europe, for *passively* managed equity funds, is approximately 75bp per value of securities held. There is some variation between funds of different size and across financial centres, which is discussed in Appendix 3.

Notwithstanding that fund managers generally have the day-to-day control of the funds they manage, and choose the specific transaction that the fund will enter into, typically the *additional* external costs involved in actually trading are either incurred (ie, paid for) directly by the fund, or the costs are passed through to the fund (eg, trading commissions). In addition, the costs external to the fund manager associated with clearing and settlement, and holding the securities (eg, custody services) are paid for directly by the fund, or passed back to the fund.

Custody

Custody involves account provision and asset servicing activities. Funds may contract directly with a custodian, or with a CSD, for custody services and make direct payments to the relevant service provider or delegate some of their custody arrangements to the fund manager, who may also choose to pass on this responsibility to the custodian.

For any fund holding dematerialised equities there must be a holding in some account in the home CSD relating to those equities. There is done in a number of ways, including the following:

– the fund holds the securities in its own name in the (home) CSD;
– the fund holds the securities with a local custodian bank (with the account in the fund's name), and the custodian bank holds the securities in an account in the bank's name in the CSD;
– the fund holds the securities with a multi-market/global custodian, which in turn holds them in a local custodian, which in turn holds them in the local CSD;
– any of the above, but with a CSD local to the custodian bank/fund holding securities in an account in another CSD which is home to the securities.

In every case there is, somewhere, an account in the home CSD that holds the security actually 'owned' by the fund, even if the account in the CSD is that of a custodian bank, or another CSD.

The analysis indicates that, averaged across all their customers, the home CSD will typically charge 0.15bp per annum for the holding of the dematerialised security, and the fund will end up paying for that either directly (if it has an account in that CSD) or indirectly (via one or more custodian banks). Hence, overall, whatever the fund or fund manager pays out for custody, around 0.15bp will end up with the home CSDs.

If the fund contracts with a custodian it can expect to pay around 4bp for custody, more if it contracts with a global custodian, and less if it goes to a local custodian. Custodians as a group will therefore take around 4bp of a fund's value per annum, out of which around 0.15bp is passed on to CSD. (To the extent that custodians represent the large customers of

CSDs, and CSDs often have volume discounts built into their pricing structures, the actual amount spent by custodians on CSDs will be lower than the average price.)

As a result, for passive funds, the costs of *holding* the securities for a year break down approximately as follows:

– 75bp is retained by the fund manager (out of which external costs not in this value chain are also paid);
– around 4bp is charged by custodians as a class (a combination of both local and global), out of which about 0.15bp is paid on to CSDs, leaving around 3.5bp for custodian services;
– 0.15bp is charged by CSDs.

Trading and post-trading transactions

In addition to the costs of holding, there will be costs associated with transactions. These include the costs of using trading platforms, CCPs, CSDs and custodians. In the case of CSDs and custodians, these transaction costs are, in general, in addition to the holding costs described above.

Funds purchase clearing and settlement services from custodians (or CSDs) directly or indirectly via fund managers. For trading services, fund managers tend to purchase services from brokers on behalf of funds (and the costs are passed through). In turn, brokers purchase services from trading platforms, CCPs, custodians and possibly CSDs to carry out the trading services that they supply to funds/fund managers. Brokers may also purchase transaction services and holding services from custodians and/or CSDs, both for their own propriety trading and where they are operating as a market maker. For the services they need to supply the transaction services to funds/fund managers, these costs represent a flow out of their commission rates (and, in some cases, a flow on from the buy/sell spread).

For some trades the broker may be bypassed. Instead, the fund manager will engage with the infrastructure, making payments directly to that infrastructure. Although bypassing brokers is becoming more common, 80–90% (by value) of fund managers' equity trades were sent to brokers in 2006. Therefore, for trading purposes, the funds are essentially paying two types of fees: a commission rate sent to brokers, and transaction-related fees paid either to custodians or CSDs directly.

Although the fee paid to brokers tends to be expressed in bp per value of transaction, the fees paid to custodian banks or CSDs tend to be expressed (and charged) in a fee per transaction. In many cases the *value* of that transaction is not reported, and in most cases the institutions reporting in the survey were unable to reliably provide the transaction value data. In addition, the fees that are charged to brokers by trading platforms, CCPs, and their use of CSDs or custodians, are also charged in relation to transactions, without necessarily recording the value of that transaction.

With regard to trading services, when a broker is used, the weighted average trading fee incurred by the fund (through the fund manager) is approximately 12bp of the value of transactions. In many cases this fee will also cover research activities, as well as any external costs incurred by the broker, such as central counterparty clearing fees. Where the fund manager engages directly with the trading platform approximately 10% of equity trades by value, the average fee is lower, at approximately 1.5bp. This reflects both the more limited scope of services provided by trading platforms compared with brokers, and the larger average size of trades that flow directly to the trading platform. Thus, the weighted average transaction fee paid by funds (via fund managers) to brokers or directly to a trading platform is in the order of 11bp of the value of the transaction.

Brokers also pay CCPs out of the 12bp they receive from funds/fund managers. The CCP fees are around €0.50 per cleared transaction. The transactions here are the trades executed by brokers, so their size is not necessarily the same as the trade order sent from

the fund/fund manager to the broker (for example, because it may include proprietary trading). In general, the value of trades executed by brokers is substantially smaller than the value of trade orders received from fund managers. Across all brokers, the average trade executed on a trading platform is approximately €25,000, around 5% of the value of the typical trade order from a fund manager. These fees of the CCP therefore represent around 0.2bp of the transaction value.

Brokers also incur custodian and/or CSD fees as part of their ability to transact against a client order, particularly if they are operating as a market maker and when they are undertaking propriety trading on their own behalf. Costs relating to propriety trading are outside the scope of this analysis. Where the broker is acting as a market maker, the costs of that operation are likely to be recovered from the spread between buying and selling. Notwithstanding these other sources of funding, brokers still incur clearing and settlement costs with custodians and/or CSD when carrying out agency trades for fund/fund manager clients. The brokers' data could not generally separate out the costs incurred as a result of market making or propriety trading from those required to carry out agency trades. A number of assumptions have to be made to interpret the available data. At one extreme, every transaction that executes on the trading platform will result in a clearing and settlement transaction in the accounts of the broker in its custodian (or its account in the CSD). However, it may be possible to net the transaction, which would reduce the number of transactions on the custody accounts.

Whatever the extent of the transactions flowing across the accounts of the brokers in custodians (or CSDs), such activity would have very little average holding with the custodian or CSD, because the holding time is likely to be (very) short. Given that the holding fees are low in terms of bp per year, any holding fees are unlikely to be a significant cost per transaction (and have therefore been ignored in the rest of this analysis). However, any transaction fees that are incurred will have an impact on the brokers' transaction costs.

The upper boundary of the number of transactions is the number of transactions sent to the trading platform. The average size of this transaction is in the order of €25,000, and the transaction price for brokers, as charged by custodians, is in the order of €5. This represents 2bp of the value of the transaction. To the extent that netting takes place, the corresponding bp fee will fall.

There may also be a flow on to CSDs. Again, if the custodian nets transactions, the number of transactions going to the CSD will be lower than the number of transactions received by the custodian, which forms the upper bound. The average CSD charge per transaction is €0.50. The upper bound is therefore around 0.2bp of value of transaction passed on.

The average cost associated with the direct clearing and settlement of each trade as paid for by the fund/fund manager can be estimated from the custodian's data. Custodians report charging institutional investors significantly more than brokers per transaction, reflecting both volumes and the level and range of services provided. From the pricing data the weighted average cost per transaction is in the region of €20 for clearing and settlement services. However, because the transaction that the fund manager sends to the broker may be broken down before being sent to the trading platform, the €20 could be incurred more than once before the transaction is completed. On the assumption that these multiple transactions are rare, and using an average transaction size of €400,000 as sent from the fund manager to the broker, this fee is 0.50bp. At the other extreme, if the fund/fund manager incurred a transaction fee for every transaction as sent by the broker to the trading platform (ie, with average value of €25,000), the clearing and settlement fees paid to the custodians would be 8bp.

The custodian will also have to undertake a subsequent transaction with the CSD as a result of the transactions relating to the fund/fund manager, unless the transaction(s) net to zero within that custodian and the custodian has a consolidated account with the CSD. The number of transactions that the custodians send to the CSDs may therefore be lower than

the number of transactions they receive from their fund/fund manager clients. (The upper bound will be the number of transactions from their clients.)

The average transaction price for CSDs reported by CSDs was €0.50. The upper bound of the number of transactions is that of the transactions flowing from the fund/fund manager to the custodian. Since the ratio of transaction prices is 1:40 (€0.50:€20), at most 1/40th of the transaction fee received by custodians flows on to CSDs. Given the range outlined above, this gives a range 0.01–0.2bp.

5.4.2 Consolidation of costs

Overall, this evidence provides some insights into the distribution of costs along the value chain. Funds are paying out:

i) 75bp per annum for management (funds under management);

ii) 11bp for the trading part of the transaction (value of transaction), largely paid to brokers;

iii) 0.5–8bp for clearing and settlement (value of transaction), with the likely costs in the order of 1bp, largely paid to custodians;

iv) 4bp for safekeeping (custodians).

Some of the fees paid under ii), iii) and iv) flow on to parts of the value chain. In particular, the fees in ii) flow on to trading platforms (0.5bp) and CCPs (0.5bp). In addition, some of these fees flow on to custodians and then onwards to CSDs. At a maximum this is likely to be 1bp, and could be lower. Of the 12bp paid to brokers, therefore, around 10–11bp (80–90%) remains with the broker (subject to other external costs). Fees in iii) will also flow on to CSDs. Of the 1bp, around 0.02bp (2%) flows on to the CSD. Fees in iv) will also flow on to CSDs. Of the 4bp, around 0.15bp (4%) flows on to the CSD.

So if the fees paid by funds for *holding* are set at 100%, and made up of the 75bp for fund management and 4bp for custody services, the final distribution along the value chain approximates the following: 95% ends up with the fund manager; 5% ends up with the custodian, and less than 0.5% ends up with the CSD.

For *transactions* where the fees paid by funds are 100%, and made up of 12bp for brokers (ignoring direct access to trading platforms for simplicity) and 1bp for clearing and settlement, the distribution is as follows: 77% ends up with the broker; 4% ends up with the trading platform; 4% with the CCP; 14% with the custodian and less than 1% with the CSD.

If an assumption is made that the average turnover of the fund is 1.3 per annum, these two fee streams can be combined and expressed as bp per value of assets held.

The fund now pays out in total per annum 75bp for management, 4bp for safekeeping, 15.5bp in commissions, 1.3bp for clearing and settlement, giving a total of 95.8bp of assets held. Using the flow on calculations above, the final distribution along the value chain approximates the following: 78% for fund management; 14% for the broker; 0.7% for the trading platform; 0.7% for the CCP; 6.5% ends up with the custodians and less than 1% ends up with the CSD.

Taking the fund management function out of the analysis, the final distribution of the costs faced by funds in holding and transacting are as follows: the fund pays 4.4bp for safekeeping (to custodians), 15.5bp in commissions (to brokers), and 1.3bp for clearing and settlement (to custodians), giving a total of 21.2bp, all based on value of assets. The final distribution is as follows: 62% for the broker; 3% for the trading platforms; 3% for the CCP; 30% for the custodians and 1.5% for the CSD.

This broad allocation of where the fees paid by end-investors finally end up is based on a number of assumptions and should therefore be seen as indicative only. In addition, as the

data in this report indicates, there is considerable variation in the prices charged for different activities in different financial centres and in relation to different securities. Therefore, this broad mapping does not necessarily represent any particular experience of a financial centre, or a particular set of end-investors. The analysis has also attempted to estimate the flow-on of fees to other parts of the value chain only, not the total flow-on of fees into other parts of the economy (eg, telecommunications services). Thus, it is not possible to use this analysis to estimate the final destination of the fees paid by end-investors because all participants in the value chain have other external costs that have not been captured (and are outside the scope of this project).

6 Cost of trading services: key indicators

This section identifies the trends and factors that affect the cost of trading services, and analyses the cost of trading and differences between the cost of domestic and cross-border trading.

6.1 Factors affecting costs of trade execution offered by brokerage firms

To assess the cost of trade execution and monitor changes over time (in the second and subsequent reports), it is useful to identify the factors and trends that affect brokerage firms' costs and pricing.

Fund managers and brokers in the sample identified a number of trends, most of which are having a downward impact on commission rates. These include increases in the choice of trading venues and competition between them, and in the use of internalisation as a cost-efficient trading channel, internal and external crossing, and electronic (algorithmic and direct market access, DMA) and programme trading. Other explanations given included the trend of unbundling of trade execution and research, more effective routing of transactions and implementation of straight-through processing (STP), and emerging markets becoming more developed. Several fund managers indicated that pricing power in decisions over commissions is shifting to the buy side, suggesting that competition among brokerage firms has been intensifying.

Survey participants also listed factors that could raise the cost of trading in the short or long term, such as increases in the costs of other services bundled with trade execution (eg, research), in market data costs, and in the legal and system costs owing to implementation of MiFID. Other explanations given include expenditure on IT systems to connect to an increasing number of trading venues, higher market impact costs as a result of market fragmentation (and subsequent loss in liquidity), and diminishing trade order size (increasing costs as a result of higher clearing and settlement costs per value of trading).

Pricing of services also depends on the client's profile. Brokers confirmed that the most relevant factors are as follows.[32]

– **Mix of transaction methods**. The survey shows that commission rates for electronic trading and programme trading are generally lower than for core brokerage (see section 6.2). Although core brokerage is still the most commonly used transaction method, survey participants indicated that there is a trend towards using electronic and programme trading. There is also some variation across financial centres—for example, the proportion of core brokerage trading by UK fund managers is around 50%, and in secondary financial centres such as Belgium and the Netherlands it is around 80%.

– **Domicile of security**. As explained in the following section, the cost of trading varies by the domicile of security. As a result, the average commission rate charged to a fund manager depends on the fund manager's profile of trading in different domiciled securities.

– **Volume of trading**. Commission rates are usually negotiated between the broker and fund manager for (almost) all the fund manager's trade. The rate agreed depends on the

[32] A few fund managers cited the type of stocks (eg, small caps versus large caps) and capital commitment as additional factors. However, they indicated that it would be difficult to provide a breakdown of trading data by type of stock, and only a few were able to provide data in the questionnaire on the cost of capital commitment.

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 rate.[33]

– **Size of trade orders**. The survey shows that the more trade orders that are placed for a certain amount of value of trading, the higher the commission rate. This is likely to be due to a combination of economies of scale in trading and because some post-trading services are charged on a per-transaction basis—a higher number of orders or transactions will result in a larger post-trading cost for brokerage firms.

– **Additional services**. In some financial centres, trade execution services are offered by (full-service) brokerage firms in a bundle with research and trade-execution-related services.[34] Therefore, the commission rates in these financial centres do not refer just to trade execution services (ie, the subject of this study). To capture just the 'pure' trade execution element, the questionnaire requested information on the research constituent of the commission rate.

  The availability of data was relatively limited in most financial centres. Most brokerage firms were unable to provide an estimate of the element of their commissions that accounts for research, and only a few fund management firms in France, Ireland, Spain and the UK provided breakdowns of commissions into trade execution and research. Typically, these are rough estimates (eg, in many cases, a 50/50 split or a 75/25 split between execution and research was provided).[35] Fund managers in a number of other financial centres (eg, Italy and the Netherlands) indicated that 100% of the commission rates they pay account for execution services.

  Owing to the limited availability of data, this analysis does not take into account the costs of research, and presents data on commissions without any adjustments for additional services. However, commission rates and the split between execution and research could be measured over time. In some financial centres, such as the UK and France, there is a trend towards unbundling of trade execution and research (and other non-trade execution goods and services). This is likely to make it easier to adjust the commission rates for non-execution services (thereby capturing 'pure' trade execution costs only) in further studies.

6.2 Cost of trade execution offered by brokerage firms

6.2.1 Securities' view on cost of trade execution

Table 6.1 shows the cost of trading from the perspective of a domicile of securities based on data from the brokerage firm questionnaire.

[33] See also, for example, a 2006 study for the UK Financial Services Authority (FSA), which shows that bundled brokerage commission rates for UK equities for investment managers with a volume of trading of £500m amount to 13.33bp, with trading volumes of £250m: 15.97bp, and with trading volumes of £100m: 18.58bp (based on data for the year 2005). Oxera (2006), 'Soft Commissions and Bundled Brokerage Services: Post-implementation Review: A Study for the FSA', October, pp. 9 and 70.

[34] In some financial centres, such as the UK, it is common practice for fund management firms to enter into commission-sharing arrangements. Under such arrangements, an investment manager agrees with brokerage firms that the non-execution constituent of the commission rate should be paid into a commission-sharing pool, from which the investment manager can then pay for research from the brokerage firm or third-party research providers.

[35] This is consistent with a recent study for the FSA that estimated the split between execution and research at 50/50. See Oxera (2009), 'Soft Commissions and Bundled Brokerage Services: Post-implementation Review', January.

Table 6.1 Weighted average commission rates charged by institutional brokerage firms for trade execution services (by domicile of security)

Domicile of securities	Cost of trading (bp)
Major financial centres	
France	10.3
Germany	8.9
Italy	6.7
Spain	5.8
Switzerland	8.0
UK	9.9
Secondary financial centre	
Belgium	7.9
Luxembourg	8.3
The Netherlands	8.9
Norway	8.7
Poland	28.2
Sweden	8.3
Other financial centres	
Austria	9.7
Czech Republic	27.1
Denmark	8.2
Greece	22.2
Ireland	14.5
Portugal	8.1
Other European	9.3

Source: Brokerage firm questionnaire, and Oxera analysis.

The analysis shows that trading in equities domiciled in major financial centres costs on average around 8bp, in secondary financial centres around 11bp, and in other financial centres 14bp.

Since institutional brokerage firms typically trade fixed income securities on a net (ie, not commission) basis, the table presents data only on commissions related to equities trading.[36]

The variation in commission rates across major and secondary financial centres is limited (and ranges between 5.8bp and 10.3bp, with the exception of Poland, which has a commission rate of 28.2bp) and is more significant in other financial centres (ranging from 8.1bp in Portugal to 27.1bp in the Czech Republic). The variation in commission rates is due to a combination of factors. First, the cost of trading in securities domiciled in a particular financial centre will reflect the cost of trading in the financial centres where the securities are domiciled. In other words, the relatively high cost of trading in Czech securities is likely to reflect, to some extent, the relatively high cost of trading in the Czech Republic, and vice versa in Spain. Second, there is likely to be some variation in the services offered across financial centres, which may affect the commission rate. As explained above, in some

[36] Retail investors do pay commission on transactions in fixed income securities, but retail brokerage firms in the sample did not provide sufficient data on this.

financial centres, trade execution is offered in a bundle with other services, such as research, while in other financial centres it is not.

Table 6.2 identifies the importance of core brokerage, electronic trading and programme trading within each category of financial centre based on data from the fund management firm and institutional brokerage questionnaires. Across fund managers in all financial centres, and across all domiciles of securities, core brokerage is the dominant execution service provided by brokerage firms.

Table 6.2 Use of transaction methods (by value of equity trade orders, %)

Execution service	Proportion of equity trade orders (fund management firm questionnaire)	Proportion of equity trade orders (brokerage firm questionnaire)
Major financial centres		
Core brokerage	63	62
Electronic trading	22	21
Programme trading	14	17
Secondary financial centres		
Core brokerage	60	70
Electronic trading	34	19
Programme trading	6	12
Other financial centres		
Core brokerage	66	70
Electronic trading	33	18
Programme trading	1	12

Source: Fund management and institutional brokerage firm questionnaires, and Oxera analysis.

6.2.2 Investors' perspective on cost of trade execution

Table 6.3 shows the average commission rates from the perspective of the domicile of investors, based on data from the fund management and retail brokerage firm questionnaires.

Table 6.3 Weighted average commission rates paid by institutional and retail investors for trade execution services offered by brokerage firms

Type of investor	Domicile of investor	Cost (bp) (equities)
Institutional	Major financial centre	12
	Secondary financial centre	12
	Other financial centre	12
Retail	Major financial centre	33
	Secondary financial centre	27
	Other financial centre.	51

Source: Fund management and retail brokerage firm questionnaires, and Oxera analysis.

The rate charged to fund managers domiciled in major, secondary and other financial centres is estimated at 12bp. These are weighted averages of the commission rates for all the securities in which these fund managers trade—in other words, they include trading in domestic and cross-border securities. Table 6.5 below presents a comparison, in index form, between the costs of domestic and cross-border transactions.

The fact that the weighted average commission rate is the same in these three categories of financial centre is to some extent a coincidence and driven by the survey sample. There is variation across financial centres. In the major financial centres, the commission rates range from 8bp to 14bp, and from 9bp to 18bp in other financial centres. The commission rate paid by UK fund managers is estimated at 10bp and by Spanish fund managers at 13bp (not shown in Table 6.3). Retail investors pay much higher commission rates than institutional investors, for at least two reasons. First, the services offered by retail brokers typically cover not only trade execution services but also the clearing and settlement of the transactions, while institutional investors typically purchase these post-trading services separately from a custodian. Second, retail investors have much lower transaction volumes than institutional investors.[37]

6.3 Cost of cross-border transactions offered by brokerage firms

The securities perspective can provide insight into the cost of cross-border transactions by looking at commission rates charged by global and local firms (see Table 6.4 below). The first row in the table shows the average commission rates (in indices relative to the commission rate charged by the foreign brokers) for trading in French securities charged by:[38]

- **global brokers with office**—firms with offices in multiple financial centres, including France;
- **global brokers without office**—firms with offices in multiple financial centres but not in France;
- **local brokers**—brokers with an office in the financial centre where the security is domiciled (ie, France), but with no operations in other financial centres;
- **foreign brokers**—firms with an office in a financial centre other than in France.

The distinction between global and local brokers may be blurred in the case of some firms. Survey participants were asked to identify the financial centres in which they are domiciled. Most global brokers listed all financial centres where they have their trading operations and sales offices, although they may have their main trading operations in only a few of the financial centres listed. Therefore, if, in the above example, the global broker's main activities are in France and Germany, but it has sales offices in other financial centres, it may act as a 'local broker' in the French and German markets and as a global broker in the other financial centres where it has sales offices. If, however, the global broker's main activity is in the UK and in Germany, but it has sales offices in France, in the French market it may be similar to a foreign broker. Nevertheless, the approach is useful to obtain an indication of the difference between the costs of domestic and cross-border transactions for monitoring over time.

[37] The sample of retail brokerage firms consists mainly of the traditional retail banks, does not generally distinguish between sales channels, and may not fully capture Internet brokers. This could bias the results to some extent.
[38] The commission rates are presented in indices due to the relatively small sample of local brokers.

Table 6.4 Commission rates charged by global and local brokerage firms (indices)

Domicile of security	Global firms with office	Global firms without office	Local firms	Foreign firms
Major financial centres	77	84	48	100
France	89	87	–	100
Germany	98	107	70	100
Italy	53	91	–	100
Spain	45	101	41	100
Switzerland	87	97	–	100
UK	54	–	–	100
Secondary financial centre	44	55	91	100
Belgium	52	38	69	100
Luxembourg	114	62	–	100
The Netherlands	54	65	–	100
Norway	27	35	–	100
Poland	62	87	–	100
Sweden	39	65	137	100
Other financial centres	41	58	35	100
Austria	40	48	48	100
Czech Republic	–	111	21	100
Denmark	23	31	–	100
Greece	39	88	42	100
Ireland	103	46		100
Portugal	60	45	42	100
Other European	62	45	–	100

Source: Institutional brokerage firm questionnaire, and Oxera analysis.

Table 6.4 leads to the following observations.

– For securities in all financial centres (except in Germany, Luxembourg, the Czech Republic and Ireland), the commission rates of foreign brokers are (much) higher than those of local and global brokers. This indicates that the fund managers that use these brokers (for both domestic and cross-border transactions) are likely to face a higher cost for cross-border trading than for domestic trading. To some extent, this is due to a volume effect. These foreign brokers are domiciled in only one financial centre and are therefore likely to be smaller firms, and their volume of trade in any one foreign financial centre is also likely to be small.

– For securities in Germany, Spain, the Czech Republic, and Portugal, the commission rates of local brokers are lower than those of one or both types of global broker. Again, this provides an indication of the cost of cross-border trading being higher than that of domestic trading.[39]

– For securities in several other financial centres (eg, Italy, Poland and Greece), the commission rates of global brokers without offices are higher than those of global

[39] Because of the limited sample, no data is presented for some of these financial centres.

brokers with offices. This is also an indication that the cost of cross-border trading is higher than that of domestic trading.

Table 6.5 shows the cost of domestic and cross-border trading from an investors' perspective. The cost of cross-border transactions is around two times higher on average than that of domestic transactions in major financial centres, while the difference is smaller in secondary and other financial centres.

The difference in the cross-border and domestic trading costs is not consistent across financial centres. For example, in the UK, the ratio of the cost of cross-border transactions to that of domestic transactions is around 1.2, in Italy around 1.6, in Greece 1.7, and in Spain 1.8, while in Ireland and Portugal the costs of cross-border transactions are slightly lower than those of domestic transactions. This may be because the additional cost of cross-border transactions is more than offset by the fact that domestic trades in this financial centre are more expensive than domestic trades in the foreign markets where these investors trade.

For retail investors, the ratio of the cost of cross-border transactions to the cost of domestic transactions across all financial centres is around 1.2.[40]

Table 6.5 Weighted average commission rates paid by institutional and retail investors for trade execution services offered by brokerage firms

Type of investor	Domicile of investor	Cost of domestic transaction (index) (bp)	Cost of cross-border transactions relative to cost of domestic transactions (index) (bp)
Institutional	Major financial centre	100	205
	Secondary financial centre	100	105
	Other financial centre	100	128
Retail	All financial centres	100	122

Source: Fund management firm and retail brokerage firm questionnaires, and Oxera analysis.

The difference between the costs of cross-border and domestic transactions may be due to various factors: the cost of trading in the foreign financial centre being high compared with other financial centres (ie, even for local investors in that financial centre); a relatively low volume of cross-border transactions (and/or small size of cross-border orders); and the specific costs incurred by the brokerage firm in allowing the security to cross the border. In particular, the domestic transactions of investors domiciled in a major financial centre will tend to be both high-volume and operating in a relatively cheap market, while their cross-border transactions are likely to be relatively low-volume in each financial centre, especially for secondary and other financial centres. While investors in secondary and other financial centres are trading domestically in relatively 'expensive' centres, their main cross-border transactions are likely to be concentrated in relatively 'cheap' major financial centres.

6.4 Costs of services offered by external crossing networks to investors

As explained above, fund managers use external crossing networks to cross trades of different investors. There are insufficient data points for this to be presented in the report. The cost of cross-border transactions is approximately 2–3 times higher than that of domestic transactions.

[40] No or insufficient data was provided by retail brokerage firms in Austria, the Czech Republic, Ireland, Norway and Poland.

6.5 Costs of services offered by trading platforms

The pattern shown in Table 6.6 indicates that the on-book trading costs in equities expressed in € per transaction have decreased significantly, while the bp costs per value of trading have increased somewhat.[41] At the same time, Table 6.7 shows that there has been significant reduction in the off-book trading costs.

Table 6.6 Changes in costs: on-book trading, equities

	bp costs per value of trading	€ costs per transaction
2006	0.43	1.18
2008	0.47	0.79
% change	9	–33

Source: Trading platform questionnaire, and Oxera analysis.

Table 6.7 Changes in costs: off-book trading, equities

	bp costs per value of trading	€ costs per transaction
2006	0.060	1.19
2008	0.027	0.55
% change	–54	–54

Source: Trading platform questionnaire, and Oxera analysis.

As explained above, both fund managers and brokers use trading platforms. Fund managers pay trading platforms between 0.60bp and 2bp for trade execution (for equities), while brokers tend to pay between 0.40bp and 0.70bp.

6.6 Concluding remarks

This section has presented data on the costs of trading services. It shows that there is considerable variation in the cost of trading across different domiciles of securities, and that there is evidence that the cost of cross-border transactions is higher than that of domestic transactions, measured from the perspectives of both brokerage firms and fund management firms. The indicators presented in this section could be monitored over time in further studies.

[41] Appendix 5 describes in detail the approach used to estimate aggregated trading platform costs. The mix of services provided by different trading platforms might somewhat differ, although Oxera has sought to ensure data consistency between the infrastructures.

7 Cost of post-trading services: key indicators

This section identifies the trends and factors that affect costs and pricing of post-trading services (offered by intermediaries), and analyses the cost of post-trading and differences between the cost of domestic and cross-border post-trading services offered by both intermediaries and infrastructure providers.

7.1 Factors affecting costs of post-trading services

Custodians identified various factors that affect their pricing, such as the size of the client contract in terms of value of assets and number of transactions; cross-selling opportunities for other markets and services and the strength of the (global) relationship; communication mode and instruction format (eg, STP or manual); the domicile of securities and type of equities (eg, blue chips or emerging markets); the range of services used (eg, client-bespoke data and reporting requirements) and credit needs; the number of accounts requested; the degree of competition; the domicile of the client; the proportion of on- and off-exchange transactions; the type of client, prices of sub-custodian and CSD services; and communication and other infrastructure costs.

The following client-specific factors were identified as important by custodians:

– the type of customer (eg, investors and fund managers typically require a broader range of services than brokerage firms);
– the size of the client or contract (due to economies of scale);
– the domicile of the securities (due to post-trading transactions in some financial centres being more costly than in others).

Changes over time in the prices of clearing and settlement and custody and safekeeping may therefore be driven by changes in the portfolio and profile of custodians' customers.

In addition, in most cases custodians operate in a way which means that there is not a strict one-to-one relationship between the purchase of the services they need to operate their business and the supply of services to clients using those inputs. The complexity of these relationships and the market dynamics (including the frequent provision of services to clients that are outside the scope of this study) means that obtaining clean data from customers' records was not practical. As a result, a different approach was adopted.

Custodians provided price data for a wide range of customer profiles with different characteristics in terms of type of client, size of contract and domicile of securities (see Appendix 2). The average prices of custodian services were compared between different categories of customer under each of the three characteristics. For example, in analysing the relationship between custodian prices and the size of client, average prices were compared between small and medium/large clients. In analysing the relationship between custodian prices and the type of client, average prices charged to custodians were compared with those charged to institutional investors and brokers.[42] The difference in average prices was in most cases found to be significant.

The findings can be summarised as follows.

[42] To determine whether the results would also hold if all factors were taken into account at the same time, an econometric analysis was undertaken of the relationship between the aforementioned characteristics and custodian pricing, by regressing custodian prices (ie, clearing and settlement, and custody and safekeeping fees) against the size and type of client, the domicile of security, and a dummy variable to indicate whether the transaction was domestic or cross-border. Most of the explanatory variables had signs that conformed to the results of the comparison of means.

– **Type of user**. The customer profiles distinguished three types of custodian client: custodians, institutional investors (ie, both funds and fund managers), and broker/dealers. The results of the analysis, presented in Table 7.1, indicate that investors and fund managers tend to pay a higher fee for custodian services than custodians and brokers. For example, the average price of clearing and settlement and custody and safekeeping services charged to small institutional investors is around 1.5 and 1.7 times the corresponding average prices charged to small custodians. This is also the case for medium-sized/large clients, although the precise ratio varies.

Table 7.1 Comparison between prices charged to different types of client (custodian services, indices)

	Settlement fees per transaction			Safekeeping fees (bp)		
Size of client	Brokers	Institutional investor	Custodian	Brokers	Institutional investor	Custodian
Small	67	153	100	84	171	100
Medium/large	44	102	100	88	186	100

Note: t-tests for both types of fee were carried out to determine whether the differences in mean fees were statistically significant. They were all found to be significant at the 5% confidence level.
Source: Custodian questionnaire, and Oxera analysis.

– **Size of contract**. The customer profiles distinguished between small, medium and large users. Size was expressed in terms of both the assets under custody (in relevant European securities) and the number of transactions per month. Examination of the data confirms that there is, in general, a negative relationship between price and size (see Table 7.2). For example, for an institutional investor the average price of clearing and settlement services for small clients is around 1.4 times higher than the price charged to medium-sized/large clients.[33] This 'size effect' is smaller for custodians in the case of settlement services and larger for custodians and brokers in the case of safekeeping services.

Table 7.2 Comparison between prices charged to small and medium-sized/large clients (custodian services, indices)

	Settlement fees per transaction		Safekeeping fees (bp)	
Type of client	Small clients	Medium/large clients	Small clients	Medium/large clients
Custodian	96	100	149	100
Institutional investor/ fund manager	144	100	137	100
Broker	144	100	142	100

Note: T-tests for both types of fees were carried out in order to determine whether the differences in mean fees were statistically significant. They were all found to be significant at the 5% confidence level with one exception: the difference between the settlement fees for small and medium-sized/large custodian clients was not significant.
Source: Custodian questionnaire, and Oxera analysis.

– **Domicile of security**. The customer profiles distinguished between securities domiciled in the domestic market, major European financial centres, other European financial centres, and all European financial centres. For the purposes of this study, major European financial centres include Belgium, France, Germany, Italy, the Netherlands, Spain, Switzerland, the UK and International, while other European financial centres

[33] Due to the small number of observations for medium-sized clients, this category was integrated with the large clients category in order to form a separate category of medium/large clients.

include Austria, the Czech Republic, Denmark, Greece, Ireland, Luxembourg, Norway, Poland, Portugal, and Sweden.

The results of the analysis, presented in Table 7.3, show that there is a general trend of custodian prices for securities domiciled in 'other financial centres' being greater than those charged for securities in major financial centres. For example, for client profiles that can be classified as having a predominantly local activity, the average prices of clearing and settlement charged to institutional investors and broker/dealers for securities in the other financial centres are around 1.3 and 1.8 times those charged for securities in the major financial centres, respectively. At the same time, the average prices of custody and safekeeping charged to custodians and broker/dealers in the other financial centres (for activity in that centre) are around 2.3 and 2.1 times higher than those charged in the major financial centres, respectively.

The average clearing and settlement fee charged to custodians for securities in the other financial centres is lower than that charged for securities in the major financial centres. At first glance, this result seems counterintuitive, in the sense that it does not conform to the general trend of prices for securities in other financial centres being higher than for securities in major financial centres. However, a two-sample t-test shows that the result of settlement fees charged to custodians for securities in other financial centres being lower than the corresponding value for securities in major financial centres was not statistically significant.

Table 7.3 Comparison between prices charged for domestic transactions for securities in major and other financial centres (custodian services, indices)

	Settlement fees per transaction		Safekeeping fees (bp)	
Type of client	Other financial centres	Major financial centres	Other financial centres	Major financial centres
Custodian	83	100	235	100
Institutional investor/ fund manager	126	100	157	100
Broker	176	100	212	100

Note: A series of two-sample t-tests for both types of fees was carried out to determine whether the differences in mean fees across securities in major and other financial centres were statistically significant. They were all found to be significant at the 5% confidence interval with one exception: the difference between the settlement fees for securities in other financial and major financial centres, for custodian clients, was not significant.
Source: Custodian questionnaire, and Oxera analysis.

7.2 Cost of post-trading services

7.2.1 Data provided by fund managers

The data supplied by fund managers provides some insights into the costs of their post-trading activities. For fund management firms, the average clearing and settlement costs reported where an agent is used is around €15 per transaction, and subject to significant variation. At the same time, the custody and safekeeping costs are around 0.9bp of the value of securities held. In many cases these costs will be paid directly by the fund, and will therefore not be directly visible to the fund manager, so these figures are based on a relatively small proportion of fund manager responses.

Table 7.4 presents the costs for retail investors. As expected, the data provided by retail brokerage firms suggests that the custody and safekeeping post-trading costs that retail investors face are much higher than those observed for the institutional investors.

Table 7.4 Weighted average costs for retail investors for post-trading services (bp)

		Cost	
Domicile of investor	Services	Equities	Fixed income securities
Major financial centres	Custody and safekeeping	17	7
Secondary financial centres	Custody and safekeeping	5	8
Other financial centres	Custody and safekeeping	–	–

Source: Retail brokerage firm questionnaire, and Oxera analysis.

The level of detail provided by fund management firms provides further insight. The post-trading costs for fixed income and equity securities vary. In general, services for fixed income securities are less expensive, but this is not always the case. For example, clearing and settlement services provided by custodians are, on average, less expensive for equity securities compared with fixed income securities. It is not clear whether this reflects the cost of providing post-trading services for the different types of security, or different characteristics for fund managers holding each type of security.

In the sample of survey respondents, the lowest costs for custody and safekeeping services are offered by CSDs. This can be explained by the specific characteristics of the respondents in the sample. For example, some of the respondents indicated that they received custody services at one-third of the lowest fee charged by custodians. Since different fund managers reported data for each type of service provider, care should be taken in reaching a conclusion about the relative costs, which may reflect differences in the types of service purchased and in user profiles.

Furthermore, by analysing the data on an individual respondent basis, relationships between the cost of post-trading services and characteristics of the fund manager were investigated. There is a negative relationship between the size of the firm and the post-trading costs, with fund management firms with a lower value of annual trades, or assets under management, facing on average, higher post-trading costs. Similarly, costs of fund management firms domiciled in smaller financial centres were often higher than those paid by fund managers domiciled in major financial centres. This is consistent with the pattern of prices as reported by custodians.

7.2.2 Data provided by brokers

Tables 7.5–7.7 present data on the cost of post-trading services used by institutional brokerage firms.

The average clearing and settlement costs reported are between €0.43 and €2.44 per transaction for institutional brokerage firms, with custody and safekeeping costs ranging between 0.50bp and 0.69bp of the value of securities held. For these services brokers are using both CSDs directly and custodians, and the individual average costs for brokers vary significantly. In addition, brokers were asked to report on CCP costs paid to agents and CCPs. On average, brokers pay between €0.48 and €0.65 per CCP transaction.

Table 7.5 Weighted average costs for brokerage firms for CCP clearing services (equities, €/transaction)

Service provider	Cost
Agents	0.48
CCP	0.65

Source: Brokerage firm questionnaire, and Oxera analysis.

Table 7.6 Weighted average costs for brokerage firms for clearing and settlement services (equities, €/transaction)

Service provider	Cost
Custodian	2.44
(I)CSD	0.43

Source: Brokerage firm questionnaire, and Oxera analysis.

Table 7.7 Weighted average costs for brokerage firms for custody and safekeeping (equities, per value of securities held, bp)

Service provider	Cost
Custodian	0.50
(I)CSD	0.69

Source: Brokerage firm questionnaire, and Oxera analysis.

Insufficient data was provided on post-trading services for fixed income securities for results to be presented in this report.

By analysing data on an individual respondent basis, a negative relationship between the volume of services purchased and the post-trading costs can be observed. This trend was found for each type of post-trading service: CCP clearing, clearing and settlement and custody and safekeeping; and across each type of service provider: CCP, custodian and (I)CSD.

The difference in post-trading costs for brokerage and fund management firms is consistent with the analysis in section 7.1 of the data reported by custodian firms. This shows significant and persistent differences in the costs facing customers of different profiles. There can be several explanations for these differences in costs—the main one arguably being the mix of services, as fund management firms generally purchase a more extensive range of services from custodians than brokerage firms do. Second, there are also some differences in post-trading costs across the domicile of securities, and, as noted above, the scope of securities that can be accessed at domestic rates is much wider for brokers than fund managers. Finally, the average value of securities held, or number of transactions carried out, on behalf of brokerage firms by each service provider is substantially higher than for fund management firms. This may suggest that brokerage firms qualify for more extensive volume discounts than fund management firms.

Overall, as with the fund management firms, the level of costs recorded for the brokerage firms is broadly consistent with those obtained in relation to the costs of services sold by the custodians, CCPs and CSDs taking part in this study.

7.2.3 Data provided by custodians

From the analysis of the customer profile data provided by the custodian banks, the weighted average fee for custody and safekeeping is in the order of 1.5bp, and the weighted average fee per transaction for clearing and settlement is around €7. The weightings used here are derived from the interaction of the customer profiles and the split of customers reported by respondents, and should therefore be interpreted as giving a broad indication of the overall averages. Furthermore, consistent with the detailed pricing analysis, the actual price paid depends on many characteristics of both the customer and the customer's demand profile.

No data is presented on the aggregated revenues actually earned by custodian banks for the provision of custody and safekeeping, or clearing and settlement. This is because the additional services that are bundled in with these are very varied and tend to be customer-specific. As a result, there is a wide variation in the apparent average fee charged. As per the

methodology for the tracking of changes through time, with time-series data on typical fees by customer type and actual fees by volume for individual data suppliers, a cross-check can be conducted to ensure that changes reported for typical customers are actually matched in magnitude and direction in the fees charged, taking account of any significant changes in the services that are bundled in with these fees.

7.2.4 Data provided by CCPs

The average central counterparty cost per transaction levied by CCPs[43] was €0.37 in 2006 and decreased significantly in 2008 (see Table 7.8).[44]

Table 7.8 Costs of central counterparty clearing services, equities

	Cost per transaction (€)
2006	0.37
2008	0.18

Source: CCP questionnaire, and Oxera analysis.

7.2.5 Data provided by CSDs

Table 7.9, which sets out the CSDs' costs, shows that account provision and asset servicing, and clearing and settlement were more expensive for fixed income securities than equities.[45] Overall, the costs of account provision and asset servicing, and clearing and settlement remained relatively stable over the period between 2006 and 2008.

Table 7.9 Costs of CSD services, equities and fixed income securities

	Equities		Fixed income securities	
Service	2006	2008	2006	2008
Account provision and asset servicing (bp cost per value of securities held)	0.15	0.17	0.19	0.18
Clearing and settlement (€ per transaction)	0.52	0.51	0.61	0.57

Source: CSD questionnaire, and Oxera analysis.

7.3 Cost of cross-border transactions

7.3.1 Data from custodian questionnaires

This section explores the possibility of price variations between cross-border and domestic transactions for post-trading services offered by custodians.

The average costs of cross-border transactions for both types of post-trading service were compared with the corresponding values for domestic transactions. This cost comparison was carried out separately for each type of client. The disaggregation of the analysis according to type of client was intended to control for the influence of client types on the prices they were charged.

Before providing an explanation of the results, it is important to explain the convention that was followed in order to distinguish between domestic and cross-border transactions. The

[43] This measure includes the costs of central counterparty clearing services only, and does not include the costs of other services, such as fail management services.

[44] Appendix 5 describes in detail the approach used to estimate aggregated CCP costs. The mix of services provided by different CCPs might vary somewhat, although Oxera has sought to ensure data consistency between the infrastructures.

[45] Appendix 5 describes in detail the approach used to estimate aggregated CSD costs. The mix of services provided by different CSDs might vary somewhat, although Oxera has sought to ensure data consistency between the infrastructures.

study identified the following types of custodian: local; multi-market; global; multi-market/local; global/local; and global/multi-market/local—see Table 7.10.

Table 7.10 Types of custodian included in the survey

Type of custodian	Local	Multi-market	Global
i) Local	✓	x	x
ii) Multi-market	x	✓	x
iii) Global	x	x	✓
iv) Multi-market, local	✓	✓	x
v) Global, local	✓	x	✓
vi) Global, multi-market, local	✓	✓	✓

Source: Custodian questionnaire, and Oxera analysis.

In the case of i) local custodians domiciled in a single financial centre, if the domicile of the firm was the same as the domicile of the security, the transaction was classified as domestic; if different, it was classified as cross-border.

In the case of ii) multi-market custodians, if for a transaction the domicile of the security was the same as any one of the domiciles of the custodian, the transaction was assumed to be domestic; otherwise it was cross-border. The reason for this assumption is that a multi-market custodian typically establishes its presence in each one of the markets where it is domiciled, by obtaining direct membership to its CSDs.

In contrast, all the transactions associated with iii) a 'global' custodian were assumed to be cross-border except for those where the global custodian is headquartered. This is because global custodians typically use local custodians to access markets rather than establish a presence by obtaining direct membership to each market's CSD.

For iv) multi-market/local, v) global/local and vi) global/multi-market/local custodians, only those transactions where the domicile of the security is the same as any one of the domiciles that the custodian identified as local were considered as domestic; otherwise they were considered cross-border.

Table 7.11 compares (in indices) the average cost of cross-border transactions with that of domestic transactions for each type of client. The difference in the case of settlement services is greatest for clients that are custodians (cross-border costs are around 2.5 times the domestic costs for custodian clients), and in the case of safekeeping services for clients that are institutional investors, for which cross-border costs are 1.9 times the domestic costs.

Table 7.11 Comparison between prices of cross-border and domestic transactions (custodian services) (indices)

	Settlement fees (base data is € per transaction)		Safekeeping fees (base data is bp of assets held)	
Type of client	**Domestic**	**Cross-border**	**Domestic**	**Cross-border**
Custodian	100	254	100	149
Institutional investor/ fund manager	100	177	100	192
Broker	100	199	100	94

Note: A series of two-sample t-tests for both types of fees was carried out to determine whether the differences in mean were statistically significant. They were all found to be significant at the 5% confidence interval with one exception: the difference between the safekeeping fees for cross-border and domestic transactions for clients that were brokers.
Source: Custodian questionnaire, and Oxera analysis.

A similar analysis was undertaken by comparing the average fees paid by custodians, brokers and institutional investors of different sizes. It resulted in a similar pattern of cross-border transactions being more expensive than domestic transactions. In the case of some types and size of firms, the sample became relatively small, making the results less reliable. The findings are therefore not presented in this report.[46]

7.3.2 Data provided by fund managers

The level of detail provided by fund management firms provides further insight into the relative costs of cross-border activities.

Tables 7.12 and 7.13 show that there is significant variation in the clearing and settlement, and custody and safekeeping costs that fund managers pay for transactions carried out for securities of different domiciles. This is most pronounced for custody and safekeeping services, where the cost of cross-border securities is around 7 times the domestic fee. For clearing and settlement services, the cost for cross-border securities is between 2.5 and three times the costs for domestic securities.

Table 7.12 Comparison between costs of cross-border and domestic clearing and settlement services (all securities, indices)

	Domicile of security	
Service provider	**Domestic**	**Cross-border**
Custodian	100	279
CSD	100	257

Source: Fund management firm questionnaire, and Oxera analysis.

[46] Furthermore, an econometric analysis was undertaken by regressing custodian prices against the size and type of client, the domicile of security and a dummy variable indicating whether the transaction was domestic or cross-border. This econometric analysis reinforced the hypothesis that the costs of cross-border transactions are higher than those of domestic transactions. This is because the coefficient for the dummy of cross-border transactions had a positive sign that was significant at 5%.

Table 7.13 Comparison between costs of cross-border and domestic custody and safekeeping services (all securities, indices)

	Domicile of security	
Service provider	**Domestic**	**Cross-border**
Custodian	100	682
CSD	n/a	n/a

Source: Fund management firm questionnaire, and Oxera analysis.

7.3.3 Data provided by brokers

Tables 7.14–7.16 present the average post-trading costs for institutional brokerage firms according to the domicile of the security.

Similar to what is observed from analysing the data reported by fund management firms, costs for securities domiciled domestically are generally lower than for securities domiciled across the border. However, since most brokers have multiple domiciles; whereas fund managers are typically domiciled in just one financial centre, the scope of securities that can be accessed at domestic rates is much wider for brokers than for fund managers.

Table 7.14 Comparison between costs of cross-border and domestic CCP clearing services (equities, indices)

	Domicile of security	
Service provider	**Domestic**	**Cross-border**
Agent	100	217
CCP	100	163

Source: Institutional brokerage firm questionnaire, and Oxera analysis.

Table 7.15 Comparison between costs of cross-border and domestic clearing and settlement services (equities, indices)

	Domicile of security	
Service provider	**Domestic**	**Cross-border**
Custodian	100	103
CSD	100	264

Source: Institutional brokerage firm questionnaire, and Oxera analysis.

Table 7.16 Comparison between costs of cross-border and domestic custody and safekeeping services (equities, indices)

	Domicile of security	
Service provider	**Domestic**	**Cross-border**
Custodian	100	229
CSD	100	145

Source: Institutional brokerage firm questionnaire, and Oxera analysis.

7.3.4 Data provided by CCPs

Most CCPs provided data on the costs for domestic securities only. Owing to the NDA restrictions, the relative cost for domestic and cross-border securities could therefore not be analysed separately. However, where data was provided, the costs of central counterparty clearing services for domestic and cross-border were found to be very similar (for example,

in 2006, cross-border costs are about 97% of domestic costs); and this relationship has remained stable over the 2006–08 period (with a one percentage point reduction in the ratio of cross-border to domestic costs).

7.3.5 Data provided by CSDs

The costs of domestic and cross-border services provided by CSDs are compared in Table 7.17. The table shows that, for equities, account provision and asset servicing, and clearing and settlement for cross-border securities is considerably more costly than for domestic securities. At the same time, for fixed income securities, the pattern is more mixed, whereby this relationship holds for account provision and servicing, while for clearing and settlement the costs for domestic securities are somewhat higher than for cross-border securities.

Table 7.17 Comparison between costs of cross-border and domestic CSD services

	Equities		Fixed income securities	
Post-trading service	**Domestic**	**Cross-border**	**Domestic**	**Cross-border**
Account provision and asset servicing				
2006 (bp)	0.16	0.38	0.20	0.29
2008 (bp)	0.15	0.36	0.18	0.39
Clearing and settlement				
2006 (€/transaction)	0.35	2.33	0.60	0.38
2008 (€/transaction)	0.25	2.88	0.62	0.42

Source: CSD questionnaire, and Oxera analysis.

7.4 Concluding remarks

This section has presented data on the costs of post-trading services. It shows that there is considerable variation in the costs of post-trading, not only across domiciles of securities but also across type and size of user. There is also evidence of the costs of cross-border transactions generally being higher than those of domestic transactions, measured from the perspectives of both users (fund management and brokerage firms) and custodians. Where time-series data is available (ie, for infrastructures), with some exceptions, the costs have decrease. The indicators presented in this section, along with additional indicators, could be monitored over time in further studies.

A1 Methodological aspects

A1.1 Conceptual definition and a practical approach

The Commission has requested an analysis of domestic and cross-border transactions. Conceptually, a domestic transaction can be defined as one where the end-investor and the company (of which the investor wants to buy or sell a share) are domiciled in the same financial centre. Following the same logic, a cross-border transaction can be defined as a transaction where the domiciles of the investor and company are different. Such a transaction can, in principle, be completed in one of the following ways.

– **The company crosses the border**. The company deposits its securities in a CSD in the financial centre where the investor is domiciled. The CSD would either need to have a link with the trading platform where the company is listed, or the company would need to list its shares on the trading platform where the CSD is domiciled. From the perspective of the investor and the trading and post-trading services, the transaction then becomes similar to a domestic transaction. The way of crossing the border may involve dual listing—eg, a primary listing in the financial centre where the company is registered and a secondary listing in the financial centre where the CSD is domiciled.

– **The investor crosses the border**. The investor hires a fund management firm domiciled in the financial centre where the company is registered. From the fund management firm's perspective, the transaction is then similar to any other domestic transaction.

– **An intermediary rather than the company or the investor crosses the border**. For example, the investor hires a local fund management firm (ie, in the financial centre where the investor is domiciled), which uses a brokerage firm in the financial centre where the company is registered. Alternatively, the local fund management firm uses a global brokerage firm that has access to the exchange in the financial centre where the company is registered and listed. Similarly, for post-trading services, a global or multi-market custodian can be used.

This study focuses on the third method of crossing the border. It analyses the relationships between fund management firms, brokerage firms, custodians, CCPs, trading platforms and CSDs. Rather than focusing on the domicile of the investor and the domicile of the company, it looks at the domicile of the fund management firm and the domicile of the security (ie, the financial centre where the security is held).

The first two ways of crossing the border are not used to measure the costs of cross-border transactions, not only because it would have been an impossible task for survey participants to track the domicile of companies and investors, but also because it does not fit with the purpose of the study. If an investor hires an overseas fund management firm, the trading and post-trading services are not used to cross the border, and therefore any additional costs due to the cross-border nature of the transaction would not be captured in the analysis. Similarly, if a company obtains a listing on a foreign trading platform, the trading and post-trading services are not used to cross the border. Put differently, transactions in the shares of this company become domestic transactions from a trading and post-trading services perspective.

Therefore, for the purposes of this report, a cross-border transaction is defined as one where the domicile of the fund management firm is different from that of the security. Fund management firms may have offices in more than one financial centre; in this study, the

domicile of a fund management firm is defined as the financial centre where the funds are managed and trading decisions made.

A1.2 Discrepancies between conceptual definition and actual measurement of cross-border transactions

The domicile of a security is determined by the domicile of the (I)CSD where the security is ultimately domiciled (ie, initially issued). In practice, survey respondents were advised to use proxies for this. For equities, the preferred proxy of the domicile of securities was the financial centre of the primary market in which the equities are listed. For fixed income securities, the preferred proxy of the domicile of securities was the financial centre code in the ISIN of the security.

These proxies for the domicile of the security may result in discrepancies between the conceptual definition of cross-border transactions and how they are measured in practice.

– First, in the case of equities, the proxy means that if a company has a dual listing, the transactions undertaken by a fund management firm in the financial centre where the company has its secondary listing will be considered cross-border, while, according to the conceptual definition, these should actually be counted as domestic transactions. In other words, in theory, the study may overestimate the number of cross-border transactions and therefore potentially underestimate the associated costs.

– Second, if, between the first and second survey, a company decides to dual-list its securities, the transactions undertaken by a fund management firm in the financial centre where the company obtains a secondary listing will continue to be counted as a cross-border transaction, while, according to the conceptual definition, they become domestic transactions. In theory, this could result in an overestimate of changes in the costs of trading and post-trading services for cross-border transactions.

– Third, if a company has a primary listing in financial centre A and a secondary listing in financial centre B, and a fund management firm in financial centre C buys or sells shares of this company in financial centre B, the transaction will be measured as a cross-border transaction with financial centre A, whereas it is actually a cross-border transaction with financial centre B.

The first and third effects are unlikely to have a significant impact on the estimates of the costs of cross-border transactions since there are currently few companies with dual listings.[47] The second effect may become more significant over time. Any increase in dual listing therefore needs to be monitored to understand the extent to which this could affect changes in the costs of cross-border transactions. Such monitoring can take place outside the formal questionnaires, as cross-listing information is generally available in the public domain.

[47] In 2007, the 51 major world stock exchanges had 46,509 companies listed, of which 3,267 were overseas (cross-border) listings (ie, 7%). Source: World Federation of Exchanges (2008), 'Annual Report and Statistics 2007', p. 76.

A2 Customer profile approach for custodians

Prices charged by custodians for clearing and settlement and custody and safekeeping vary to some extent, depending on the type of customer (eg, investors and fund management firms typically require a broader range of services than brokerage firms or global custodians); the size of the client or contract (due to economies of scale); and the financial centre covered (with some being more expensive than others). Thus changes over time in the prices for clearing and settlement and custody and safekeeping may be driven by changes in the portfolio and profile of custodians' customers.

To monitor changes in prices over time, therefore, the characteristics of custodians' customers need to be controlled for. This can be done by analysing price, revenue, and volume data broken down by relevant characteristics of custodians' customers.

As explained in section 3, it was agreed with the Commission and the industry to simplify the questionnaires for custodians. The request for breakdowns of actual data by characteristics of customer was replaced by a request for price data for predefined customer profiles and aggregate data on revenues. The customer profiles predefine typical customers. By comparing the prices for individual customer profiles over time, the characteristics of the customers are kept constant and any changes will then be the result of factors other than these customers' characteristics. The aggregate data on revenues was requested to allow for a cross-check of prices for the customer profiles.

Such an approach can work only if a number of conditions are met:

– the customer profiles need to capture a sufficient proportion of custodians' customers;

– the customer profiles need to capture the main characteristics of custodians' clients that affect the prices for clearing and settlement, and for custody and safekeeping;

– although new profiles can in principle be incorporated, significant changes to the profile of customers would distort the analysis. Therefore, customer profiles need to be relatively stable over the time covered by the analysis;

– prices need to reflect actual market prices. If profiles do not provide sufficient detail or become out of date, there may be a risk that prices do not sufficiently reflect the actual prices in the market.

The following sub-sections describe how the customer profile approach was implemented and assess the extent to which it can be used for this study.

A2.1 Implementation of the customer profile analysis

The prices charged by custodians for clearing and settlement and custody and safekeeping were measured using a customer profile approach. Custodians were asked to indicate the prices they would charge for a number of predefined customer profiles. This customer profile model was developed following discussions between Oxera, the Commission and industry representatives, in which the industry representatives indicated that this was their preferred method for providing information on the volumes, revenues and characteristics of custodian services provided to clients. The customer profiles themselves were also developed through discussions between Oxera and industry representatives, and include profiles of institutional clients that the industry representatives indicated were descriptive of clients purchasing custodian services.

Custodians were asked to indicate the proportion of their clients best represented by each of the 39 customer profiles. It was recognised that few clients would perfectly match individual customer profiles.

The customer profiles required custodians to identify their clients based on three dimensions: type of client, size of client and range of markets.

- **Type of client**: custodians, institutional investors (ie, both funds and fund managers) and broker/dealers:
  - custodians: providing custody services (and other additional services) as a third party to institutional clients such as funds, fund management firms, brokerage firms, and other custodians;
  - institutional investors: institutional funds and institutional fund management firms;
  - broker/dealers: institutional brokerage firms—ie, intermediaries (usually but not exclusively investment banks) that execute trade orders on behalf of investors or fund managers. An institutional brokerage firm may also execute trades on its own account.
- **Size of client**: the definition of small, medium or large varies by type of user and is expressed in terms of both the assets under custody (in relevant European securities) and the number of transactions per month.
- **Range of markets**: based on the proportion of both assets under custody and transactions per month for securities domiciled in the domestic market, (other) major European financial centres and other European financial centres:
  - major European financial centres—for the purposes of this question, these include Belgium, France, Germany, Italy, the Netherlands, Spain, Switzerland, the UK, and international;
  - other European financial centres—for the purposes of this question, these include Austria, the Czech Republic, Denmark, Greece, Ireland, Luxembourg, Norway, Poland, Portugal, Sweden.

The customer profiles were set out in the questionnaire for custodians. For example, customer profile 3 is a large custodian purchasing pan-European services with around €10,000m of assets under custody and around 5,000 transactions per month, with around 80% in major European financial centres, and around 20% in other European financial centres. The figures for the size of clients (by both assets under management and number of transactions per month) and the range of markets covered are based on indications provided by industry representatives of the appropriate size and range of markets for different types of client. These figures are indicative, and do not have to correspond to the actual size of clients and range of markets covered.

A2.2 Assessment of customer profile approach

Following discussions with industry representatives, it was expected that at least 75% of custodian clients would be reasonably represented by the 39 predefined customer profiles.

For around 82% of the custodians, the profiles covered at least 75% of their clients, while around 8% indicated that more than 25% of their customers could not be classified under any of the predefined customer profiles. Examples of customers that, according to these survey participants, were not sufficiently covered include local authorities, smaller companies or institutional funds, and (retail) banks. It should be noted that local authorities and companies

are not directly covered by this study. (They are only indirectly covered as clients of fund management or brokerage firms.)

Around 62% of custodians provided aggregated data of revenues and volumes, broken down by type of service. This allows for cross-checking of the data on prices for individual customer profiles by aggregating them across the customer profiles and comparing them with the changes over time in aggregated revenues and average price per service. This analysis could be undertaken in further studies.

As explained above, the customer profiles were designed on the assumption that the price for clearing and settlement, and custody and safekeeping, varies according to three distinct dimensions: size of client (small, medium or large); type of client (investor, broker or custodian); and range of markets (pan-European, major, other, or local markets). Examination of the data provided by custodians confirms that, in general, prices vary depending on size, type of markets covered and type of customer (see section 6). No evidence was provided of any other customer characteristics that affect pricing. It can therefore be concluded that these three aspects are relevant for the customer profiles.

Finally, custodians also provided data on the services they purchased from CSDs and (local) custodians. This shows that they pay widely varying fees per transaction to CSDs (local) custodians. A check on this part of the transaction process has also revealed inconsistency between what custodians have reported that they pay for services and what they themselves charge other custodians as customers (provided in the customer profiles). This inconsistency may be due to the fact that there is not necessarily a one-to-one relationship between a transaction into a custodian and one out to a CSD or another custodian.

A3 Cost of fund management services

Although, strictly speaking, the cost of fund management services is not a trading or post-trading cost, it is still sufficiently relevant to be monitored over time. First, for some funds, fund managers purchase custodian services and recover their costs through the management fee. Second, depending on what trading and post-trading services fund managers use, their internal costs (reflected in the management fees) may change. For example, if a fund manager decided to use trading platforms directly rather than using brokers, it is likely to incur some internal costs in setting up and maintaining the connections with the trading platforms. Monitoring the fund management fees may give an indication of any additional cost incurred over time.

The following sections assess the factors that affect the cost and pricing of fund management services based on data from the survey and other sources. Data on fund management fees and, therefore, the exact level of management fees, is not reported here, but would be measured over time in absolute terms or index form.

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**. 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. In the survey, information about fees for passive funds only was requested.

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

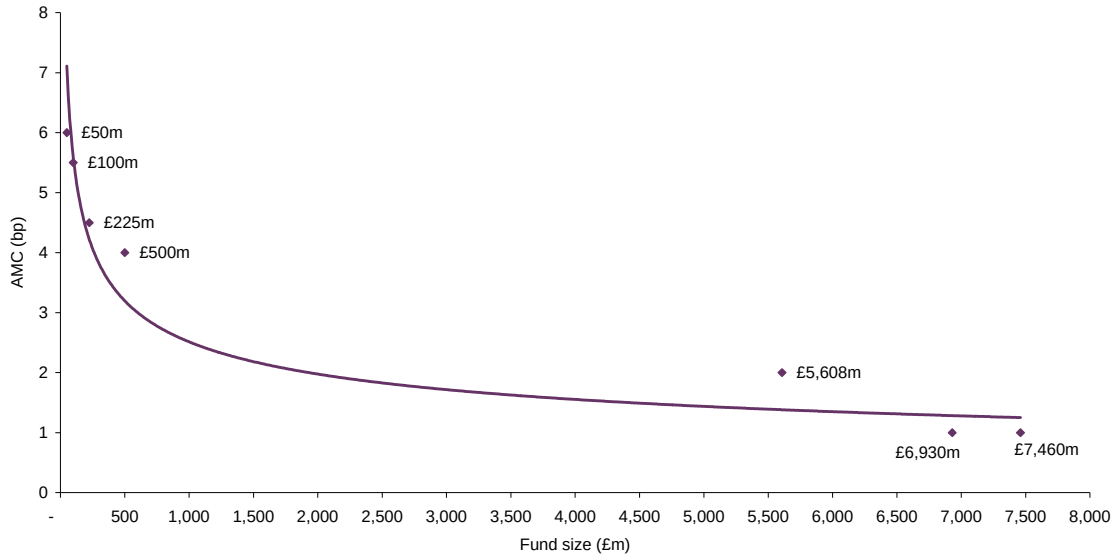
  Figure A3.1 shows passive fund management fees relative to the size of fund under management. The management fees are based on data provided by a representative sample of UK fund management firms, and reflect typical fund management fees charged to UK pension funds averaged across the sample of fund management firms. The figure includes a number of large pension funds in the USA. It indicates that there

[48] 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.

are significant economies of scale, particularly for funds up to £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.

The data from the survey shows a similar, although weaker, relationship between size and management fee. In a significant number of cases, the survey respondents reported the same fund management fee for different sizes of fund.

Figure A3.1 Relationship between fund size (£m) 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. The questionnaire requested data on fees for both fixed income and equity funds, and indeed confirms that fees for fixed income funds are lower than 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 (eg, equities listed on the Nikkei). The survey asked for data on fees for domestic and European funds. Although some fund managers reported higher fees for European funds than for domestic funds, a significant number of fund managers reported the same fees for domestic and European funds.

A4 Data analysis of trends over time: methodology

This appendix explains Oxera's methodology for calculating the changes over time for trading platforms, CCPs, and (I)CSDs. The first column of each table describes what is stated in the results tables, and the remainder of the table explains how this number is calculated.

Not all calculations have been set out in the tables below, as many tables are variants of each other. Where separate tables have been available for equities and fixed income securities, these are presented in preference to tables for total securities.

It is important to note that it is the change in costs that has been calculated; therefore, this includes, for example, discounts, which may mean that the effective cost differs from the fee charged on the price list.

A4.1 Trading platform calculations

This section contains the calculations for the tables produced for each trading platform in each financial centre. The tables are grouped into the following:

– distribution of activity;
– cost of services;
– changes in relative costs of cross-border transactions.

Table A4.1 describes the calculations for the change in distribution of activity. In each case the change of the non-domestic to total ratio is calculated.[49] For example, if there were ten members in 2006 in total, of which three were non-domestic; and in 2008 there were 20 members in total, of which 12 were non-domestic, the result presented would be as follows:

– in 2006, non-domestic members comprised 30% (3/10) of total membership;
– in 2008, non-domestic members comprised 60% (12/20) of total membership.

Therefore the percentage increase over time would be 100% (= (60% – 30%)/30%). This is different to stating that there was a 30 percentage point increase.

The calculations for value of transactions are computed in a similar way using the value of transactions instead of the number of members.

[49] This is different to the percentage increase of non-domestic members.

Table A4.1 Distribution of activity

Result displayed in table (calculation of change over time)	Calculation of ratio	Inputs
Percentage change in the proportion of **non-domestic members** = $(r_{08} - r_{06}) / r_{06}$	Proportion of non-domestic members in 2006 $r_{06} = (m_{n-d} / m_t)$	Number of non-domestic members in 2006 (m_{n-d})
		Total number of members in 2006 (m_t)
	Proportion of non-domestic members in 2008 $r_{08} = (m_{n-d} / m_t)$	Number of non-domestic members in 2008 (m_{n-d})
		Total number of members in 2008 (m_t)
Percentage change in the proportion of equity trading by **non-domestic members** = $(r_{08} - r_{06}) / r_{06}$	Proportion of equity trading by non-domestic members in 2006 $r_{06} = (m_{n-d}^{Eq} / m_t^{Eq})$	Value of equity trading by non-domestic members in 2006 $\left(m_{n-d}^{Eq}\right)$
		Total value of equity trading in 2006 $\left(m_t^{Eq}\right)$
	Proportion of equity trading by non-domestic members in 2008 $r_{08} = (m_{n-d}^{Eq} / m_t^{Eq})$	Value of equity trading by non-domestic members in 2008 $\left(m_{n-d}^{Eq}\right)$
		Total value of equity trading in 2008 $\left(m_t^{Eq}\right)$
Percentage change in the proportion of **non-domestic equity trading** $x = (r_{08} - r_{06}) / r_{06}$	Proportion of non-domestic equity trading in 2006 $r_{06} = Eq_{n-d} / Eq_t$	Value of non-domestic equity trading in 2006 $\left(Eq_{n-d}\right)$
		Total value of equity trading in 2006 $\left(Eq_t\right)$
	Proportion of non-domestic equity trading in 2008 $r_{08} = Eq_{n-d} / Eq_t$	Value of non-domestic equity trading in 2008 $\left(Eq_{n-d}\right)$
		Total value of equity trading in 2008 $\left(Eq_t\right)$

Note: The calculations can be replicated for total securities (ie, equities and fixed income securities), or fixed income securities, by replacing equities as appropriate.
Source: Oxera.

Table A4.2 Cost of trading services

Result displayed in table (calculation of change over time)	Calculation of ratio	Inputs
Percentage change in cost of **on-book equity trading** (bp) $= (p_{08} - p_{06}) / p_{06}$	Cost in bp of on-book equity trading in 2006 $p_{06} = 10{,}000 * \left(\pi^{Eq}_{on-book}\right) / \left(Eq^{value}_{on-book}\right)$	Revenue from on-book equity trading in 2006 $\left(\pi^{Eq}_{on-book}\right)$
		Value of transactions in relation to on-book equity trading in 2006 $\left(Eq^{value}_{on-book}\right)$
	Cost in bp of on-book equity trading in 2008 $p_{08} = 10{,}000 * \left(\pi^{Eq}_{on-book}\right) / \left(Eq^{value}_{on-book}\right)$	Revenue from on-book equity trading in 2008 $\left(\pi^{Eq}_{on-book}\right)$
		Value of transactions in relation to on-book equity trading in 2008 $\left(Eq^{value}_{on-book}\right)$
Percentage change in cost of **on-book equity trading** (cost per transaction) $= (p_{08} - p_{06}) / p_{06}$	Cost per transaction of on-book equity trading in 2006 $p_{06} = \left(\pi^{Eq}_{on-book}\right) / \left(Eq^{number}_{on-book}\right)$	Revenue from on-book equity trading in 2006 $\left(\pi^{Eq}_{on-book}\right)$
		Number of transactions in relation to on-book equity trading in 2006 $\left(Eq^{number}_{on-book}\right)$
	Cost per transaction of on-book equity trading in 2008 $p_{08} = \left(\pi^{Eq}_{on-book}\right) / \left(Eq^{number}_{on-book}\right)$	Revenue from on-book equity trading in 2008 $\left(\pi^{Eq}_{on-book}\right)$
		Number of transactions in relation to on-book equity trading in 2008 $\left(Eq^{number}_{on-book}\right)$

Note: Where equity is mentioned, this can be replaced by fixed income, for similar calculations, or by total securities. The calculations can be replicated for other services such as on-book order management, off-book trading and trade data services.
Source: Oxera.

Table A4.3 Change in relative cost of cross-border transactions

Percentage change in the ratio of **cross-border to domestic costs** (basis points)	Ratio of cross-border: domestic fees in 2006 $= \frac{p_{n-d}}{p_d}$	Cost of trading in cross-border securities in 2006 $p_{n-d} = 10{,}000 * (\pi_{n-d}) / (EQ + FI)^{value}_{n-d}$	Revenue from trading in cross-border securities in 2006 (π_{n-d})
			Value of trading in cross-border securities in 2006 $(EQ + FI)^{value}_{n-d}$
		Cost of trading in domestic securities in 2006 $p_d = 10{,}000 * (\pi_d) / (EQ + FI)^{value}_{d}$	Revenue from trading in domestic securities in 2006 (π_d)
			Value of trading in domestic securities in 2006 $(EQ + FI)^{value}_{d}$
	Ratio of cross-border: domestic fees in 2008 $= \frac{p_{n-d}}{p_d}$	Cost of trading in cross-border securities in 2008 $p_{n-d} = 10{,}000 * (\pi_{n-d}) / (EQ + FI)^{value}_{n-d}$	Revenue from trading in cross-border securities in 2008 (π_{n-d})
			Value of trading in cross-border securities in 2008 $(EQ + FI)^{value}_{n-d}$
		Cost of trading in domestic securities in 2008 $p_d = 10{,}000 * (\pi_d) / (EQ + FI)^{value}_{d}$	Revenue from trading in domestic securities in 2008 (π_d)
			Value of trading in domestic securities in 2008 $(EQ + FI)^{value}_{d}$

Source: Oxera.

A4.2 CCP calculations

This section contains the calculations for the tables produced for each CCP in each financial centre. The tables are grouped into the following sections:

– distribution of activity;
– cost of services;
– changes in relative costs of cross-border transactions.

The table below describes the calculations for the change in distribution of activity. In each case the change of the non-domestic to total ratio is calculated.[50] For example, if there were ten members in 2006 in total, of which three were non-domestic; and in 2008 there were 20 members in total, of which 12 were non-domestic, the result presented would be as follows:

– in 2006, non-domestic members comprised 30% (3/10) of total membership;
– In 2008, non-domestic members comprised 60% (12/20) of total membership.

Therefore the percentage increase over time would be 100% (= (60% – 30%) / 30%). This is different to stating that there was a 30 percentage point increase.

The calculations for the number of transactions are computed in a similar way using the number of transactions instead of number of members.

[50] This is different to the percentage increase of non-domestic members.

Table A4.4 Distribution of activity

Result displayed in table (calculation of change over time)	Calculation of ratio	Inputs
Percentage change in the proportion of **non-domestic members** = $(r_{08} - r_{06}) / r_{06}$	Proportion of non-domestic members in 2006 $r_{06} = (m_{n\text{-}d} / m_t)$	Number of non-domestic members in 2006 ($m_{n\text{-}d}$)
		Total number of members in 2006 (m_t)
	Proportion of non-domestic members in 2008 $r_{08} = (m_{n\text{-}d} / m_t)$	Number of non-domestic members in 2008 ($m_{n\text{-}d}$)
		Total number of members in 2008 (m_t)
Percentage change in the proportion of equities transactions executed by **non-domestic members** = $(r_{08} - r_{06}) / r_{06}$	Proportion of equities transactions executed by non-domestic members in 2006 $r_{06} = \left(\left(m_{n-d}^{Eq+FI}\right) / \left(m_t^{Eq+FI}\right)\right)$	Number of equities transactions cleared by non-domestic members in 2006 $\left(m_{n-d}^{Eq+FI}\right)$
		Total number of equities transactions cleared in 2006 $\left(m_t^{Eq+FI}\right)$
	Proportion of equities transactions executed by non-domestic members in 2008 $r_{08} = \left(\left(m_{n-d}^{Eq+FI}\right) / \left(m_t^{Eq+FI}\right)\right)$	Number of equities transactions cleared by non-domestic members in 2008 $\left(m_{n-d}^{Eq+FI}\right)$
		Total number of equities transactions cleared in 2008 $\left(m_t^{Eq+FI}\right)$
Percentage change in the proportion of **non-domestic equities transactions executed** = $(r_{08} - r_{06}) / r_{06}$	Proportion of non-domestic equities held in 2006 $r_{06} = \left(Eq_{n-d}^{number}\right) / \left(Eq_t^{number}\right)$	Number of non-domestic equities transactions executed in 2006 $\left(Eq_{n-d}^{number}\right)$
		Total number of equities transactions cleared in 2006 $\left(Eq_t^{number}\right)$
	Proportion of non-domestic equities held in 2008 $r_{08} = \left(Eq_{n-d}^{number}\right) / \left(Eq_t^{number}\right)$	Number of non-domestic equities transactions cleared in 2008 $\left(Eq_{n-d}^{number}\right)$
		Total number of equities transactions cleared in 2008 $\left(Eq_t^{number}\right)$

Source: Oxera.

Table A4.5 Cost of CCP services

Result displayed in table (calculation of change over time)	Calculation of ratio	Inputs
Percentage change in cost of **central counterparty clearing** for equities (cost per transaction) = $(p_{08} - p_{06}) / p_{06}$	Cost per transaction for central counterparty clearing for equities in 2006 $p_{06} = \left(\pi^{Eq}_{CCPC}\right) / \left(n^{Eq}_{CCPC}\right)$	Revenue from central counterparty clearing of equities in 2006 $\left(\pi^{Eq}_{CCPC}\right)$
		Number of central counterparty clearing transactions for equities in 2006 $\left(n^{Eq}_{CCPC}\right)$
	Cost per transaction for central counterparty clearing for equities in 2008 $p_{08} = \left(\pi^{Eq}_{CCPC}\right) / \left(n^{Eq}_{CCPC}\right)$	Revenue from central counterparty clearing of equities in 2008 $\left(\pi^{Eq}_{CCPC}\right)$
		Number of central counterparty clearing transactions for equities in 2008 $\left(n^{Eq}_{CCPC}\right)$

Source: Oxera.

CCPs also provide the following services:

– risk management;
– settlement instruction;
– fail management.

For the above services, the calculations use the revenue from the specific service; however, the **central counterparty clearing** number of transactions is used to calculate the per-transaction cost for each of the different services.

Table A4.6 Change in relative cost of cross-border transactions

Percentage change in the ratio of **cross-border to domestic costs** (cost per transaction)	Ratio of cross-border: domestic costs in 2006 $= \frac{p_{n-d}}{p_d}$	Cost of clearing cross-border securities in 2006 $p_{n-d} = \left(\pi_{n-d}^{Eq+FI}\right)/\left(n_{n-d}^{Eq+FI}\right)$	Revenue from central counterparty clearing of cross-border securities in 2006 $\left(\pi_{n-d}^{Eq+FI}\right)$
			Number of cleared transactions for cross-border securities in 2006 $\left(n_{n-d}^{Eq+FI}\right)$
		Cost of clearing domestic securities in 2006 $p_{n-d} = \left(\pi_{n-d}^{Eq+FI}\right)/\left(n_{n-d}^{Eq+FI}\right)$	Revenue from central counterparty clearing of domestic securities in 2006 $\left(\pi_{n-d}^{Eq+FI}\right)$
			Number of cleared transactions in domestic securities in 2006 $\left(n_{n-d}^{Eq+FI}\right)$
	Ratio of cross-border: domestic costs in 2008 $= \frac{p_{n-d}}{p_d}$	Cost of clearing cross-border securities in 2008 $p_{n-d} = \left(\pi_{n-d}^{Eq+FI}\right)/\left(n_{n-d}^{Eq+FI}\right)$	Revenue from central counterparty clearing of cross-border securities in 2008 $\left(\pi_{n-d}^{Eq+FI}\right)$
			Number of cleared transactions for cross-border securities in 2008 $\left(n_{n-d}^{Eq+FI}\right)$
		Cost of clearing domestic securities in 2008 $p_{n-d} = \left(\pi_{n-d}^{Eq+FI}\right)/\left(n_{n-d}^{Eq+FI}\right)$	Revenue from central counterparty clearing of domestic securities in 2008 $\left(\pi_{n-d}^{Eq+FI}\right)$
			Number of cleared transactions for domestic securities in 2008 $\left(n_{n-d}^{Eq+FI}\right)$

Source: Oxera.

The cross-border to domestic cost ratio can also be calculated for the following services provided by CCPs:

– risk management;
– settlement instruction;
– fail management.

As with the calculation of the cost per transaction, the number of central counterparty clearing transactions is used.

A4.3 (I)CSD calculations

This section contains the calculations for the tables produced for each (I)CSD in each financial centre. The tables are grouped into the following sections:

– distribution of activity;
– cost of services;
– changes in relative costs of cross-border transactions.

The table below describes the calculations for the change in distribution of activity. In each case the change of the non-domestic to total ratio is calculated.[51] For example, if there were ten members in 2006 in total, of which three members were non-domestic; and in 2008 there were 20 members in total, of which 12 were non-domestic, the result presented would be as follows:

– in 2006, non-domestic members comprised 30% (3/10) of total membership;

[51] This is different to the percentage increase of non-domestic members.

– in 2008, non-domestic members comprised 60% (12/20) of total membership.

Therefore, the percentage increase over time would be 100% (= (60% – 30%) / 30%). This is different to stating that there was a 30 percentage point increase.

The calculations for value of securities are computed in a similar way using value of securities held instead of number of members.

Table A4.7 Distribution of activity

Result displayed in table (calculation of change over time)	Calculation of ratio	Inputs
Percentage change in the proportion of **non-domestic members** $= (r_{08} - r_{06}) / r_{06}$	Proportion of non-domestic members in 2006 $r_{06} = (m_{n\text{-}d} / m_t)$	Number of non-domestic members in 2006 ($m_{n\text{-}d}$)
		Total number of members in 2006 (m_{total})
	Proportion of non-domestic members in 2008 $r_{08} = (m_{n\text{-}d} / m_t)$	Number of non-domestic members in 2008 ($m_{n\text{-}d}$)
		Total number of members in 2008 (m_{total})
Percentage change in the proportion of **securities held by non-domestic members** $= (r_{08} - r_{06}) / r_{06}$	Proportion of non-domestic securities held by members in 2006 $r_{06} = (\left(m_{n-d}^{Eq+FI}\right) / \left(m_t^{Eq+FI}\right))$	Value of securities held by non-domestic members in 2006 $\left(m_{n-d}^{Eq+FI}\right)$
		Total value of securities held in 2006 $\left(m_t^{Eq+FI}\right)$
	Proportion of non-domestic securities held by members in 2008 $r_{08} = (\left(m_{n-d}^{Eq+FI}\right) / \left(m_t^{Eq+FI}\right))$	Value of securities held by non-domestic members in 2008 $\left(m_{n-d}^{Eq+FI}\right)$
		Total value of securities held in 2008 $\left(m_t^{Eq+FI}\right)$
Percentage change in the proportion of **non-domestic equities held** $= (r_{08} - r_{06}) / r_{06}$	Proportion of non-domestic equities held in 2006 $r_{06} = \left(Eq_{n-d}\right) / \left(Eq_t\right)$	Value of non-domestic equities held in 2006 $\left(Eq_{n-d}\right)$
		Total value of equities held in 2006 $\left(Eq_t\right)$
	Proportion of non-domestic equities held in 2008 $r_{08} = \left(Eq_{n-d}\right) / \left(Eq_t\right)$	Value of non-domestic equities held in 2008 $\left(Eq_{n-d}\right)$
		Total value of equities held in 2008 $\left(Eq_t\right)$

Source: Oxera.

Table A4.8 Cost of post-trading services: account provision and asset servicing and clearing and settlement

Result displayed in table (calculation of change over time)	Calculation of ratio	Inputs
Percentage change in cost of **account provision and asset servicing** (bp) $= (p_{08} - p_{06}) / p_{06}$	Cost in bp for account provision and asset servicing for equities in 2006 $p_{06} = (10{,}000 * \left(\pi_{AP}^{Eq}\right) / v_{06})$	Revenue from account provision and asset servicing for equities in 2006 $\left(\pi_{AP}^{Eq}\right)$
		Value of securities held in relation account provision and asset servicing for equities in 2006 (v_{06})
	Cost in bp for account provision and asset servicing for equities in 2008 $p_{08} = (10{,}000 * \left(\pi_{AP}^{Eq}\right) / v_{08})$	Revenue from account provision and asset servicing for equities in 2008 $\left(\pi_{AP}^{Eq}\right)$
		Value of securities held in relation to account provision and asset servicing for equities in 2008 (v_{08})
Percentage change in cost of **clearing and settlement** for equities (cost per transaction) $= (p_{08} - p_{06}) / p_{06}$	Cost per transaction for clearing and settlement for equities in 2006 $p_{08} = \left(\pi_{CS}^{Eq}\right) / n_{06}$	Revenue from clearing and settlement of equities in 2006 $\left(\pi_{CS}^{Eq}\right)$
		Number of clearing and settlement transactions for equities in 2006 (n_{06})
	Cost per transaction for clearing and settlement for equities in 2008 $p_{06} = \left(\pi_{AP}^{Eq}\right) / n_{08}$	Revenue from clearing and settlement of equities in 2008 $\left(\pi_{CS}^{Eq}\right)$
		Number of clearing and settlement transactions for equities in 2008 (n_{08})

Source: Oxera.

Table A4.9 Change in the relative costs of cross-border transactions for account provision and asset servicing

Percentage change in the ratio of **cross-border to domestic costs** for account provision and asset servicing $= (r_{08} - r_{06}) / r_{06}$	Ratio of cross-border: domestic cost in 2006 $r_{06} = c_{n\text{-}d} / c_d$	Cost of account provision and asset servicing for cross-border securities in 2006 $p_{n\text{-}d} = 10{,}000 * (\pi_{n-d}) / (V_{n-d})$	Revenue from account provision and asset servicing for cross-border securities in 2006 (π_{n-d})
			Value of securities held for account provision and asset servicing in relation to cross-border securities in 2006 (V_{n-d})
		Cost of account provision and asset servicing for domestic securities in 2006 $p_d = 10{,}000 * (\pi_d) / (V_d)$	Revenue from account provision and asset servicing for domestic securities in 2006 (π_d)
			Value of securities held for account provision and asset servicing in relation to domestic securities in 2006 (V_d)
	Ratio of cross-border: domestic cost in 2008 $r_{08} = c_{n\text{-}d} / c_d$	Cost of account provision and asset servicing for cross-border securities in 2008 $p_{n\text{-}d} = 10{,}000 * (\pi_{n-d}) / (V_{n-d})$	Revenue from account provision and asset servicing for cross-border securities in 2008 (π_{n-d})
			Value of securities held for account provision and asset servicing in relation to cross-border securities in 2008 (V_{n-d})
		Cost of account provision and asset servicing for domestic securities in 2008 $p_d = 10{,}000 * (\pi_d) / (V_d)$	Revenue from account provision and asset servicing for domestic securities in 2008 (π_d)
			Value of securities held for account provision and asset servicing in relation to domestic securities in 2008 (V_d)

Source: Oxera.

Table A4.10 Change in the relative costs of cross-border transactions for clearing and settlement services

Percentage change in the ratio of **cross-border: domestic costs** $= (r_{08} - r_{06}) / r_{06}$	Ratio of cross-border: domestic costs in 2006 $r_{06} = p_{n-d} / p_d$	Cost of clearing and settlement for cross-border securities in 2006 $p_{n-d} = (\pi_{n-d})/(n_{n-d})$	Revenue from clearing and settlement of cross-border securities in 2006 (π_{n-d})
			Number of clearing and settlement transactions in relation to cross-border securities in 2006 (n_{n-d})
		Cost of clearing and settlement for domestic securities in 2006 $p_d = (\pi_d)/(n_d)$	Revenue from clearing and settlement of domestic securities in 2006 (π_d)
			Number of clearing and settlement transactions in relation to domestic securities in 2006 (n_d)
	Ratio of cross-border: domestic costs in 2008 $r_{08} = p_{n-d} / p_d$	Cost of clearing and settlement for cross-border securities in 2008 $p_{n-d} = (\pi_{n-d})/(n_{n-d})$	Revenue from clearing and settlement of cross-border securities in 2008 (π_{n-d})
			Number of clearing and settlement transactions in relation to cross-border securities in 2008 (n_{n-d})
		Cost of clearing and settlement for domestic securities in 2008 $p_d = (\pi_d)/(n_d)$	Revenue from clearing and settlement of domestic securities in 2008 (π_d)
			Number of clearing and settlement transactions in relation to domestic securities in 2008 (n_d)

Source: Oxera.

Table A4.11 Change in the relative costs of cross-border transactions for settlement instruction services

Percentage change in the ratio of **cross border: domestic costs** = $(r_{08} - r_{06}) / r_{06}$	Ratio of cross-border: domestic costs in 2006 $r_{06} = p_{n-d} / p_d$	Cost of settlement instruction for cross-border securities in 2006 $p_{n-d} = (\pi_{n-d})/(n_{n-d})$	Revenue from settlement instruction of cross-border securities in 2006 (π_{n-d})
			Number of settlement instruction transactions in relation to cross-border securities in 2006 (n_{n-d})
		Cost of settlement instruction for domestic securities in 2006 $p_d = (\pi_d)/(n_d)$	Revenue from settlement instruction of domestic securities in 2006 (π_d)
			Number of settlement instruction transactions in relation to domestic securities in 2006 (n_d)
	Ratio of cross-border: domestic costs in 2008 $r_{08} = p_{n-d} / p_d$	Cost of settlement instruction for cross-border securities in 2008 $p_{n-d} = (\pi_{n-d})/(n_{n-d})$	Revenue from settlement instruction of cross-border securities in 2008 (π_{n-d})
			Number of settlement instruction transactions in relation to cross-border securities in 2008 (n_{n-d})
		Cost of settlement instruction for domestic securities in 2008 $p_d = (\pi_d)/(n_d)$	Revenue from settlement instruction of domestic securities in 2008 (π_d)
			Number of settlement instruction transactions in relation to domestic securities in 2008 (n_d)

Source: Oxera.

A5 Aggregated analysis

This appendix presents the results for trading platforms, CCPs and CSDs aggregated across financial centres.

A5.1 Approach

Aggregating data across financial centres provides a higher level of anonymity regarding an individual respondent's data. Thus, for several indicators, it is possible to report a higher level of detail than at the individual financial centre level. For example, rather than just report on the percentage change in the indicator over the period 2006–08, it is also possible to present the absolute level at an aggregate level, in each year.

To protect the anonymity of other respondents and ensure that the data presented is representative of the group of aggregated financial centres where the number of respondents that remains falls below three, the absolute level has not been reported; rather, an index is provided. The calculations underlying each indicator are as described for the individual financial centre analysis in section 4.

Care has been taken to ensure that the aggregate estimate for a specific indicator in each time period monitors a consistent sample of respondents. Therefore, when a respondent has not been able to provide sufficient data for a specific indicator for both years, it is excluded from the aggregate estimate for this indicator.

The approach taken to aggregating results across financial centres sums the data across the relevant sample of financial centres (excluding those where sufficient data is not provided in both years) before performing any calculation. In this way, the data reported from each respondent is weighted by its relative activity. For example, the cost of service across all domiciles is estimated as total revenue received by all respondents in the sample for this specific service, divided by the appropriate total volume measure for this specific service for all respondents in the sample. The sample is defined as respondents that provided data on both the revenue received and volume measure for the specific service in both years. The cost is then estimated at the aggregate financial centre level, and therefore weights the data reported by each respondent by its relative activity.

A5.2 Interpretation of results

Overall, the analysis in this section is based on the same dataset that is used for the individual financial centre analysis in section 4. However, for each type of infrastructure, there is some variation in the sample of respondents upon which each table is based. This is a consequence of variation in the level of detail in the data provided by each respondent, and between each year. Within each table, the estimates presented for both 2006 and 2008 follow the same sample of firms through time.

Similar issues as identified in the individual financial centre analysis in section 4 also apply here. The analysis has focused on how the *effective unit* costs that users of relevant services face changed between 2006 and 2008. Such changes may be driven not only by changes in infrastructures' prices or pricing structures, but also by changes in the nature of activity of their users.

A5.3 Aggregated trading platform results

A5.3.1 Distribution of activity

Table A5.1 shows the activity of cross-border members within trading platforms over the period 2006–08. The proportion of activity is expressed in terms of the number of members and the value of transactions executed by these members.

The tables show that there has been an increase in the proportion of trading platforms' cross-border membership. By number of members, there has been a four percentage point increase in the proportion of cross-border members. In terms of the value of trades of cross-border members, there has been a nine percentage point increase for equities and a two percentage point increase for fixed income securities.

Table A5.1 Provision of trading platform services for domestic and cross-border members (by number of members, by value of transaction) (%)

	By number of members		By value of equity transactions		By value of fixed income transactions	
	Domestic	Cross-border	Domestic	Cross-border	Domestic	Cross-border
2006	64	36	70	30	90	10
2008	60	40	61	39	88	12

Source: Trading platform questionnaire, and Oxera analysis.

Table A5.2 shows how the proportion of activity in cross-border securities for trading platforms domiciled in secondary and other financial centres has changed over the period of 2006–08. The proportion of activity is expressed in terms of the total value of transactions executed for cross-border securities. For equities, there has been a five percentage point increase in the cross-border activity of trading platforms. For fixed income securities, the change has been negligible.

Table A5.2 Provision of trading platform services for domestic and cross-border securities (by value of transactions) (%)

	Proportion of the value of executed equity transactions		Proportion of the value of executed fixed income securities transactions	
	Domestic	Cross-border	Domestic	Cross-border
2006	89	11	99	1
2008	84	16	99	1

Source: Trading platform questionnaire, and Oxera analysis.

Table A5.3 shows how the membership profile of trading platforms may have changed over the period of 2006–08. The proportion of activity is expressed in terms of the number of each type of member.

There appears to be little change in the type of members for trading platforms. The table shows a three percentage point decrease in the proportion of members that are brokers, and a three percentage point increase in the proportion of members that are classified as 'other'.

Table A5.3 Trading platform clients by type (%)

	Proportion of clients in 2006 (%)	Proportion of clients in 2008 (%)
Brokers	87	84
Fund managers	2	3
Other trading platforms	0	0
Other	10	13

Note: 'Other' includes a central bank.
Source: Trading platform questionnaire, and Oxera analysis.

A5.3.2 Costs of services

Tables A5.4–A5.5 show how the costs for different trading platform services have changed over the period 2006–08. Costs are presented for equities, and represent the average cost for all trading platforms; they have been measured on a double-counted basis.

Table A5.4 shows that, on average, on-book trading costs for equities fell by 33% when measured per transaction, and increased by 9% when measured by value of trading. Table A5.5 shows that, in terms of off-book trading, the reduction in the costs for equities is approximately 54%.

Table A5.4 Changes in costs: on-book trading, equities

	bp costs per value of trading	€ costs per transaction
2006	0.43	1.18
2008	0.47	0.79
% change	9	–33

Source: Trading platform questionnaire, and Oxera analysis.

Table A5.5 Changes in costs: off-book trading, equities

	bp costs per value of trading	€ costs per transaction
2006	0.060	1.19
2008	0.027	0.55
% change	–54	–54

Source: Trading platform questionnaire, and Oxera analysis.

Tables A5.6–A5.7 show how the costs of trading in domestic and cross-border securities changed over the period 2006–08. The number of trading platforms that could provide data on the breakdown between domestic and cross-border costs is smaller than the sample that provided data on their total activities.

Table A5.6 Changes in the relative costs of on-book trading in cross-border equities

	bp costs per value of trading, domestic	bp costs per value of trading, cross-border	Ratio of cross-border: domestic costs (%)	€ costs per transaction, domestic	€ costs per transaction, cross-border	Ratio of cross-border: domestic costs (%)
2006	0.39	0.38	96	0.95	1.23	130
2008	0.38	0.46	121	0.58	1.08	185
% change	–3	22	26	–39	–12	42

Source: Trading platform questionnaire, and Oxera analysis.

Table A5.7 Changes in the relative costs of off-book trading in cross-border equities

	bp costs per value of trading, domestic	bp costs per value of trading, cross-border	Ratio of cross-border: domestic costs (%)	€ costs per transaction, domestic	€ costs per transaction, cross-border	Ratio of cross-border: domestic costs (%)
2006	0.05	0.05	100	0.91	0.93	101
2008	0.02	0.02	147	0.46	0.94	206
% change	–66	–50	47	–50	1	103

Source: Trading platform questionnaire, and Oxera analysis.

A5.4 Aggregated CCP results

A5.4.1 Distribution of activity

Table A5.8 shows the activity of domestic and cross-border members of CCPs over the period 2006–08. The proportion of activity is expressed in terms of the number of members and the number of clearing transactions in equities.

Overall, there has been a slight increase in the relative activity of cross-border members within CCPs. In terms of the number of members, there has been a two percentage point increase, and in terms of the number of clearing transactions undertaken by cross-border members, this has increased by four percentage points.

Table A5.8 Provision of CCP services for domestic and cross-border members (by number of members and number of clearing transactions in equities, %)

	By number of members		By number of clearing transactions	
	Domestic	Cross-border	Domestic	Cross-border
2006	70	30	81	19
2008	68	32	77	23

Source: CCP questionnaire, and Oxera analysis.

Table A5.9 shows the percentage change in the proportion of activity in cross-border equities over the period of 2006–08. The table suggest that there has been a slight increase in the relative activity in cross-border equities.

Table A5.9 Provision of CCP services by domicile of security (by number of clearing transactions in equities, %)

	Domestic	Cross-border
2006	96	4
2008	94	6

Source: CCP questionnaire, and Oxera analysis.

7.4.1 Costs of services

Table A5.10 shows how the costs for central counterparty clearing services[52] changed over the period 2006–08. The costs are presented for equities, and represent the average cost incurred by CCPs across financial centres; they have been measured on a double-counted basis. The table shows that, on average across financial centres, the CCP clearing cost for equities has declined from €0.37 per transaction to €0.18 per transaction—a reduction of 51%.

Table A5.10 Costs of central counterparty clearing services, equities

	Cost (€ per transaction)
2006	0.37
2008	0.18

Source: CCP questionnaire, and Oxera analysis.

CCPs may provide a number of other services in addition to the core services of central counterparty clearing, such as fail management, risk management or settlement instruction. Where such services are charged for separately, these generally form a relatively small proportion of a CCP's revenue. Thus, the total costs incurred by CCPs predominantly reflect the cost of providing central counterparty clearing.

Most CCPs provided data on the costs for domestic securities only. Owing to the NDA restrictions, the relative cost for domestic and cross-border securities could therefore not be analysed separately. However, where data was provided, the costs of central counterparty clearing services for domestic and cross-border were very similar (for example, in 2006, cross-border costs are about 97% of domestic costs); and this relationship has remained stable over the period between 2006–08.

A5.5 Aggregated CSD results

A5.5.1 Distribution of activity

Table A5.11 shows the activity of domestic and cross-border members of CSDs over the period 2006–08. The proportion of activity is expressed in terms of the number of members and the value of total securities held (equities and fixed income combined).

The table shows that there has been a slight increase in the proportion of CSDs' cross-border membership. By number of members, there has been a one percentage point increase in the proportion of cross-border members. In terms of the value of securities held on behalf of cross-border members, there has been a two percentage point increase.

[52] This measure includes the costs of central counterparty clearing services only, and does not include the costs of other services, such as fail management services.

Table A5.11 Provision of CSD services for domestic and cross-border members (by number of members and value of securities held, %)

	By number of members		By value of securities held	
	Domestic	Cross-border	Domestic	Cross-border
2006	98	2	88	12
2008	97	3	86	14

Source: CSD questionnaire, and Oxera analysis.

Table A5.12 shows the change in the proportion of activity in cross-border securities over the period of 2006–08.

For equities, the table shows that there has been negligible change in the relative amount of activity in cross-border securities. However, for fixed income securities, the table shows a small increase in the proportion of foreign securities held by CSDs, rising by two percentage points, from 10% to 12%, of fixed income securities held.

Table A5.12 Provision of CSD services domestic and cross-border securities (by value of securities held, %)

	Equities		Fixed income securities	
	Domestic	Cross-border	Domestic	Cross-border
2006	96	4	90	10
2008	96	4	88	12

Source: CSD questionnaire, and Oxera analysis.

A5.5.2 Costs of services

Table A5.13 shows how the costs for different CSD services have changed over the period 2006–08. The costs are presented separately for equities and fixed income securities, and represent the average cost charged by CSDs across financial centres.

The table shows that, on average across financial centres, account provision costs for equities have risen by 16%, but fallen slightly for fixed income securities. In terms of clearing and settlement services, on average there has been a slight reduction in the cost of service for both equities and fixed income securities.

Table A5.13 Costs of services provided by CSDs, equities and fixed income securities

	Account provision and asset servicing (bp costs per value of securities held)		Clearing and settlement (€ per transaction)	
	Equities	Fixed income securities	Equities	Fixed income securities
2006	0.15	0.19	0.52	0.61
2008	0.17	0.18	0.51	0.57
% change	16	–3	–2	–7

Source: CSD questionnaire, and Oxera analysis.

Tables A5.14–A5.17 show how the costs for different CSD services changed over the period 2006–08. The costs are presented separately for domestic and cross-border equities and fixed income securities, and represent the average cost for CSDs across all financial centres. The number of CSDs that could provide data on the breakdown between domestic and cross-border costs is smaller than the sample that provided data on their total activities.

Tables A5.14–A5.15 show that, for account provision and asset servicing, the cost for cross-border equities decreased slightly over the period 2006–08, and the cost for fixed income securities increased. For equities, the cross-border cost fell by 6%, and 2% compared with the cost for domestic securities. For fixed income securities, the cross-border cost increased by 35% in absolute terms, and 48% compared with the cost for domestic securities

Table A5.14 Changes in the relative costs of cross-border account provision and asset servicing: equities

	Domestic cost (bp costs per value of securities held)	Cross-border cost (bp costs per value of securities held)	Ratio of cross-border: domestic costs (%)
2006	0.16	0.38	243
2008	0.15	0.36	239
% change	–4	–6	–2

Source: CSD questionnaire, and Oxera analysis.

Table A5.15 Changes in the relative costs of cross-border account provision and asset servicing: fixed income securities

	Domestic cost (bp costs per value of securities held)	Cross-border cost (bp costs per value of securities held)	Ratio of cross-border: domestic costs (%)
2006	0.20	0.29	144
2008	0.18	0.39	213
% change	–9	35	48

Source: CSD questionnaire, and Oxera analysis.

For clearing and settlement, the cost for cross-border securities has increased for both equities and fixed income securities. Table A5.16 shows that the cross-border cost increased by 24%, and 71% compared with the cost for domestic securities. Table A5.17 shows that, for fixed income securities, the cross-border cost increased by 10% in absolute terms, and 7% compared with the cost for domestic securities.

Table A5.16 Changes in the relative costs of cross-border clearing and settlement: equities

	Domestic cost (€ per transaction)	Cross-border cost (€ per transaction)	Ratio of cross-border: domestic costs (%)
2006	0.35	2.33	664
2008	0.25	2.88	1,136
% change	–28	24	71

Source: CSD questionnaire, and Oxera analysis.

Table A5.17 Changes in the relative costs of cross-border clearing and settlement: fixed income securities

	Domestic cost (€ per transaction)	Cross border cost (€ per transaction)	Ratio of cross-border: domestic costs (%)
2006	0.60	0.38	63
2008	0.62	0.42	67
% change	3	10	7

Source: CSD questionnaire, and Oxera analysis.

A6 Glossary

This glossary includes a list of terms used in this report and/or the survey questionnaires and accompanying handbooks.

Terminology	Definition
(I)CSD	Both CSDs and ICSDs. See 'Central securities depository' and 'International central securities depository'
Access and connectivity	Services, such as connectivity and communication, provided to members or other users of trading and post-trading infrastructure providers. The purchase of these services may or may not be mandatory
Account provision	Defined in the ECSDA Glossary as 'the maintenance of securities accounts'
Account provision and asset servicing	In keeping with the ECSDA conversion tables, account provision and asset servicing have been combined. For the purposes of this study, this also incorporates the safekeeping of securities provided by (I)CSDs See 'Account provision' and 'Asset servicing'
AFTI	Association française des professionals des titres
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	Where provided by custodians, asset servicing is defined according to Chan et al. (2007), as 'processing the rights and obligations associated with securities in safekeeping. This usually includes income and dividend collection, withholding tax processing and reclamation, proxy voting, corporate action notifications, and statements of securities holdings' Where provided by (I)CSDs, asset servicing is defined according to the ECSDA Glossary as 'the securities administration activities performed for others—eg, the processing of corporate actions, tax reclaims and portfolio valuation'
Banking services offered by custodians	Chan et al. (2007) define banking services as 'taking deposits and providing services that involve credit exposure, usually intraday liquidity, lending money, and lending securities as principal or as agent with a guarantee to the lender'. These services often include collateral management
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'
Book-entry settlement	The ECSDA Glossary defines book-entry settlement as 'the act of crediting and debiting the transferee's and transferor's accounts respectively, with the aim of completing a transaction in securities'
Broker	Intermediaries that undertake trading activities on behalf of their clients
Capital commitment	The service of providing an institutional brokerage firm's capital in the execution of trade orders. Some institutional brokerage firms offer trade execution services using their own capital—ie, it is the broker's capital that is 'at risk' in the transaction. A higher gross commission rate may be charged for taking this risk, of which a proportion is for the broker's capital commitment
CCP	See 'Central counterparty'
Central counterparty (CCP)	Defined in the Draft Working Document on Post-trading Services (EC DG Internal Market and Services 2006), as 'an entity that 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'

Terminology	Definition
Central securities depository (CSD)	According to the ECSDA Glossary, providers of clearing, settlement and custody services. CSDs can either provide the primary book-entry register (ie, for securities issued into the CSD), where they are described as the 'issuer CSD', or can serve as a custody service provider (for securities issued into another CSD), where they are described as the investor CSD. See 'Investor CSD' and 'Issuer CSD'
CESR	Committee of European Securities Regulators
CESAME	Clearing and Settlement Advisory and Monitoring Experts group
Clearing	Defined in the ECSDA Glossary 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 and settlement	The service of clearing and settling transactions. See 'Clearing' and 'Settlement'
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	Defined in the ECSDA Glossary as 'the process used to control the correspondence between the market value of the collateral and the required value of the collateral. The service will generally also include generation and processing of collateral movements'
Competitive clearing	New models of counterparty risk clearing are being developed in which more than one CCP compete to provide counterparty risk clearing
Core brokerage	Full-service trade execution services in which salespersons and traders typically manage the execution process. All trading that is not considered core programme trading or electronic trading is considered core brokerage
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	Defined in the Draft Working Document on Post-trading Services (EC DG Internal Market and Services 2006) 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	Defined in the ECSDA Glossary as the provision of 'credit lines in commercial bank money for short-term (intra-day or intra-night) use, with the main purpose of facilitating the technical settlement process'
Cross-border transaction	A transaction in which one or both parties is located in a different financial centre to the domicile 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 to institutional clients such as funds, fund management firms, brokerage firms, and other custodians Chan et al. (2007) identify three types of custodian: single-market (also referred to as local custodians or sub-custodians); multi-direct (also referred to as multi-market custodians); and global. See 'Local custodian', 'Multi-market custodian' and 'Global custodian'

Terminology	Definition
Custody and safekeeping	For custodians, custody and safekeeping services are those specified in Chan et al. (2007). This includes safekeeping and asset servicing. See 'Safekeeping' and 'Asset servicing' For (I)CSDs, custody and safekeeping services are those specified in the Industry Code of Conduct. This includes account provision, asset servicing, credit provision, collateral management and securities lending and borrowing. See 'Account provision', 'Asset servicing', 'Credit provision', 'Collateral management' and 'Securities lending and borrowing'
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: account provision, asset servicing, credit provision, collateral management, securities lending, and securities borrowing
Custody services provider	Can refer to several types of custodian, broker or CSD
DACSI	Dutch Advisory Committee Securities Industry
Dealer	Intermediaries that 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 domicile of the security
Domicile of securities	The domicile of a security is determined by the domicile of the Issuer (I)CSD where the security is ultimately domiciled (ie, initially issued). However, as this may be difficult for firms to identify, two proxies can be used for equities and fixed income securities. For equities, the preferred proxy of the domicile of securities is the financial centre of the primary market in which equities are listed; for fixed income securities, the preferred proxy is the country code in the ISIN of the security
DvP	See 'Delivery versus payment'
EACB	European Association of Co-operative Banks
EACH	European Association of Central Counterparty Clearing Houses
EBF	European Banking Federation
ECB	European Central Bank
ECSA	European Credit Sector Associations
ECSDA	European Central Securities Depositories Association
EFAMA	European Fund and Asset Management Association
Electronic trading	Includes all light-touch trade execution methods—eg, DMA or algorithmic trading
Equities	Securities that are shares in a listed company or listed investment company. For the purposes of this report, derivatives structured to have equity-like returns—eg, contracts for difference or certificates—are excluded
ESBG	European Savings Banks Group (ESBG)
Establishing securities in book-entry form	Defined in the ECSDA Glossary 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

Terminology	Definition
Fail management services	Services that deal with failed trades that have occurred, and may include penalties for failed trades and repair services to resolve the failure These services can be provided in relation to CCP clearing, where it may be provided by CCPs and agents (ie, general clearing members). It can also be provided in relation to clearing and settlement, where it may be provided by (I)CSDs and agents (ie, global/multi-market custodians and local custodians)
Failed trade	A transaction that is not cleared or settled by the intended settlement date because the transactions do not match or because at least one of the settlement parties has not met the settlement conditions
FESE	Federation of European Securities Exchanges
Financial centre	The country in which an investor, client or security is domiciled. See 'Domicile of securities'
Fixed income securities	Securities that provide a pre-determined return (which may be fixed or variable) comprising both periodic payments and return of the principal—for the purposes of this study, this includes government bonds and non-securitised corporate bonds. This excludes derivatives structured to have fixed income returns—eg, certificates
Flow-related services	Activities that arise from securities transactions. There are four flow-related activities: trading, counterparty risk clearing, clearing, and settlement
FSA	Financial Services Authority
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
Fund services	Defined in Chan et al. (2007) as the 'specialised services for investment portfolios (funds), usually involving investment accounting, net asset valuation, performance measurement, compliance monitoring, and regulatory record keeping', and may also include 'fund holder registration, subscription and redemption services'
Giovannini barriers	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 custodian offering custody services across many financial centres, usually to investors or fund managers. Chan et al. (2007) describe global custodians as those that 'offer a one-stop-shop service, usually covering about 100 markets, and opt to appoint intermediaries to access many markets' CSDs'
Government bonds	Fixed income securities issued by national governments
Gross commission revenues	The total commission revenues paid by an investor to an institutional brokerage firm for a trade execution service undertaken on a commission basis
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 (FESE, EACH and ECSDA 2006). This focused on transparency, access and interoperability, and unbundling
Infrastructure providers	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 brokerage firm	An intermediary, usually but not exclusively an investment bank, that executes trade orders on behalf of investors or fund managers. An institutional brokerage firm may also execute trades on its own account
Institutional brokerage services	Trade execution and non-trade execution services provided by an institutional brokerage firm. These services can include core brokerage, programme trading, electronic trading and other bundled goods and services such as research
Institutional fund	An intermediary that invests institutional funds—eg, the pension fund of a company. Institutional investors may hire one (or several) fund managers to manage their funds and make investment decisions, or they may have internal fund management teams
Institutional fund management firm	A firm that manages the funds of other investors, making investment decisions for the funds in accordance with the agreed mandate of the fund

Terminology	Definition
Institutional investor	Both institutional funds and institutional fund management firms. See 'Institutional fund' and 'Institutional fund management firm'
Institutional side	The side of a transaction between the investor and the broker
Intermediaries	Market participants that provide trading and post-trading activities, such as brokers and dealers providing trade execution, or custodians providing custody services
Internal crossing	A form of trading in which a fund management firm internalises trade orders between its own funds
Internalisation	A form of trading in which an institutional brokerage firm internalises trade orders between its own clients, or where it takes the opposite side to a transaction
International central securities depository (ICSD)	Providers of 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)
International securities	The domicile of securities is determined by the domicile of the (I)CSD where the security is ultimately domiciled (ie, initially issued). In the case of securities initially issued into the ICSDs (including using a custody agent), these securities are considered to be 'international' For fixed income securities, the country code of the ISIN is 'XS'
International securities identification number (ISIN)	The unique identification code determined by national numbering agencies in each financial centre in accordance with the structure determined by ISO 6166 (ISO 2001)
Investor	The entity that makes investment decisions. This may be the institutional investor or an appointed fund manager
Investor CSD	Defined in the ECSDA Glossary as 'the CSD that holds an account with an issuer-CSD'. See 'Central securities depository' and 'Issuer CSD'
ISIN	See 'International securities identification number'
Issuer	The entity (either a corporate or government) that issues securities into a CSD
Issuer CSD	Defined in the ECSDA Glossary as 'the CSD which has established securities of a certain issue in book-entry form and which provides the account'. See 'Central securities depository' and 'Investor CSD'
Local custodian	A custodian offering access to a single local securities market and post-trading infrastructures. Chan et al. (2007) describe local custodians as those which 'specialise in their home market to serve domestic customers and inflow investment from foreign customers'
Matching utility	An intermediary that provides verification, usually on the institutional side of a transaction
Membership	Membership services are the different classes of membership that enable users to access services provided by trading and post-trading infrastructure providers
Mergers and acquisitions	An acquisition is a transaction in which a firm acquires part or the whole of another business. A merger is a transaction in which two companies merge to form a new company
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 custodian offering access to several local securities markets and post-trading infrastructure. Chan et al. (2007) describe multi-market custodians as those which 'capture additional cross-border business by establishing a presence in multiple markets and obtaining direct membership in each market's CSD'
Netting	The process of combining multiple transactions into a single clearing and settlement order

Terminology	Definition
Non-segregated funds	The funds for which fund management firms provide fund management services and manage the provision of clearing and settlement and custody and safekeeping services. See also 'Segregated funds'
Non-trade execution goods and services	The goods and services that may be provided through bundled brokerage, soft commissions, commission-sharing arrangements or soft-dollar agreements Institutional brokerage firms subject to regulation of the use of commissions for non-trade execution services (eg, from the FSA in the UK or the Securities and Exchange Commission in the USA) should use the relevant regulation and guidance to distinguish between trade execution services and non-trade execution services
Off-book trading	The service of reporting and processing off-book trades for sending to post-trade service providers
On-book order management	The provision of services to change or manage orders placed on the order book—for example, removing or editing orders that have already been placed on the order book
On-book trading	The provision of trading and matching services on a trading platform's order book. This includes both the active and passive sides of on-book transactions—ie, it includes the costs of placing orders on the order book, filling orders on the order book, and the completed transaction
OTC	See 'Over-the-counter trading'
Other European securities	The domicile of securities is determined by the domicile of the (I)CSD where the security is ultimately domiciled (ie, initially issued). See also 'Domicile of securities' For the purposes of this study, other European securities are securities domiciled in a CSD in an EEA country that is not otherwise specified
Over-the-counter trading (OTC)	A form of off-exchange trading in which brokers/dealers trade directly with one another
Paying agent services	Chan et al. (2007) define paying agent services as the services provided on behalf of issuers—eg, 'distributing.. dividends, interest or principal redemptions to the securities holders or their financial intermediaries'
Post-trade data	The service of providing data on the prices and volumes of transactions that were executed at the trading platforms, including on- and off-book transactions, provided either directly to trading members or indirectly via data vendors
Pre-trade data	The service of providing data on the prices and volumes on the trading platforms' order book, either directly to trading members or indirectly via data vendors
Primary book-entry register	The register that is established and maintained by the CSD into which the issuer has issued the securities
Programme trading	The execution of automatically generated transactions for multiple securities transactions bundled into a single trading package
Regulated market	The MiFID term for an exchange
Resource check	See 'Clearing'
Retail brokerage firm	An intermediary that provides brokerage services to private individuals. This may include retail banks, online brokers and specialist retail brokerage firms, and is sometimes referred to as a private client broker. Retail brokerage firms may access markets directly, or more commonly via a retail service provider

Terminology	Definition
Retail brokerage services	Trade execution and custody and safekeeping services provided by a retail brokerage firm. It is understood that these services may be provided and priced separately, or as one service provided and priced on the basis of trade execution services The custody and safekeeping services provided by retail brokers are defined according to Chan et al. (2007): safekeeping is defined as the service of 'ensuring that a record of title to the customer's securities is maintained on the books of a higher-tier entity, and that the number of securities owned by the customer as recorded in the custodian books can be delivered to the customer's order', and asset servicing is defined as 'processing the rights and obligations associated with securities in safekeeping. This usually includes income and dividend collection, withholding tax processing and reclamation, proxy voting, corporate action notifications, and statements of securities holdings' The trade execution services provided by retail brokers include all types of trade execution and all potential trading routes
Retail investor	An individual who invests securities in their own account
Risk management	Where provided by CCPs, risk management is the process of managing the risk arising from the provision of CCP clearing, which may include the use and management of collateral
Safekeeping	Defined in Chan et al. (2007) as 'ensuring that a record of title to the customer's securities is maintained on the books of a higher-tier entity, and that the number of securities owned by the customer as recorded in the custodian books can be delivered to the customer's order'
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 unused securities available for borrowing (for short-selling or fail management) to generate additional revenue
Securities lending and borrowing	Defined in the ECSDA Glossary as 'the services offered by a CSD (to) facilitate the temporary transfer of securities from a securities lender to a securities borrower'
Segregated funds	The funds for which fund management firms provide fund management services, but which purchase clearing and settlement and custody and safekeeping services directly. See also 'Non-segregated funds'
Settlement	Where provided by custodians, settlement is defined according to Chan et al. (2007) as 'transmitting customers' securities receipt and delivery orders to a higher-tier entity and effecting or monitoring the associated payments' Where provided by (I)CSDs, settlement is defined according to the ECSDA Glossary as 'the act of crediting and debiting the transferee's and transferor's accounts respectively, with the aim of completing a transaction in securities.' Also referred to as 'Book-entry settlement'
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 process of sending transactions for settlement at the (I)CSD or custodian level. This process may incorporate netting of transactions. See 'Netting'
Stock-related activities	Activities related to the existence of the securities, rather than transactions involving those securities. Such 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 side of a transaction 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

Terminology	Definition
Trade execution services	Services provided by institutional brokerage firms, through which clients' trade orders are executed by the brokerage firms. Trade execution services can be broken down into three types: core brokerage, programme trading and electronic trading. They may also include the provision of capital commitment. See 'Capital commitment', 'Core brokerage', 'Electronic trading' and 'Programme trading'
Trade orders	The preferred definition includes all trade orders sent from the client. An order that is later cancelled is counted as just one order—ie, the cancellation is not counted as an additional order. All amendments (excluding cancellations) are counted as separate trade orders
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, MTF or a crossing network
Transactions	A transaction is a completed trade, in which securities have been agreed to be exchanged for either cash or securities. For transactions in which securities are exchanged for cash, each completed trade counts as one transaction. For transactions in which securities are exchanged for securities, each completed trade counts as two transactions (ie, one transaction from the perspective of each counterparty) For CCP clearing, the definition of the number of transactions is the *pre-netting* number of transactions sent to the CCP or general clearing member for central counterparty clearing For clearing and settlement, the definition of the number of transactions is the *post-netting* number of settlement instructions sent to the (I)CSD or custodian for clearing and settlement
UCITS	Undertakings for Collective Investments in Transferable Securities
Verification	Defined in the ECSDA Glossary 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

References for glossary

Chan, D., Fontan, F., Rosati, S. and Russo, D. (2007), 'The Securities Custody Industry', ECB, August.

ECSDA (2007), 'Glossary', December. This draws on many definitions in European Commission DG Internal Market and Services (2006), 'Draft Working Document on Post-trading', May

CESAME Sub-Group on Definitions (2005), 'Commission Services Working Document on Definition of Post-trading Activities', MARKT/SLG/G2(2005)D15283.

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

ISO (2001), 'Securities and Related Financial Instruments: International Securities Identification Numbering System (ISIN)'.

Park Central
40/41 Park End Street
Oxford OX1 1JD
United Kingdom

Tel: +44 (0) 1865 253 000
Fax: +44 (0) 1865 251 172

Stephanie Square Centre
Avenue Louise 65, Box 11
1050 Brussels
Belgium

Tel: +32 (0) 2 535 7878
Fax: +32 (0) 2 535 7770

Thavies Inn House
7th Floor
3/4 Holborn Circus
London EC1N 2HA
United Kingdom

Tel: +44 (0) 20 7822 2650
Fax: +44 (0) 20 7822 2651

www.oxera.com