Oxera

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

(MARKT/2007/02/G)

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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 CESR (now ESMA).

Oxera is grateful to all the many people involved in the study, whose cooperation, contribution and dedication over several years have made it possible. Any errors, however, remain those of Oxera.

Executive summary and conclusions

Objectives and remit

Traditionally, each national market in Europe had its own monopoly securities trading, clearing and settlement systems, often by construct of law. This situation has changed significantly in the past 10–15 years. Capital markets and equity trading have become more and more international—market players have been seeking to provide trading and post-trading services across borders, and this has led to several cross-border mergers and alliances. This process has gained momentum in recent years, with the European Commission and the industry working together to remove technical, legal and other barriers to cross-border post-trading,[1] and to facilitate the introduction of competition by putting in place an industry code of conduct for infrastructure providers.[2] Various new players have entered the markets since, strengthening competition and increasing choice for investors, investment managers and brokers.

This price monitoring study, commissioned by DG Internal Market and Services of the European Commission, examines the impact of recent changes in the industry on the costs of trading and post-trading services. It provides an analysis of a new large set of data collected by Oxera from intermediaries (fund managers, brokers and custodians) and infrastructure providers (trading platforms, central counterparties (CCPs) and central securities depositories (CSDs)) operating in the trading and post-trading value chain in 18 financial centres in Europe. The Commission requested a classification of three types of financial centre: major (France, Germany, Italy, Spain, Switzerland and the UK), secondary (Belgium, Luxembourg, the Netherlands, Norway, Poland and Sweden), and other (Austria, Czech Republic, Denmark, Greece, Ireland and Portugal).[3]

All major trading platforms (including new entrants), CCPs (including new entrants) and CSDs participated in the survey, as well as a large number of custodians (representing around 45% of the market), brokers (20% of the market) and fund managers (10% of the market).

The study measures for the first time the effects of increased competition and market integration on prices of trading and post-trading services over the period 2006–09, thereby capturing important developments such as the introduction of the Markets in Financial Instruments Directive (MiFID) and the entry of new providers.

This study is broader in scope than previous studies on the costs of trading, clearing and settlement, with greater coverage of both different types of cost and intermediaries and financial centres, and better access to detailed data on costs and volumes. 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.[4]

[1] For a summary of this work, see CESAME (2008), 'The Work of the Clearing and Settlement Advisory and Monitoring Experts' Group ("CESAME" Group)—Solving the Industry Giovannini Barriers to Post-trading within the EU', November.

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

[3] 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, section 3 (hereafter referred to as 'the methodology paper'). Available at http://ec.europa.eu/internal_market/financial-markets/docs/clearing/oxera_study_en.pdf.

[4] 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), 'Cross-Border Clearing and Settlement

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. Furthermore, rather than measuring costs on the basis of pricing schedules, this study measures the unit cost for the trading and post-trading services on the basis of the revenues (divided by the number or value of transactions) of the providers of the services, and the total costs (divided by the number or value of transactions) incurred by the users of the services. Measuring costs on the basis of pricing schedules can provide cost estimates for specific user profiles only, but not necessarily for an average user. The advantage of the approach in this study is that the actual costs incurred by users, on average across the market, are measured.

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, greater consistency in the definition of services between, and a larger sample of, survey participants, in order to ensure that the analysis of a financial centre was fully representative and the services being compared were, in fact, the same.

The focus of this study 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.

The research was subject to a number of limitations. These are set out in detail in the main body of the report, and include the following.

– The study measures the explicit transaction-related costs incurred when using infrastructure providers and intermediaries. Other types of cost are not included, such as access and membership fees, or revenues, such as the interest that brokers may receive on cash margins when using CCPs. Similarly, implicit trading costs (such as market impact costs) are also not included in the analysis.

– Although the core services offered by infrastructure providers and intermediaries, and included in the analysis (eg, trade execution at the trading level and netting at the CCP level), have broadly similar characteristics, there may be differences in the definition of these services. A degree of consistency is provided by taking into account work on the definition of services—for example, by the European Commission and the task forces set up by the Federation of European Securities Exchanges (FESE) and European Central Securities Depositories Association (ECSDA)—but no further adjustments are made to harmonise the definition of services. [5]

– Other aspects of the service offering of infrastructure providers and intermediaries, such as liquidity and quality of service, are not covered. It is not the purpose of this study to provide a comprehensive assessment of the attractiveness of individual infrastructure

Arrangements in the European Union', November; Giovannini Group (2003), 'Second Report on EU Clearing and Settlement Arrangements', April.; and NERA (2004), 'The Direct Costs of Clearing and Settlement: An EU–US Comparison', Corporation of London, June.

The most recent study focusing on the prices charged by infrastructure providers is an Oxera report published in April 2010 assessing the distribution of trading and post-trading costs for a (large) user trading in UK equities within different channels and the factors driving the differences in the distribution of costs across channels. See Oxera (2010), 'Costs of securities trading and post-trading—UK equities', April, available at http://www.oxera.com/cmsDocuments/Reports/Costs%20of%20securities%20trading%20and%20post-trading%20April%202010.pdf

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. See 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'.

[5] 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; 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.

providers and intermediaries or financial centres; for such an assessment, a wider range of factors than just transaction-related costs would need to be considered.

– The 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.

Finally, the data submitted by survey participants to Oxera was subject to a non-disclosure agreement (NDA), which imposes restrictions on the way in which the data can be presented in this report. In relation to infrastructure providers, this means that it is not possible to present the cost estimates in absolute terms per individual financial centre. The cost estimates are therefore presented in relative terms (in the form of an index) per financial centre and in absolute terms *aggregated* across financial centres. In relation to intermediaries, this means that only where there were sufficient respondents per financial centre are the cost estimates presented per individual financial centre; in all other cases, data was aggregated across financial centres. This aggregation of data is also driven by the fact that most of the brokers and custodians that participated in the survey are global firms that found it difficult to break down their data by financial centre.

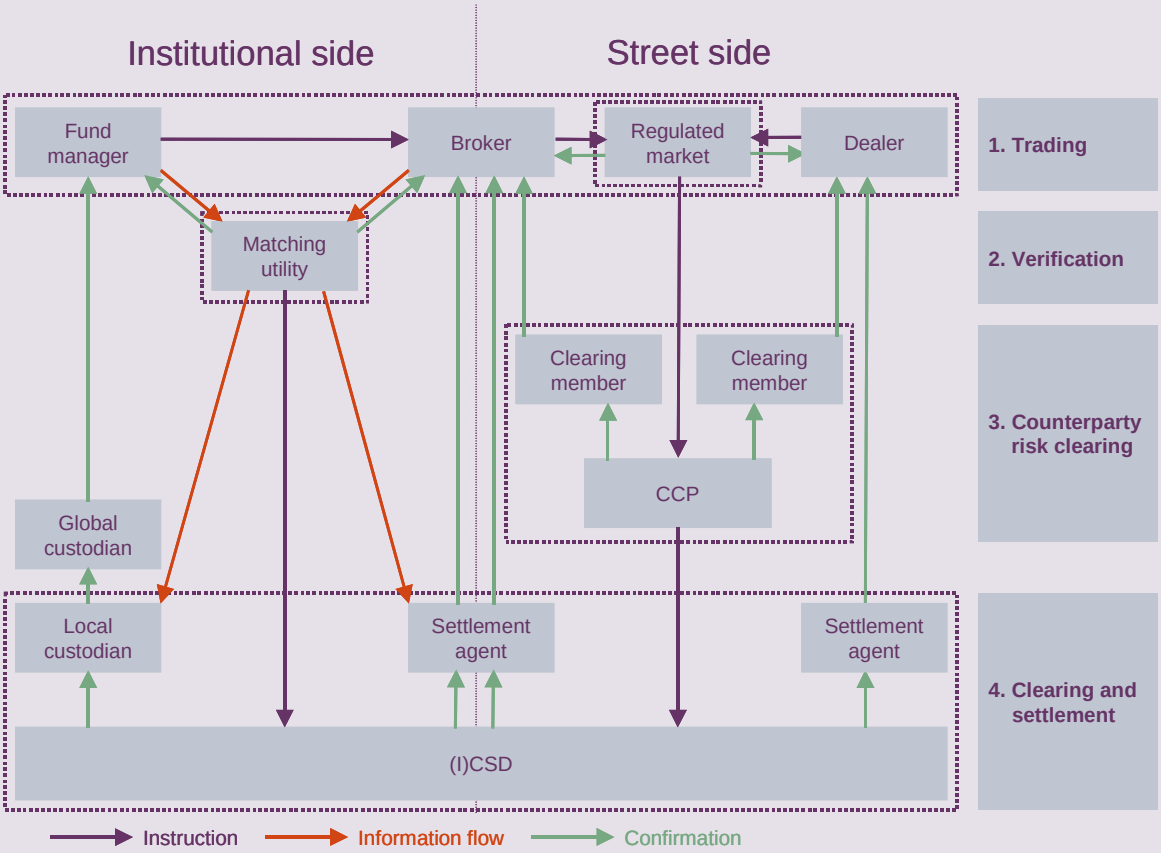
Trading and post-trading—a complex business

The ‘simple’ operation of investors buying and selling or holding securities is underpinned by a complex structure and transaction flows. It requires a number of specialised services, typically categorised as trading (offered by brokers and trading platforms) and post-trading, consisting of a range of services such as central counterparty clearing, clearing and settlement, and custody and safekeeping (offered by infrastructure providers and custodians). The box below provides a short description of the trading and post-trading value chain.

What is trading and post-trading?

Figure 1 presents a stylised illustration of the value chain for the provision of trading and post-trading services for equities. For any given trade order from investors, there are typically two transactions: one on the street side, in which the broker executes the trade via a trading platform (or other trading channels), and one on the institutional side, in which the broker completes the transaction with the investor. The transaction starts with the trade order from the fund manager (acting on behalf of the investor), and the broker then executes it on the street side, and on the institutional side with the fund manager.

Figure 1 Stylised illustration of the value chain for trading and post-trading transactions



Note: This stylised illustration combines 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.

There are numerous ways in which investors can access a particular market to undertake 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. A methodology was developed by Oxera in a previous study for the Commission to address these challenges, allowing for the measurement of prices and volumes over time on a consistent basis.[6]

[6] Oxera (2007), 'Methodology for Monitoring Prices, Costs and Volumes of Trading and Post-trading Activities', report prepared for DG Internal Market and Services.

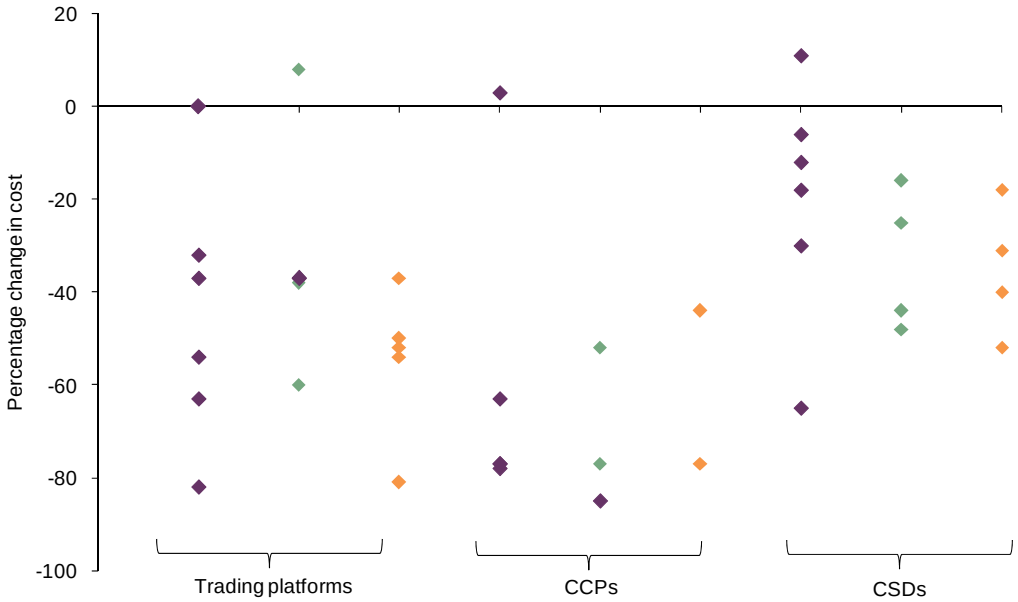
Main findings

The prices and costs of using infrastructure providers are coming down

In the past few years, various infrastructure providers have reduced their prices in response to new players entering the market. The analysis shows that, in almost all financial centres, this has resulted in a significant reduction in the costs of using trading platforms, with some financial centres indicating reductions of around 80% (expressed in terms of cost per transaction) over the period 2006–09 (see Figure 2).

Aggregating across all financial centres, trading platforms' costs for on-book trading in equities fell by 60% (from €1.18 in 2006 to €0.47 in 2009). There is significant variation across trading platforms. For example, data from brokers suggests that the costs of using trading platforms for transactions in UK equities ranged from €0.03 to around €0.30 per transaction in 2009 for a typical large broker.

Figure 2 Change in the costs per transaction of using trading platforms (equities), CCPs (equities) and CSDs (equities and fixed income securities), 2006–09



Note: For trading platforms, the cost per on-book trading transaction is shown; for CCPs, the cost per central counterparty clearing transaction is shown; and for CSDs, the cost per clearing and settlement transaction is shown. Changes in the costs of account provision and asset servicing (offered by CSDs) are not presented here, and range from –34% to +52%. The different colours denote the financial centre classifications: major (purple), secondary (green), and other (orange) financial centres. The data in this figure is taken from the tables in section 3.5.
Source: Oxera trading platforms, CCPs and CSDs questionnaires.

There has also been a general decrease in the costs of using infrastructures for post-trading services. For CCPs, cost changes ranged from +3% to –85% (for equities), with an average reduction across all financial centres of 73% (from €0.37 in 2006 to €0.10 in 2009).[7] For CSDs, clearing and settlement costs have also generally declined, as illustrated in Figure 2. The average reduction across all financial centres was 25% (from €0.48 in 2006 to €0.36 in 2009) for equities, and a decline of 35% (from €0.53 in 2006 to €0.34 in 2009) for fixed income securities,[8] ranging between +11% and –65% for individual financial centres (equities and fixed income securities taken together). For account provision (not presented in Figure 2), the data on costs does not reveal such a systematic trend—in some financial centres costs have increased, while in others they have decreased. On average, across all financial centres, the costs of using CSDs for account provision and asset servicing fell by around 9%

[7] See Table A5.10.
[8] See Table A5.13.

(from 0.19 basis points (bp) in 2006 to 0.17bp in 2009[9]) for equities, and by around 7% (from 18bp in 2006 to 17bp in 2009) for fixed income securities.

This reduction in the costs of using infrastructure providers reflects some significant price reductions made in recent years, and is arguably what would be expected as competition increases (partly as a result of the various policy initiatives aimed at strengthening competition). In those financial centres where the costs of using infrastructure providers went up, this is not necessarily due to changes in the pricing schedule—it may be due to changes in the profile of users (eg, fewer transactions resulting in lower volume discounts).

Although the cost per transaction on trading platforms has fallen in all financial centres, the costs expressed in terms of the value of trading have increased in some financial centres, including France, Germany, Italy and Spain. This may reflect a trend in the brokerage sector towards smaller transactions, which in turn is the result of brokers splitting orders into more transactions, with the aim of reducing the market impact (ie, reducing the effect that the transaction might have; a transaction might move the market price upwards when buying, or downwards when selling). This trend is also reflected in the increase in the use of transaction methods such as programme and algorithmic trading (in major financial centres, for example, this rose from 30% of all transactions in 2006 to 51% in 2009).[10] As a result, one trade order (as seen from the fund manager's perspective) today requires more trading and post-trading transactions than it did in 2006, potentially increasing investors' costs per value of trade, since trading and clearing and settlement services are generally charged on a per-transaction basis.

The average trade size of a transaction in equities on a trading platform fell from approximately €25,000 in 2006 to around €10,000 in 2009.[11] The average transaction size between 2006 and 2009 fell by between 22% and 80% in each financial centre.[12] Considering major financial centres only, the size of the decline in average transaction size ranges between 46% and 80%.[13]

On the one hand, therefore, the costs per trade of using trading platforms have fallen (as a result of lower prices and the application of volume discounts); on the other hand, they have risen (as a result of an increase in the number of transactions needed to complete a particular value of transaction required by the fund manager). In some financial centres, the net result of this is a decrease in costs per value transacted, and in other centres it is an increase.

In relation to trading services, users are charged according to the number of transactions and/or the value per transaction. For example, although most trading platforms charge on the basis of the number of transactions, some (also) charge according to the value of the transaction. Furthermore, brokerage firms generally charge for their trade execution services on the basis of the value of the transaction.

For central counterparty clearing, and clearing and settlement services, however, CCPs and CSDs (and custodians) tend to charge on the basis of the number of transactions only (although there are exceptions, such as the CSD in Greece, which charges on the basis of the value of transactions).

Irrespective of how users are charged for trading and post-trading services, from an investor point of view it is useful to measure the costs both ways: per transaction, and per value of

[9] See Table A5.13.
[10] See Table 5.2.
[11] Based on data from FESE (see Table 2.1).
[12] See Table 3.1.
[13] See Table 3.1.

transaction. Estimating the cost per value of transaction provides an effective cost estimate in relation to the value of trading, and allows a comparison of costs across the value chain.

Measuring the costs of using CCPs and CSDs in terms of the value of the transaction (at the trading level) shows a trend similar to that observed for trading platforms: although the cost per transaction has fallen, the cost per value of trade has increased due to smaller average transaction sizes in some financial centres.[14] An increase in netting efficiency can compensate for the increase in the number of CSD transactions as a result of the lower average transaction size at the trading platform level—an increase in netting efficiency means that fewer CSD transactions per value of trading would be required. However, data from the questionnaires indicates that the increases in netting efficiency over the 2006–09 period have been relatively limited in most financial centres.

Measured in terms of costs as a proportion of the value of transactions in equities, around 78% of the trading and post-trading costs that relate to infrastructures (trading platforms, CCPs and CSDs) is accounted for by trading platforms, 19% by CCPs, and 4% by CSDs. (This includes the CSD clearing and settlement costs, but does not include the CSD account provision and asset servicing costs, since these services are charged for in relation to the value of securities held rather than the value of securities traded).[15]

The costs of using intermediaries are coming down

The question is how these changes in costs have affected the fees charged by intermediaries (custodians and brokers) to end-users (fund managers and institutional and retail investors).

Custodians provided price data for predefined customer profiles, and data on aggregate revenues. Analysis of the customer profile data suggests that, on average across all financial centres, prices for clearing and settlement fell by 22%.[16] Analysis of custodians' revenue data suggests a greater reduction in clearing and settlement fees, of around 40% (from around €9 per transaction in 2006 to around €5 in 2009), while safekeeping and custody fees have remained broadly constant at around 1bp.[17] Although prices fell in the case of most custodians and across most customer profiles, the changes are not uniform. Analysis of revenue data and customer profile data suggests that costs per transaction rose in the case of a small number of custodians.

Although brokers will have benefited from reductions in the costs (expressed in terms of cost per transaction) of using infrastructure providers and custodians in most financial centres, costs expressed as a proportion of the value of transactions may have increased in some financial centres as a result of the trend towards smaller transactions. Despite this, brokers have managed to lower their commission rates (expressed as a proportion of the value of transactions). Data from institutional brokers indicates that the average commission rate (for equities domiciled in all 18 financial centres covered by the study) fell by 21%, from around 9bp in 2006 to 7bp in 2009.[18] This is confirmed by data from fund managers that suggests that commission rates fell by around 25%.[19] These averages mask a significant variation in reductions across financial centres. Furthermore, part of the reduction in commission rates might be due to unbundling of services—eg, non-execution services such as research no longer being paid for through the trade execution commission rate.

Like institutional investors, retail investors have also benefited from reductions in brokerage commission rates. Commission rates charged by retail brokers fell by around 35% between

[14] The approach to the analysis of the cost per value of transaction is described in section 3.4.

[15] See sections A5.3.2, A5.4.2 and A5.5.2. Sums to more than 100% as a result of rounding.

[16] See section 6.5.1.

[17] See section 6.5.1.

[18] See Table 5.1.

[19] See Table 5.4.

2006 and 2009. (For retail investors in major financial centres, they fell from around 29bp in 2006 to 19bp in 2009, and in secondary and other financial centres from 46bp in 2006 to 30bp in 2009.[20])

Market integration

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. Analysis of the data reveals that there are no significant differences between 2006 and 2009.[21] In the major financial centres, between 30% and 70% of equity investments (managed by institutional fund managers) are allocated to domestic securities, while for retail investors the home bias is even stronger: between 40% and 95% of the trading by retail brokerage firms in the sample is in domestic securities. The degree of home bias varies between financial centres, and is less pronounced in some smaller financial centres. For example, the proportion of equities invested domestically in Austria, Belgium, Denmark, Luxembourg and the Netherlands lies between 10% and 30%.

The way in which the transactions in securities across the border are traded, cleared and settled, however, suggests that markets are becoming more integrated. For example, an increasing proportion of members on trading platforms, CCPs and, to a lesser extent, CSDs originate from outside the domicile of the infrastructures. In the case of CCPs, this reflects the entry of new pan-European CCPs. A large proportion of the members of these CCPs are located outside the domicile where the CCP's head office is located. Between 2006 and 2009 the cross-border proportion of members of trading platforms in Austria, Belgium, Denmark, France, Ireland, the Netherlands, Portugal and the UK rose by 13–31%. In Greece and Luxembourg, it almost doubled, with increases of 80% and 115% respectively, while in Germany it increased by around 5% and in Switzerland there was a decrease of 10%.[22] Aggregated across all financial centres, the ratio of cross-border members to total members increased by 11% (from 35% in 2006 to 39% in 2009[23]). This rise in the proportion of cross-border members is also reflected in the proportion of activity by cross-border members of infrastructures, and is consistent with the increase in the direct use of CSDs reported by brokers. In 2006, 88% of brokers reported using a CSD directly, compared with 93% in 2009.[24]

Cross-border transactions

The analysis indicates that trading and post-trading services can still be more expensive when purchased for cross-border transactions. In relation to custodian services there is no evidence that the difference in costs between domestic and cross-border transactions has become smaller—indeed, there are indications that it may have become larger (in percentage terms) over time. This suggests that, although the overall costs of custodian services have fallen, the costs of domestic transactions have come down more than the costs of cross-border transactions. Figure 3 presents the ratio of the costs of clearing and settling cross-border securities (equities and fixed income) to the costs for domestic securities based on customer profile data from custodians. The ratio varies across types of client and types of service: brokers find cross-border clearing and settlement services most expensive relative to domestic services in 2009, while for custody and safekeeping, other custodians experienced the largest cross-border to domestic ratio in 2009, at approximately 250 (not presented in Figure 3 below).[25]

[20] See Table 5.4.

[21] See section 4.1

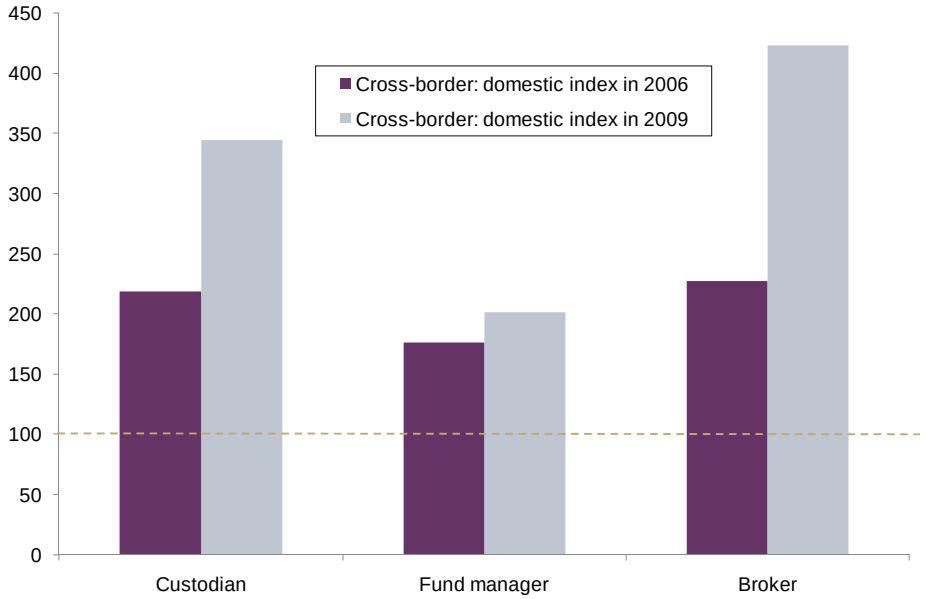
[22] Data is taken from the tables for the individual financial centres in section 3.5.

[23] See Table 4.8.

[24] See Table 4.12.

[25] There is insufficient data to present an analysis of the costs of domestic and cross-border activities over time on the basis of the fund managers and brokers questionnaires.

Figure 3 The costs of cross-border clearing and settlement (index)



Note: The data in the figure is taken from Table 6.4. A series of two-sample t-tests for both types of fee 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 except for the difference in settlement fees for domestic transactions between 2006 and 2009 charged to fund managers.
Source: Oxera.

Data on the costs of CSD services shows a different pattern. The difference between the cost of clearing and settlement for domestic and cross-border transactions has fallen by 36% and for account provision and asset servicing by 12%.[26] Most CCPs provided data on the costs for domestic securities only. Where data was provided, the costs of central counterparty clearing services for domestic and cross-border securities were very similar, and this relationship remained stable over the period between 2006 and 2009.

On the basis of fund management firm data, trading services purchased from brokers are generally more expensive when purchased for cross-border securities, but the difference in costs between domestic and cross-border transactions has become smaller over time. Interestingly, the cost of trading cross-border securities varies across fund managers, with some finding domestic services more expensive.

The differences between the costs of securities in different domiciles can be attributed to a number of factors:

– cross-border barriers;
– economies of scale;
– variation in the types of service available/provided;
– variation in the costs of trading and post-trading services across financial centres.

There are specific legal and technical barriers that make cross-border trading more costly than domestic trading, which the Commission and the industry have been working to remove.

Given the substantial variation in the costs of trading and post-trading different 'cross-border' securities, cross-border barriers can go only some way in explaining the full variation in trading and post-trading costs. For example, it is not uncommon for some fund management firms to incur costs of up to ten times the value of their lowest fee for the 'same' service, but for a different domicile of security. In such cases, the volume of services being undertaken,

[26] See Table 6.12.

the specific domicile in question, and the details of the service provided can be particularly important cost drivers.

Economies of scale and variation in costs across financial centres

Economies of scale are significant in this sector, as reflected in the widespread practice of volume discounts. This means that using a broker or custodian that is not located in the domicile of the security is generally more expensive than using a local or global broker/custodian, because the former will typically have much lower transaction volumes than the latter.

The analysis also shows that the costs of trading and post-trading services in some financial centres are higher than in others, although the differences have become smaller over time. This is reflected in data from brokers that indicates that the cost of trading varies per domicile of equity. For example, all institutional brokerage firms in the sample charge, on average, around 7bp for trading in equities domiciled in one of the financial centres covered by this study, but more for trading in equities domiciled in some of the smaller financial centres, such as Poland and the Czech Republic, where trading costs are around 23bp, and Greece, where the cost is approximately 13bp.[27] The cost of trading in securities domiciled in particular financial centres 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. Data on post-trading shows a similar pattern. The costs of settlement and safekeeping services vary by domicile of security. It is not clear from the data whether the variation in costs across financial centres has become smaller.

This variation in costs across financial centres explains some of the higher costs of cross-border transactions. If the investor is located in a 'cheap' financial centre and trades in an 'expensive' financial centre, this will result in the costs of cross-border transactions being higher than those of domestic transactions.

The variation in costs across financial centres might in turn be explained by differences in the services offered. For example, in some financial centres, trade execution is offered in a bundle with other services such as research, while in other financial centres it is not, or it is offered in this way but to a lesser extent. (This may, for example, explain the relatively low cost of trading in Italian equities, at 4.1bp.[28])

In some cases, the variation in costs might also be due to economies of scale at the level of the financial centre, explaining why trading and post-trading is more expensive in some smaller financial centres.

The combined effect of these two factors (economies of scale and variation in costs across financial centres) is interesting. The pattern that emerges is that the domestic transactions of investors domiciled in a major financial centre will tend to be of high volume and will be undertaken in a relatively cheap market, while their cross-border transactions are likely to be of 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.

[27] See section 5.2.1.

[28] See Table 5.1.

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.[29] The European Commission refers to the methodology paper as Lot 1; the first application of that methodology, the results of which were presented in an Oxera report published in 2009,[30] is referred to as Lot 2; and the second application, the results of which are presented in this report, is referred to as Lot 3.

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).

The 2009 Oxera report presented an analysis of the costs of trading and post-trading services at the level of trading platforms, CCPs, and CSDs over the period 2006 and 2008 and the baseline (year 2006) for the costs of trading and post-trading services at the level of fund managers, brokers, and custodians.

This report presents an analysis of the costs of trading and post-trading costs at all levels in the value chain for the period 2006 to 2009. It provides answers to the following key questions.

– What channels do investors and intermediaries typically use to trade, clear and settle? Has this changed over the period 2006–09?

– How have the costs of trading and post-trading activities in Europe changed over the period 2006–09?

– Are the costs of cross-border transactions higher than those of domestic transactions, and if so by what order of magnitude and to what extent has this changed over the period 2006–09?

The 2009 report showed that there had been a reduction in the costs of using trading platforms for (on-book) trading expressed in terms of costs per transaction. 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 had not systematically decreased (or increased). This report extends the value of trading analysis by assessing whether there are similar trends at the level of CCPs and CSDs. In other words, has the cost per transaction of using CCPs and CSDs decreased but the cost per value of transaction increased?

[29] Oxera (2007),Methodology for Monitoring Prices, Costs and Volumes of Trading and Post-trading Activities', report 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.

[30] Oxera (2009), 'Monitoring prices, costs and volumes of trading and post-trading services', report prepared for European Commission DG Internal Market and Services, August. Available at http://ec.europa.eu/internal_market/financial-markets/docs/clearing/oxera_study_en.pdf.

1.2 Why a price monitoring study?

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.[31]

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.[32] It concluded that, until these barriers are eliminated, the EU clearing and settlement environment would continue to be comprised of largely 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.[33] In its May 2006 draft working document, it summarised its overall policy objectives and approach to post-trading activities.[34]

The Commission has also launched several policy initiatives, ranging from specific measures to remove the Giovannini barriers, to an industry Code of Conduct.[35] 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.[36]

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 national and European trade associations, have largely resulted in reasonable 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.

[31] 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.

[32] Ibid.

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

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

[35] 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.

[36] For an overview of the work done by the European Commission and industry in the area of trading and post-trading, see CESAME (2008), 'Solving the industry Giovannini Barriers to post-trading within the EU', November 28th. For a more general assessment of European financial integration, see European Commission (2009), 'European Financial Integration Report (Commission Staff Working Document), December 11th.

1.3 Specific features of this study

Compared with previous studies on the costs of trading, clearing and settlement, this study is broader in scope, with greater coverage in terms of both different types of cost and intermediaries and financial centres, and better access to detailed data on prices and volumes.[37]

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.[38] 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, across 18 financial centres in Europe.

Furthermore, rather than measuring costs on the basis of pricing schedules, this study measures the unit cost for the trading and post-trading services on the basis of the revenues (divided by the number or value of transactions) of the providers of the services and the total costs (divided by the number or value of transactions) incurred by the users of the services. Measuring costs on the basis of pricing schedules can provide cost estimates for specific user profiles only, but not necessarily for an average user. The advantage of the approach in this study is that the actual costs incurred by users, on average across the market, are measured.

The research was subject to a number of limitations which are explained in more detail in section 2. It should also be noted that 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.

1.4 Structure of the report

This report is structured as follows.

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

– Section 3 summarises the results of the analysis of the data provided by the trading platforms, CCPs and CSDs. In particular, it shows changes in costs over 2006–09 at the individual financial centre level.

– Section 4 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

[37] 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.

[38] 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. The most recent study focusing on the prices charged by infrastructure providers is an Oxera report published in April 2010 assessing the distribution of trading and post-trading costs for a (large) user trading in UK equities within different channels and the factors driving the differences in the distribution of costs across channels. See Oxera (2010), 'Costs of securities trading and post-trading—UK equities', April. Available at http://www.oxera.com/cmsDocuments/Reports/Costs%20of%20securities%20trading%20and%20post-trading%20April%202010.pdf.
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. See 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'.

market integration by measuring the holdings of institutional and retail investors of securities in domestic and foreign financial centres.

– Section 5 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 6 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 analysis of changes in the costs of using infrastructure providers aggregated across financial centres over time (Appendix 5); an analysis of trends in the average value of on- and off-book transactions (Appendix 6); changes in activity and costs in various individual financial centres between 2006 and 2008 (Appendix 7); and a glossary of terms (Appendix 8).

2 Methodological aspects and research activities

2.1 Methodological aspects[39]

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, to the extent that there is sufficient data available, the provision of trading and post-trading services by reference to domestic providers and multi-market or global providers.

In this study, 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.[40]

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.

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 former are measured from a fund management firm perspective, while the latter 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-

[39] Part of the text in this section is taken from the 2009 Oxera report, updated where relevant.

[40] 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.

transactions are inputs into the end-to-end price, movements in their prices (and their volumes) will influence this end-to-end price.

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 between, and a larger sample of, survey participants in order to ensure that the analysis of a financial centre was fully representative and the services being compared were, in fact, the same.

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 in any particular year), and, on the other hand, obtaining sufficiently 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 over time (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.

This means that, unless stated otherwise, the indicators in this report are measured on the basis of a consistent sample over time—in other words, on the basis of data supplied by firms that participated in both the first and second survey. Since some of the firms that participated in the first survey did not participate in the second survey, there may be differences between the indicators for 2006 in this report and the previous report. Where relevant, indicators were also measured on the basis of the full sample (ie, including firms that provided data for only one year) and compared with the indicators on the basis of the consistent sample to assess whether they were sufficiently in line with each other.

The indicators are based on weighted averages across the survey participants, using as weights metrics such as the number and value of transactions. Thus, any changes in the indicators may be driven by changes in the costs incurred by individual firms and/or in the share of individual firms in the sample. For example, if the market share of a brokerage firm that pays relatively low custodian fees increases in the sample, the weighted average cost of using custodians would fall. Where relevant, indicators for 2009 were therefore also measured on the basis of market shares for 2006 to identify whether changes in market shares were distorting the results. Although not the case in general, adjustments were made where it was the case.

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.

It should also be borne in mind that most indicators are averages across firms. Thus, for example, an average reduction in costs does not necessarily mean that the costs fell for all individual survey participants—it may mask a combination of increases and decreases in

costs. Where there was a signification variation in indicators at the individual firm level, this is noted.

Furthermore, changes over time can be due to various factors and do not necessarily represent a particular trend. For example, changes in the profile of trades can affect overall costs, but the resulting changes in costs do not necessarily represent an industry-wide trend.

For most trading and post-trading services, data on costs is measured from both sides (ie, both buyers and sellers of services) for any level of 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 levels of 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, changes in price on one side at any level in the value chain have been cross-checked against changes in price on the other side.

2.2 Scope

2.2.1 Prices and costs

In general in this report, prices refer to the analysis done where respondents are reporting the prices they charge, while costs 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.[41] 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 does not have its own presence in all the local markets it provides service for, but appoints intermediaries to access these.

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

– **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.[42]

– **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.[43]

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.[44] 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.[45] 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.

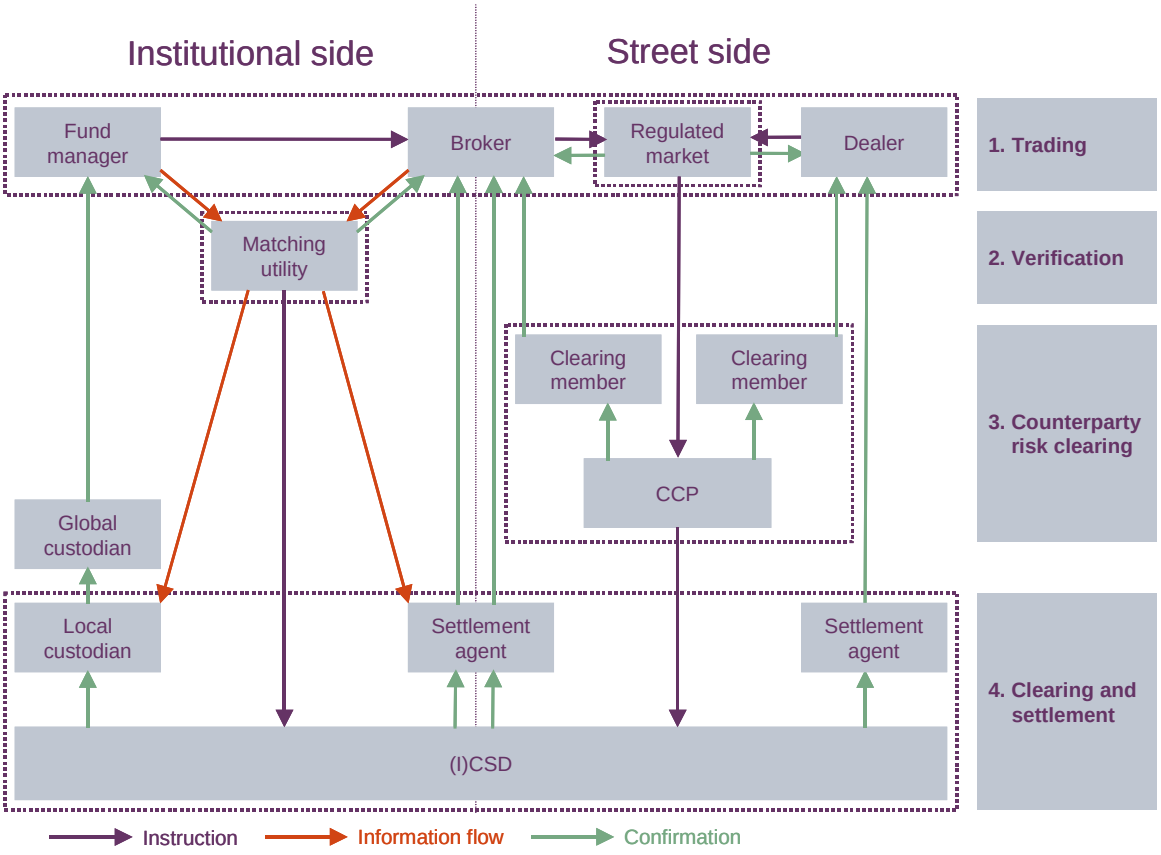
[42] ECSDA (2007), 'Glossary—Definitions of Services Relevant to the Code of Conduct', December. This draws on many definitions in European Commission DG Internal Market and Services (2006), 'Draft Working Document on Post-trading Activities', May.

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

[44] 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 Oxera methodology paper.

[45] 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 takes place between broker/dealers, and the 'institutional side' takes place between a broker/dealer and the investor (either an institutional or retail investor).

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



Note: This stylised illustration combines a regulated market with a CCP on the street side with a centralised matching utility on the institutional side. As such, it 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.

2.2.3 Types of security and trading

This study covers equities and fixed income securities in dematerialised or immobilised form.[46] In general, there is more data available in relation to equities than in relation to fixed income securities. 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.

Although the focus is on monitoring the cost of on-book trading, where relevant and possible, the cost of off-book trading is also measured. On- and off-book trades in this report are defined as follows:

[46] 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.

– on-book trades are transfers of ownership by way of trades executed through an exchange's or MTF's electronic order book, where orders placed by trading members are usually exposed to all market users and automatically matched according to precise rules set up by the exchanges/MTF and whose prices are displayed to the market. These trades may include floor trading organised by an exchange/MTF;

– off-book trades are not executed through an electronic order book on an exchange, but rather confirmed through a system managed (directly or indirectly) by an exchange or MTF, where both seller and buyer agree on the transaction (price and quantity). This system checks automatically whether the transaction is compliant with the exchange rules.

2.2.4 How are transactions measured—single- or double-counted?

Not all trading platforms count the volume of trades on their platform in the same way: some count a transaction once (single-counting), others count it twice (double-counting) because the buy and the sell are viewed as distinct transactions. In this report, transactions are double-counted at the trading platform, CCP and CSD level; this means that a transaction always refers to one side of the transaction (the buy or the sell). Where infrastructure platforms submitted data on transactions that were single-counted, appropriate adjustments were made.

This is in line with the way users of infrastructure providers are charged (each buyer and seller is charged a separate fee) and is consistent with the way users of infrastructure providers (eg, brokers) reported their trading and post-trading data.

2.2.5 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.[47]

These financial centres were selected as part of the analysis in the methodology paper.[48] 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.

2.2.6 Evolution in European securities markets

The landscape of capital markets has changed over the period 2006–09 (see Table 2.1). Over this period, the number of equity trades has almost doubled, with growth coming from both exchanges and MTFs; by contrast, the value of equities traded has declined significantly. In relation to fixed income trading in Europe, the number of trades has remained stable, but the value of trading has increased by approximately 50%.

[47] Definition taken from FESE.

[48] Section 3 of the Oxera methodology paper describes the selection process.

Table 2.1 Evolution of equity and fixed income markets, 2006–09

	Equities			Fixed income		
	Trades	Turnover (€m)	Average size of transaction	Trades	Turnover (€m)	Average size of transaction
2006 total	477,959,619	16,745,939	35,036	8,617,311	9,721,109	1,128,091
2009 total	904,150,671	9,513,038	10,522	8,208,711	13,624,271	1,659,733
of which: exchanges	661,986,147	8,155,163	12,319	—	—	—
MTFs	242,164,524	1,357,875	5,607	—	—	—

Note: This table relates to trading in the 18 financial centres (and includes NASDAQ OMX Nordic). The MTFs included in 2009 are BATS Europe, Burgundy, Chi-X, NASDAQ OMX Europe and Turquoise.
Source: Oxera analysis of FESE statistics.

Even at this level of analysis, patterns emerge: the average transaction size for equities (which are largely traded on electronic order books) has fallen, while for fixed income securities (which are largely traded away from an electronic order book), the average trade size has risen.

2.3 Research activities

The application of the Oxera methodology involved the following activities.

– **Reviewing questionnaires and handbooks**. For the first application of the methodology (which resulted in the 2009 Oxera report), Oxera formulated data requirements and assessed the availability of data in meetings with intermediaries and infrastructure providers. With input from intermediaries, infrastructure providers and national and European trade associations, questionnaires were subsequently designed. Since the scope of the study has been kept the same, the same questionnaires have been used for this second survey, although these were reviewed and some changes made, and clarification was provided to make it easier for firms to complete the questionnaires. The handbooks prepared for the previous survey (to guide the respondents through each question, with a glossary and answers to frequently asked questions) were also updated.

– **Conference calls and meetings** were held with individual intermediaries, infrastructure providers and trade associations to update them on the process for the second survey.

– **Preparing the survey sample**. As explained in the previous Oxera reports, the aim is to track the same firms over time, to the extent that this is possible. Given that firms have different user profiles and vary in size, and may define services and transactions in different ways, if surveys were based on a different sample of firms, the results and findings could be affected. Therefore, the firms invited to participate in the first survey were also invited to participate in this second survey. In a few cases, where new types of service provider had emerged (eg, trading platforms), firms were added to the list of those asked to provide information.

– **Undertaking the survey**. Questionnaires were sent to the selected infrastructure providers, fund management firms, institutional and retail brokerage firms, and custodians. 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.

As was the case for the first survey, the data provided has been covered by a **Non-disclosure agreement** (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 can still be presented in relative terms (in an index form) per financial centre and/or aggregated across financial centres. The names of survey participants are not disclosed. For infrastructure providers, 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. For intermediaries, where there is insufficient data per financial centre, data has been aggregated across financial centres. In accordance with the NDA, the draft results of this study were sent to infrastructure providers and intermediaries before publication of the report.

2.4 Addressing challenges

The 2009 Oxera report described how a number of practical challenges faced when undertaking the survey and the data analysis were addressed. Most of the observations in relation to these challenges are still valid and therefore summarised in this section.

2.4.1 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.[49]

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.

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

[49] 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; 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.

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 in the future makes it easier to capture 'pure' trade execution costs.[50] For the first and second surveys, brokerage and fund management firms did not provide sufficient information on the costs of non-trade execution services.

Fourth, the firms were asked to describe their services and categorise them into predefined high-level services.

Intermediaries and infrastructure providers indicated that there were no significant changes in the categorisation of their services. Some infrastructure providers mentioned significant changes in the description of their services (that could affect the comparison of costs over time). These are referred to in the relevant sections of this report.

2.4.2 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 the number of trading transactions per order (which varies across firms and over time), and the degree of netting by CCPs. In principle, the value of transactions is consistent throughout the value chain, and therefore cost as a proportion of the value of transactions is 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. The results of the value chain analysis should therefore be considered indicative and an illustration only.

2.4.3 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.

– **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.

  Most 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 is not possible to monitor the costs of trading and post-trading activities for 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

[50] For the developments in the UK, see Oxera (2009), 'Soft Commissions and Bundled Brokerage Services: Post-implementation Review', prepared for the Financial Services Authority.

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. This affects the ability to distinguish between domestic and cross-border trading transactions from a brokerage perspective (as explained in more detail in section 5).

– **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. The analysis presented in the 2009 report concluded that this approach was appropriate.[51] 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.

2.4.4 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.

2.4.5 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, it 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 according to 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

[51] See Appendix 2 in the Oxera 2009 report.

security, blended rates are broken down into rates for domestic and cross-border transactions.

2.5 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 first survey (for 2006 data), covering around 23% of the market in terms of value; in 2009, more than 20 firms participated, covering around 10% of the market in terms of value (19 of which also participated in the first survey).[52] While the study makes a distinction between retail and institutional investors, it is not possible to distinguish between small and large institutional investors.

– **Brokerage firms**. Close to 40 firms participated in the first survey (for 2006 data), consisting of a large number of global (or multi-market) firms and a smaller number of local brokerage firms; in 2009 close to 20 firms responded to the survey (10 of which also participated in the first survey). In terms of the proportion of the market that they cover, this has remained fairly stable, at around 32% in 2006 and 29% in 2009 (the market is measured in terms of value of equity trading[53]). This is because a large number of global brokerage firms responded, while local brokers, in particular, did not participate in the second survey. 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 particular, in some major and secondary financial centres—the survey sample does not contain any local brokers. When considering the market coverage, again in terms of the value of equity trading, the coverage of brokerage firms that provided responses both in 2006 and 2009 is around 17%.

  The fact that a relatively 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 2006 and around 20 firms responded in 2009 (17 of which also participated in the survey in 2006). There were too few responses to allow changes over time to be presented per individual financial centre. Changes over time have therefore been analysed in aggregated form across financial centres.

– **Custodians**. Around 60 custodians participated in the survey in 2006 and around 30 firms in 2009, covering around 86% of the market in terms of value of assets held in 2006 and 47% in 2009.[54] Twenty custodians participated in the surveys for both years.

[52] 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).

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

[54] 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 that are 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.

When restricting the analysis to the custodians that responded in both years, the market shares of these firms are 46% in 2006 and 47% in 2009, reflecting the inclusion in the survey of five of the largest custody banks.

– **Infrastructure providers**. Almost all infrastructure providers participated in the survey, including the new MTFs and CCPs.[55]

[55] The CSDs in Denmark, Norway and Luxembourg and the trading platform and CSD in Czech Republic did not provide sufficient data this time around.

3 Changes in indicators over time (infrastructure providers)

This section sets out changes in the key indicators over time (from 2006 to 2008, 2008 to 2009 and 2006 to 2009) for the trading platforms, CCPs and CSDs. It also provides an indication of the trends in the distribution of users/members[56] (domestic versus cross-border), and average (unit) costs.

The methodology is applied consistently across the financial centres, as far as is possible. 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 intentionally 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.

International CSDs (ICSDs)—the analysis of data from ICSDs is presented in section 3.5.18. Due to the specific nature of ICSDs, they are not included in the aggregate analysis (across financial centres) in Appendix 5.

New entrants (eg, trading platforms and CCPs)—new entrants are included in the sub-sections in section 3.5 in the financial centres where they are domiciled. Although most of the new entrants are pan-European firms, they are included only in the analysis of the financial centre where they have their head office. New entrants are also included in the aggregated analysis (across financial centres) in Appendix 5.Equities and/or fixed income securities—unless otherwise indicated, in this section the costs of using trading platforms and CCPs refer to transactions in equities and the costs of using CSDs refer to transactions in both equities and fixed income securities (indicated as ‘total securities’). The same approach is followed in relation to the aggregated analysis in Appendix 5, with the exception of CSDs, for which the costs are presented separately for equities and fixed income securities.

3.1 Approach to estimating changes over time

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

– the distribution of activity of domestic and cross-border members;
– 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
– the costs of services.

[56] In the context of trading platforms, CCPs and CSDs, users are often referred to as members.

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 the 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 2009, 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 2006–09, defined in terms of:
  - the proportion of members domiciled outside the domicile of the infrastructure provider;
  - the proportion of activity (eg, trading value) of members 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 2009 for different services, in each case segmenting the change between 2006–2008 and 2008–09. The specific indicators vary between types of infrastructure firm, and are summarised below.

For trading platforms, the indicators measure changes in the costs of trading services between 2006 and 2009 (including intermediate time segments) 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 activity (ie, the sum of on-book trading and order management);
- changes in the costs of off-book trading.

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

For CCPs, the indicators measure changes in the costs of services offered by CCPs between 2006 and 2009 (including intermediate time segments):

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

For CSDs, the indicators measure changes in the costs of services offered by CSDs between 2006 and 2009 (including intermediate time segments):

– changes in the costs of account provision and asset servicing;[57]
– 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, to report costs in basis points and per transaction in euros, respectively.

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 2009, similar to individual financial centre analysis, segmenting the change between 2006–2008 and 2008–09. 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 5 and 6, 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 and 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.

3.2 Individual financial centre analysis

3.2.1 Interpretation of results

The analysis in this section focuses on how the *unit costs* faced by users of relevant services changed between 2006 and 2009, including intermediate changes between 2006–2008 and 2008–09. For example, CSDs' clearing and settlement costs, expressed in terms of costs per transaction, 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 changes not only in infrastructures' prices or pricing structures, but also, for example, in the nature of users' activities. 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 to users. At the same time, changing the fee/price structure (eg, by introducing volume discounts) would also affect the costs to users in a more idiosyncratic way (including a rise in costs for a particular user, even if prices, on average, are falling).

– **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 changes in the 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.

[57] Definitions of these services are provided in the glossary in Appendix 8.

– **Changes in the mix of securities**. If the types of service required for different securities differ then changes in the mix of securities can result in changes in average 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.

– **Changes in the 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 when measured per value of transaction.

A number of other factors can affect costs, including the total amount of activity across the market (if, for example, rebates are 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. Section 3.4 considers 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. In doing so, this analysis allows assessment 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 the 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, an increase in on-book trading relative to 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.

3.2.2 Impact of exchange rate fluctuations

The change in the costs of services across infrastructure providers, presented above and subsequently in section 3.5 across individual financial centres, is measured using data reported in euros. Although the majority of infrastructures that provided data charge for the relevant services in euros, a number of them charge for these services in local currencies, For the purposes of analysis, the data from these infrastructure providers was converted into euros (by the infrastructure providers themselves or by Oxera) to examine the trends in costs. As a result, some of the reported changes in costs on a per-transaction basis over time will arise from changes in the exchange rate rather than changes in prices as measured in that local currency. Where the local currency has appreciated against the euro (ie, in 2009 fewer units of local currency were needed to buy the same amount of euros), this will result in an apparent rise in the cost per transaction when measured in euros, even if the average cost has remained the same in the local currency. Where the local currency has depreciated, this will result in an apparent fall in the cost per transaction measured in euro.

The percentage change in exchange rate per euro across the financial centres where the prices charged were not in euros, from 2006 to 2009, was as follows.

CZK/euro	7.0
DKK/euro	0.0
NOK/euro	–8.0
PLN/euro	–10.0
SEK/euro	–13.0
CHF/euro	4.0
GBP/euro	–23.0

For most of these financial centres, the impact of the changes in exchange rate is relatively small. The UK is an outlier, with a change of around –23%. Across these selected financial centres, when interpreting the change in per-transaction cost over time, the reader should take account of the impact of the exchange rate changes.[58]

Where prices are charged or calculated in basis points, there should be no, or little, impact on the price changes arising from exchange rate changes, since both the denominator and the numerator will change by the same amount.

3.2.3 Reporting of data

The results are presented consistently across the financial centres. In presenting the 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.

[58] The decomposition of the reported change into the effect of the exchange rate and the effect of cost changes measured in local currency is quite complex. However, where the exchange rate changes is small, the decomposition by simple addition is a reasonably proxy. So, for example, if the total change is –25%, and the exchange rate change is –5%, the local price change will be approximately –20% (it would actually be –21%).

3.3 Main trends

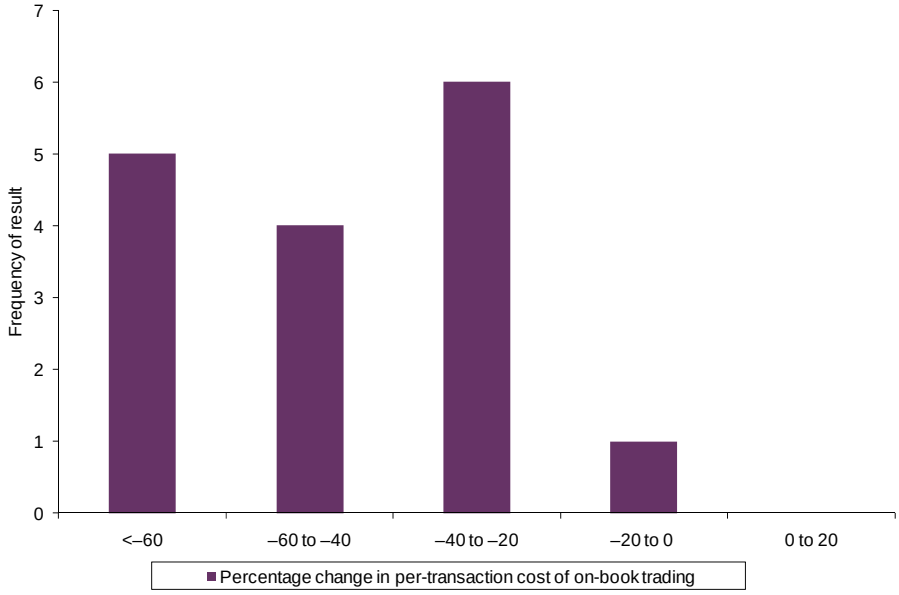
The evidence on changes in activity and costs in various individual financial centres between 2006 and 2009 provides a number of insights, as follows. (Appendix 7 reviews similar trends between 2006 and 2008.)An increasing proportion of members on trading platforms, CCPs and, to a lesser extent, CSDs originate from outside the domicile of the infrastructures. In the case of CCPs, this reflects the entry of new pan-European CCPs. A large proportion of the members of these CCPs is located outside the domicile where the CCP's head office is located. 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 2009 there appears to have been a trend towards increasing use of infrastructures in other financial centres.

Across financial centres, there appears to be a mixed trend in terms of the proportion of trading activity in cross-border equities on trading platforms and CSDs. In other words, for a number of financial centres, a decreasing proportion of trading is represented by activity in cross-border equities, whereas for other financial centres this has increased. At the same time, in the case of CCPs, there appears to be an increase in the proportion of trading activity in cross-border equities. Trends across fixed income securities also present a similar picture.

Across financial centres, there has been a reduction in on-book trading costs (equities) expressed in terms of costs per transaction (see Figure 3.1). In other words, in most financial centres, the average cost per trade incurred by market participants in 2009 was significantly lower than in 2006. The previous Oxera report already showed that the cost per transaction had come down over the 2006–2008 period (see Appendix 7), and this trend continued during 2008–09. At the same time, expressed in terms of cost per value of trading (see Figure 3.2), the pattern of changes is different; using this measure the trading costs facing investors have not systematically decreased (or increased)—the decrease in cost per transaction is offset by the decrease in the value of each transaction, resulting in the average cost per value of transaction remaining more or less the same. In most cases, the decline in the average value of transactions across trading platforms (see Figure 3.3 below) was in excess of 40%.

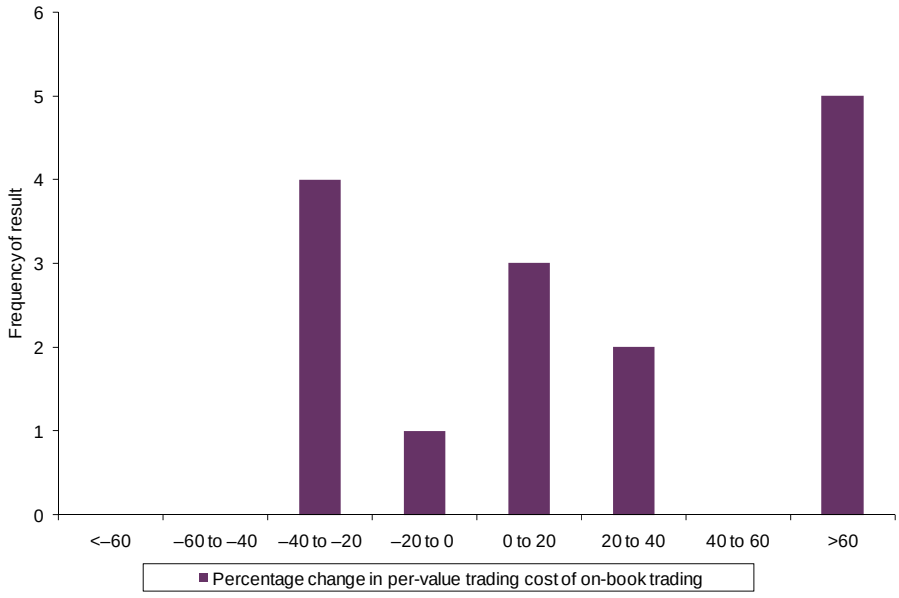
The overall costs (ie, the combined on-book trading and on-book order management costs) appear to exhibit similar trends to those observed for the on-book trading (equities).

Figure 3.1 Change in on-book trading costs (per transaction) between 2006 and 2009 (equities)



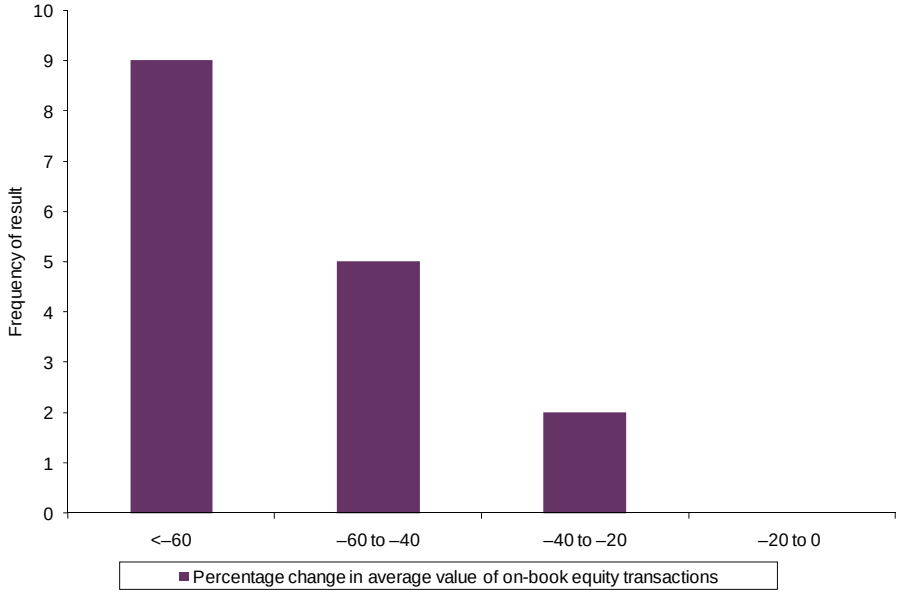
Source: Trading platform questionnaires, and Oxera analysis.

Figure 3.2 Change in on-book trading costs (per value of transaction) between 2006 and 2009 (equities)



Source: Trading platform questionnaires, and Oxera analysis.

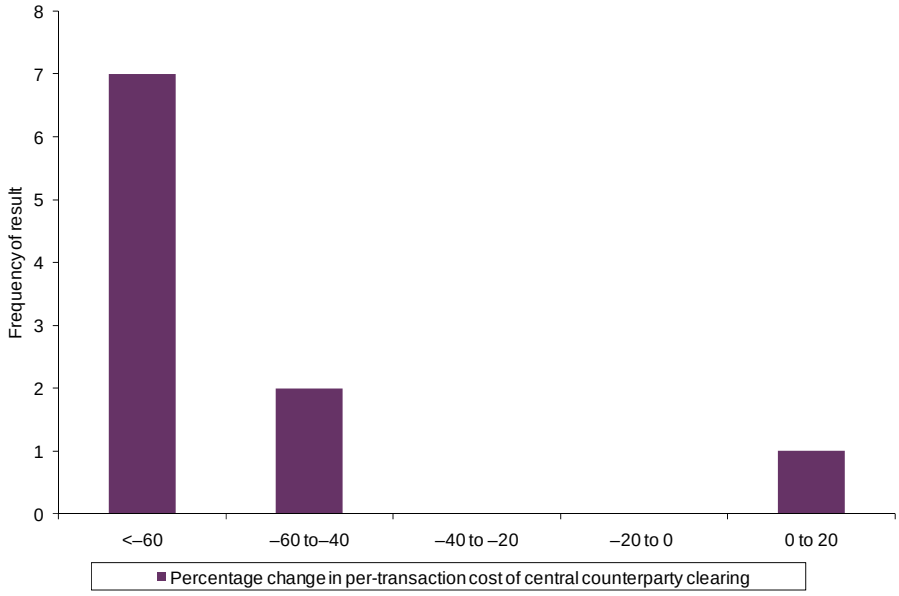
Figure 3.3 Change in average value of on-book equity transactions between 2006 and 2009



Source: Trading platform questionnaires, 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 3.4) (equities). In other words, in most financial centres with CCPs, the average central counterparty clearing cost per transaction incurred by market participants in 2009 was significantly lower than in 2006. The decline in cost for CCP transactions between 2008 and 2009 is consistent with the trend observed between 2006 and 2008. 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 2009.

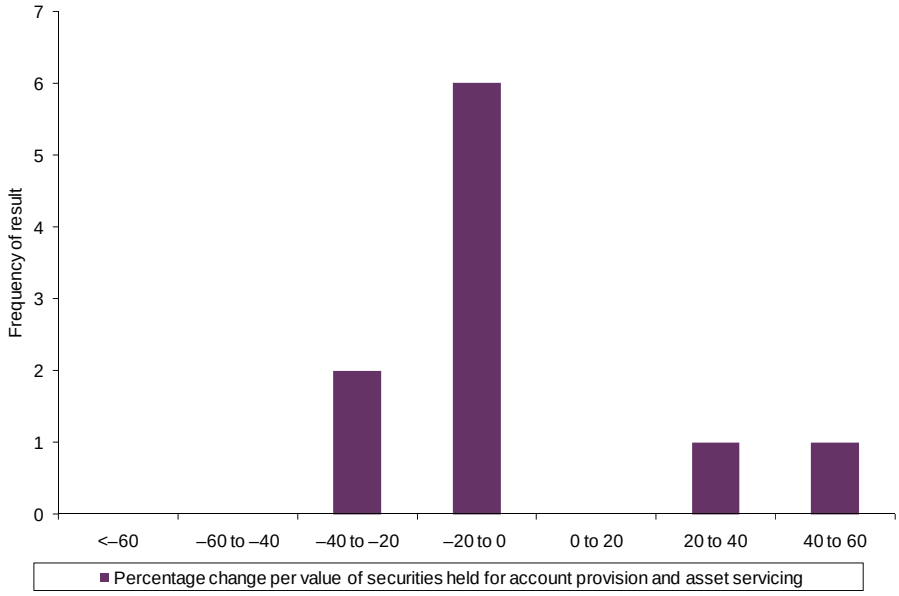
Figure 3.4 Change in central counterparty clearing costs (per transaction) between 2006 and 2009 (equities)



Source: CCP questionnaires, and Oxera analysis.

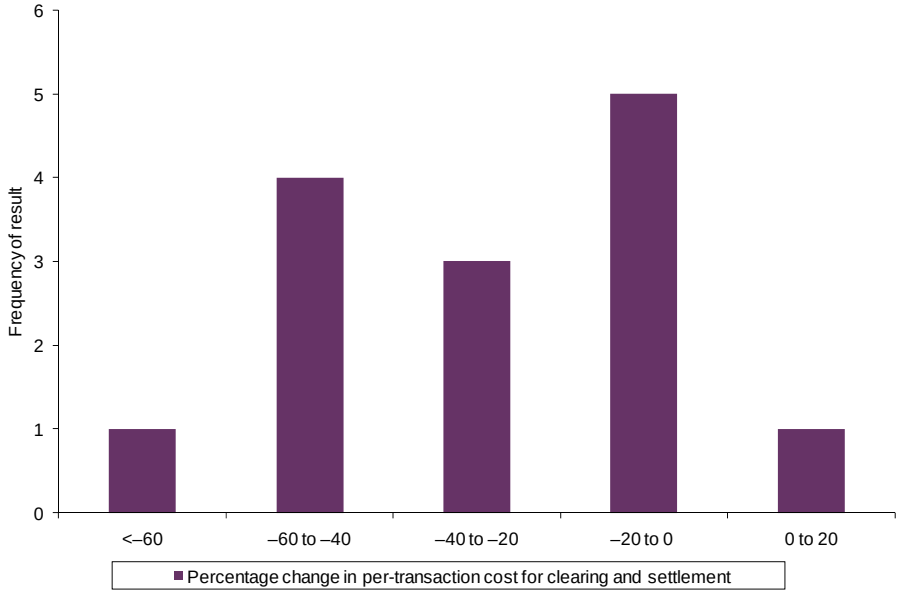
The data on CSDs across financial centres reveals that, in a large number of financial centres, the costs for account provision and asset servicing, and clearing and settlement fell between 2006 and 2009 (as shown in Figures 3.5 and 3.6) (total securities). The trend was less systematic between 2006 and 2008; for a significant number of financial centres, these costs had increased, and for a significant number they had decreased.

Figure 3.5 Change in the costs of account provision and asset servicing between 2006 and 2009 (total securities)



Source: CSD questionnaires, and Oxera analysis.

Figure 3.6 Change in clearing and settlement costs (per transaction) between 2006 and 2009 (total securities)



Source: CSD questionnaires, and Oxera analysis.

Overall, this data analysis reveals strong patterns in the changes in the nature of the activity and costs faced by market participants. The next sections provide more detailed analysis for each individual financial centre. An aggregated analysis (across all financial centres) is provided in Appendix 5.

3.4 Analysis of costs per value of transaction

The analysis of the costs of using trading platforms (presented in section 3.2) shows that, although the costs per transaction have come down across the majority of financial centres, in some financial centres the costs per value of transaction have increased. As explained, this is driven by the trend of transaction sizes having become smaller over time.

This section summarises the evidence on costs (per transaction and per value of transaction) of using trading platforms for equity trading, and then assesses whether there is a similar pattern at the level of CCPs and CSDs across financial centres—it measures the costs of using CCPs and CSDs per number and value of equity transaction at the trading level.

In relation to trading services, users are charged on the basis of the number of transactions and/or the value per transaction. For example, although most trading platforms charge on the basis of the number of transactions, some (also) charge according to the value of the transaction. Furthermore, brokerage firms generally charge for their trade execution services on the basis of the value of transaction.

However, for central counterparty clearing and clearing and settlement services, CCPs and CSDs (and custodians) only charge on the basis of the number of transactions, although there are exceptions. For example, the CSD in Greece charges on the basis of the value of transactions.

Irrespective of how users are charged for trading and post-trading services, from an investor point of view, it is useful to measure the costs both ways: per transaction, and per value of transaction. Estimating the cost per value of transaction provides an effective cost estimate in relation to the value of trading and allows a comparison of costs across the value chain.

When interpreting the results presented in this section, it is important to recognise that the estimates for changes in the cost per value of transaction provide an indication of changes in the effective costs that the user faces, and that these changes are not necessarily driven by changes in infrastructure providers' prices—ie, as explained above, the change could be driven by changes in the average transaction sizes.

The remainder of this section is structured as follows.

– Section 3.4.1 measures changes in the average size of transactions for on- and off-book trading.

– Section 3.4.2 reviews the changes in the cost of using trading platforms in terms of both cost per transaction and cost per value of transaction. Section 3.4.3 does the same for CCPs and section 3.4.4 for CSDs.

3.4.1 Trends in the average value of transactions at the trading level

Table 3.1 below shows changes in the average value of on-book equity transactions for those financial centres where data on both the number and value of transactions was available. The evidence indicates that the average value of equity transactions has consistently declined over time, across the entire sample of financial centres, ranging from 22% in Poland to 76% in the UK. There are a number of potential explanations for this, such as brokers splitting up transactions to reduce market impact and an increase in 'high frequency trading'. Appendix 6 shows trends in the average value of on- and off-book equity transactions combined across financial centres where data was available on both the number and value of transactions.

The table also presents the average trade size across financial centres in 2009. This shows that there is variation in the average transaction size across financial centres, and within major financial centres. For example, the average transaction size in the UK amounts to €11,105 and in Spain to €28,386.

Table 3.1 Trends in the average value of transactions in equities at the trading platform level (on-book trading)

Trading platform(s) domiciled in the following financial centres	2006–08 (%)	2008–09 (%)	2006–09 (%)	2009 average transaction value (€)[1]
Major financial centres				
Average: major financial centre	–39	–28	–56	14,059
France	–40	–39	–63	8,271
Germany	–35	–34	–57	12,481
Italy	–25	–29	–47	10,535
Spain	–32	–21	–46	28,386
Switzerland	–51	4	–49	16,564
UK	–53	–49	–76	11,105
Secondary financial centre				
Average: Secondary financial centre	–23	–39	–53	8,998
Belgium	–40	–39	–63	8,271
Luxembourg	n/a	n/a	n/a	14,939
The Netherlands	–40	–39	–63	8,271
Norway	–37	–43	–64	10,370
Poland	29	–39	–22	2,924
Sweden	–41	–37	–62	9,715
Other financial centres				
Average: Other financial centre	–27	–34	–51	7,509
Austria	–44	–38	–65	7,193
Czech Republic	n/a	n/a	n/a	
Denmark	–35	–26	–52	9,753
Greece	12	–33	–25	4,565
Ireland	–40	–42	–65	7,765
Portugal	–40	–39	–63	8,271

Note: [1] The change in the average value of transactions over time is based on data provided by the respondents to the trading platform questionnaire, whereas the average trade size for individual trading platforms is reported using FESE data (which includes MTFs). Because the NDA, to which the questionnaires are subject, does not allow for the data to be presented in absolute terms in the report, FESE data is presented here instead. However, it should be emphasised that the data from the trading platform questionnaire, rather than FESE data, was used for the analysis in this report. The percentage change in average value of transactions reported for Ireland is based on FESE data.
Source: Trading platform questionnaire, FESE, and Oxera analysis.

3.4.2 Analysis of costs at the trading level

The costs per value of transaction of using trading platforms have been estimated by dividing the relevant trading platform revenues by the value of transactions traded. (This is equivalent to dividing the cost per transaction by the average value of a transaction.) Table 3.2 shows the costs of using trading platforms per equity transaction and per value of equity transaction for on-book trading across all financial centres where sufficient data was available (based on the analysis in section 3.5). Across almost all financial centres the cost per transaction has declined over time. However, expressed in terms of cost per value of trading, the pattern of changes is different. Using this measure, trading costs have not systematically decreased (or increased) over the three years. The results can be summarised as follows.

– For some financial centres, such as France, Germany Spain, Belgium, the Netherlands, Norway, Sweden, Austria, Denmark and Portugal, the cost per transaction decreased, whereas the cost per value of transaction increased over time. This is driven by a decrease in the average value of transactions offsetting the impact of the decrease in the cost per transaction.

– In other financial centres, such as Switzerland, the UK, Poland and Greece, costs have declined in terms of both cost per transaction and per value of transaction. Although the average size of transaction also fell in these financial centres (in the UK the fall was the largest across all financial centres), the reduction in the costs per transaction was so significant that it also led to a reduction in the cost per value of transaction.

– In a small number of financial centres, the costs appear to have increased slightly, both per transaction and per value of transaction.

Table 3.2 Changes in the cost of on-book trading in equities

	2006–08 (%)		2008–09 (%)		2006–09 (%)		2006–09
Trading platform (s) domiciled in the following financial centres	**Change in cost per transaction**	**Change in bp costs**	**Change in cost per transaction**	**Change in bp costs**	**Change in cost per transaction**	**Change in bp costs**	**% change in average value of transactions**
Major financial centres							
France	–18	36	–23	26	–37	71	–63
Germany	–36	0	–28	8	–54	8	–57
Italy	–2	32	2	44	0	90	–47
Spain	–28	6	–6	19	–32	26	–46
Switzerland	–40	23	–38	–41	–63	–27	–49
UK	–57	–9	–57	–16	–82	–24	–76
Secondary financial centre							
Belgium	–18	36	–23	26	–37	71	–63
Luxembourg	–36	–84	n/a	n/a	n/a	n/a	
The Netherlands	–18	36	–23	26	–37	71	–63
Norway	–8	51	–57	–25	–60	13	–64
Poland	–4	–26	–35	6	–38	–22	–22
Sweden	–43	–5	–29	14	–60	8	–62
Other financial centres							
Austria	–41	6	–22	25	–54	32	–65
Czech Republic		n/a		n/a		n/a	
Denmark	–50	–23	–3	30	–52	0	–52
Greece	–26	–34	–33	0	–50	–34	–25
Ireland	–82	–70	2	76	–81	–46	–65
Portugal	–18	36	–23	26	–37	71	–63

Note: Changes in the average value of transactions are reported for on-book transactions. The percentage change in the bp cost of on-book trading and the average value of transactions reported for Ireland are based on FESE data.
Source: Trading platform questionnaire, and Oxera analysis.

3.4.3 Analysis of costs at the CCP level

The cost per value of transaction at the CCP level can conceptually be measured by dividing the CCP revenues by the value of the CCP transactions at the point of trading (ie, pre-netting). (This is equivalent to dividing the cost per CCP transaction by the average value of the CCP transaction at the trading platform level; and this is how the cost per value of transaction has been estimated.) Table 3.3 shows that the costs of CCP services (measured as cost per equity transaction) have declined consistently over time across all financial centres. When measured in terms of costs per value of equity transaction, the evidence is more mixed:

– across the majority of financial centres (eg, France, Germany, the UK, Belgium, Poland and Portugal), the declining cost per CCP transaction has translated into a decreasing cost per value of CCP transaction. The impact of the decline in the average trade size (in terms of increasing the cost per value of transaction) across financial centres was less material than the decreasing absolute cost of CCP services;

– in the case of certain financial centres, such as Austria and Switzerland, the cost per transaction is decreasing, while the cost per value of transaction is increasing over time. This is driven by a decrease in the average value of transactions;

– in the case of other financial centres, such as Italy, the costs per transaction and per value of transaction have both increased over time.[59]

[59] The relevant provider of CCP services explained to Oxera that the fee charged across the listed CCP services did not change over the 2006–09 period, and hence the change in costs is due to changes in the user profile and underlying trends in the market.

Table 3.3 Changes in the cost of central counterparty clearing services for equities

	2006–08 (%)		2008–09 (%)		2006–09 (%)		2006–09
CCPs domiciled in the following financial centres	**Change in cost per transaction**	**Change in bp costs**	**Change in cost per transaction**	**Change in bp costs**	**Change in cost per transaction**	**Change in bp costs**	**% change in average value of transactions**
Major financial centres							
France	–58	–30	–45	–10	–77	–37	–63
Germany	–42	–12	–35	–2	–63	–14	–57
Italy	11	49	–7	31	3	94	–47
Switzerland	–60	48	–42	70	–77	151	–49
UK	–71	–39	–23	52	–78	–7	–76
Secondary financial centre							
Belgium	–58	–30	–45	–10	–77	–37	–63
The Netherlands	–58	–30	–65	–41	–85	–59	–63
Poland	–46	–58	–12	45	–52	–39	–22
Other financial centres							
Austria	–54	–19	22	67	–44	60	–65
Portugal	–58	–30	–45	–10	–77	–37	–63

Note: Change in average value of transactions is reported for on-book transactions. For Austria, CCP costs per transaction have been estimated in relation to both equities and fixed income securities.
Source: CCP and trading platform questionnaire, and Oxera analysis.

3.4.4 Analysis of costs at the CSD level

Table 3.4 below shows the change in the CSD cost per transaction across the financial centres. It indicates that, across the majority of financial centres, the cost per equity transaction has declined.

In principle, the cost per value of transaction at the CSD level could be measured by dividing the CSD revenues by the value that the CSD transaction would have had at the point of trading. (This is equivalent to dividing the cost per CSD transaction by the average value that this CSD transaction would have had at the point of trading.)[60]

In financial centres without a CCP (that net the transactions coming from the trading platform), the reduction in the CSD cost per value of transaction is smaller than the reduction in the CSD cost per transaction due to the fall in the average transaction size. As a result of this fall (which means that more CSD transactions are required per value of trading), the CSD cost per value of transaction has increased over the period 2006–09 in most of the financial centres without a CCP. The changes in the CSD cost per value of transaction over the 2006–09 period were as follows: 75% in Spain, 7% in Poland,[61] 101% in Sweden, and –20% in Greece.[62]

In financial centres with a CCP (and where the CCP nets the transactions), the cost per value of transactions is affected by the netting efficiency—the higher the netting efficiency, the lower the CSD cost per value trading. This is because fewer CSD transactions per value of trading would be required. This also means that if the netting efficiency were to increase through time, fewer CSD transactions per value of trading would be required, which would compensate for the increase in the number of CSD transactions as a result of the lower average transaction size at the trading platform level.

In 2009, the overall CCP netting efficiency was around 98%, and the average transaction size was in the order of €10,000, while in 2006 it was around €25,000. If the overall netting efficiency in 2006 were 95%, this change (from 95% to 98%) would fully accommodate the change in transaction size. In other words, if the cost per transaction at the CSD level remained the same, the cost per value of transaction (in bp) would also remain the same. The implication for the calculations in Table 3.4 is that if netting efficiency increased by three percentage points over the period 2006–09, the changes in the CSD cost per value of transaction would be equivalent to the changes in the CSD cost per transaction.

Data from the questionnaires indicates that the increases in netting efficiency over the period 2006–09 have been relatively limited in most financial centres—ie, more limited than the aforementioned three percentage points. This means that (similar to the financial centres without CCP), it is likely that the reduction in CSD cost per value is smaller than the reduction in the CSD cost per transaction. Assuming that the netting efficiency did not change, the change in the CSD cost per value of transaction would have been as follows for the period 2006–09: 141% in France, the Netherlands and Belgium, 62% in Germany, 66% in Italy, –31% in Switzerland, 240% in the UK,100% in Austria, 134% in Ireland, and 31% in Portugal.

An alternative approach to calculating the CSD cost per value of transaction would be to divide CSD revenues by the value of transactions at the CSD level rather than their value at

[60] In financial centres where there is a CCP, the CSD cost per value of transaction (in bp) can be estimated as follows: ((1 – netting efficiency) * CSD cost per transaction) / average value of transactions at trading platform level * 10,000. This is equivalent to dividing the relevant CSD revenues (ie, the revenues relating to clearing and settling equity transactions that were executed on the trading platform) by the value of these equity transactions at the trading platform level: (CSD cost per transaction) *(number of CCP transactions * (1 – netting efficiency) * CSD cost per transaction) / ((number of CCP transactions) * average value of transaction at trading platform level). This simplifies (in bp) to: (CSD average cost of transaction)*(1-netting efficiency)/(average value of transactions at trading platform level) * 10,000.

[61] Although Poland does have a CCP, the CCP does not net the transactions.

[62] The CSDs in Luxembourg, Denmark, Czech Republic and Norway did not provide sufficient data for an analysis to be undertaken.

the trading level. However, due, for example, to the netting of transactions where these have taken place between brokers on the trading platform and a CCP, and because CSDs have transactions that are additional to those at the trading platform level (eg, a movement in a CSD between a custodian and a broker), the average value per transaction at the CSD level tends to be higher than at the trading level. Such an approach could be useful for comparing the CSD costs across financial centres, or between CSDs. This is because it ensures that a common denominator is used across CSDs (ie, the value of transactions at the CSD), and this denominator is not affected by factors outside the CSD's control (eg, the netting efficiency of the CCP). Furthermore, such an approach may be more informative to compare costs across CSDs than the CSD cost per transaction because in this case the denominator (the number of transactions) is not necessarily the same across the CSDs; it may depend on the definition and nature of services.

That said, it is not the purpose of this study to compare CSD costs across financial centres/CSDs, but rather to compare them over time and to provide a measure of total costs from the end-user/investor perspective. Measuring CSD costs as a proportion of the value of transaction at the trading level means that the denominator is the same across different levels in the value chain. The total costs from an end-user/investor perspective can then be measured and a breakdown by level in the value chain can be provided.

Table 3.4 Changes in cost of clearing and settlement services

CSDs domiciled in the following financial centres	Change in cost per transaction (2006–08)	Change in cost per transaction (2008–09)	Change in cost per transaction (2006–09)	% change in average value of transactions
Major financial centres				
France[1]	11	0	11	–63
Germany	–13	–20	–30	–57
Italy	–6	–6	–12	–47
Spain	–4	–2	–6	–46
Switzerland	–64	–2	–65	–49
UK	–40	36	–18	–76
Secondary financial centre				
Belgium[1]	82	–72	–48	–63
Luxembourg	n/a	n/a	n/a	
The Netherlands[1]	0	–44	–44	–63
Norway	n/a	n/a	n/a	–64
Poland	–15	–1	–16	–22
Sweden	–13	–14	–25	–62
France, the Netherlands and Belgium as one financial centre (see Table 3.33)	17	–24	–11	–63
Other financial centres				
Austria	–11	–22	–31	–65
Czech Republic	n/a	n/a	n/a	
Denmark	–3	n/a	n/a	
Greece	–3	–38	–40	–25
Ireland	–40	36	–18	–65
Portugal	–13	–45	–52	–63

Note: Changes in the average value of transactions are reported for on-book transactions. The CSD costs on a per transaction basis have been estimated in relation to both equities and fixed income securities and this is used as a proxy for the CSD costs in relation to equity transactions. The basis point costs are estimated for equities only, using average value of on-book equity transactions at the relevant trading platform(s). The CSDs in Luxembourg, Denmark, Czech Republic and Norway did not provide sufficient data for an analysis to be undertaken. The percentage change in average value of transactions reported for Ireland is based on FESE data. [1] When estimating the change in costs over time, Belgium, France and the Netherlands are treated as separate domiciles for each year. Adopting an approach consistent with the way the CSD was organised in 2009, such that costs in 2009 are estimated by treating the three domiciles as one market (ie, the cost per transaction in 2009 are the same across these three domiciles) whereas costs in 2006 and 2008 are estimated by treating Belgium, France and the Netherlands as separate domiciles (ie, the cost per transaction in 2006 and 2008 differ across these three domiciles) implies the following change in the cost per value of transaction: Belgium (3%), France (176%) and the Netherlands (116%).
Source: CSD and trading platform questionnaire, and Oxera analysis.

3.5 Changes across financial centres[63]

This section presents the indicators for infrastructure providers. The calculations of these indicators are explained in more detail in Appendix 4.

3.5.1 Austria

Distribution of activity

Table 3.5 shows the percentage change in the relative activity of cross-border members over the period 2006–09.

Table 3.5 Changes in activity of cross-border members over 2006–09: ratio of cross-border to all members

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By number of members	20	22	26
By equity activity	26	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 questionnaire, and Oxera analysis.

Table 3.6 shows the percentage change in the relative activity in cross-border securities over the period 2006–09.

Table 3.6 Changes in activity in cross-border securities over 2006–09: ratio of cross-border to all securities

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By equity activity	–55	n/a	–17
By fixed income activity	19	n/a	–27
By total activity	–48	n/a	–14[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). [1] The percentage change in the ratio for all securities is outside of the range defined by the change for fixed income and for equities. This is consistent within the methodology used and is explained in section A4.4.
Source: Trading platform, CCP and CSD questionnaire, and Oxera analysis.

Costs of services

Tables 3.7 and 3.8 below show changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–09. The trading platform does not charge for on-book order management separately.

[63] No analysis is presented for costs of using infrastructure providers in the Czech Republic due to insufficient data.

Table 3.7 Changes in costs (bp costs per value of trading), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	6	25	32
On-book order management	n/a	n/a	n/a
On-book total	6	25	32
Off-book trading	n/a	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. For off-book trading, bp costs are calculated with reference to the value of off-book trading.
Source: Trading platform questionnaire, and Oxera analysis.

Table 3.8 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	–41	–22	–54
On-book order management	n/a	n/a	n/a
On-book total	–41	–22	–54
Off-book trading	n/a	n/a	n/a

Note: For on-book trading, on-book order management and on-book total, costs per transaction are calculated with reference to the number of on-book transactions. For 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 3.9 shows changes in the costs of CCP services for total securities (equity and fixed income combined) over the period 2006–09.

Table 3.9 Changes in costs (costs per transaction), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Central counterparty clearing	–54	22	–44
Risk management services	n/a	n/a	n/a
Settlement instructions	n/a	n/a	n/a
Fail management	n/a	n/a	n/a
Total	n/a	n/a	n/a

Note: The costs per transaction are calculated with reference to the number of clearing transactions. The CCP domiciled in Austria was unable to break down the cost by equities and fixed income securities; the costs therefore refer to transactions in both equities and fixed income transactions.
Source: CCP questionnaire, and Oxera analysis.

Tables 3.10 and 3.11 below show changes in the costs of account provision and asset servicing, and clearing and settlement costs total securities (equities and fixed income securities combined) over the period 2006–09.

Table 3.10 Changes in costs (bp costs per value of securities held), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Account provision and asset servicing	21	10	33

Note: Bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held.
Source: CSD questionnaire, and Oxera analysis.

Table 3.11 Changes in costs (costs per transaction), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Clearing and settlement	–11	–22	–31

Note: The 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.

3.5.2 Belgium

Distribution of activity

Table 3.12 shows the percentage change in the relative activity of cross-border members over the period 2006–09.

Since 2009, a single operational facility has provided access to three European markets (Belgium, the Netherlands and France), and the same pricing schedule is applied to securities in these financial centres. Therefore, in the calculations in Table 3.12, users in these three financial centres are treated as domestic for 2009, while for 2006 users in the Netherlands and France were considered cross-border. This may explain the reduction in the ratio of cross-border members.

Table 3.12 Changes in activity of cross-border members over 2006–09: ratio of cross-border to all members

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By number of members	16	15	–55 (227)
By equity activity	5	n/a	
By fixed income activity	99	n/a	
By total activity	5		–50 (80)

Note: Equity, fixed income and total activity defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs). In the case of central securities depositories, since 2009 a single operational facility has provided access to three European markets (Belgium, the Netherlands and France), and the same pricing schedule is applied to securities in these financial centres. Therefore, in the calculations in the table, users in these three financial centres are treated as domestic for 2009. For the figures reported in brackets for CSDs, only Belgium is treated as domestic—France and the Netherlands are treated as cross-border in each year.
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Table 3.13 shows the percentage change in the relative activity of cross-border securities over the period 2006–09.

Table 3.13 Changes in activity in cross-border securities over 2006–09: ratio of cross-border to all securities

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By equity activity	n/a	844	–31 (–31)
By fixed income activity	n/a	–5	n/a
By total activity	n/a	–57[1]	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). In the case of central securities depositories, since 2009 a single operational facility has provided access to three European markets (Belgium, the Netherlands and France), and the same pricing schedule is applied to securities in these financial centres. Therefore, in the calculations in the table, users in these three financial centres are treated as domestic for 2009. For the figures reported in brackets for CSDs, only Belgium is treated as domestic—France and the Netherlands are treated as cross-border in each year. [1] The percentage change in the ratio for all securities is outside of the range defined by the change for fixed income and for equities. This is consistent within the methodology used and is explained in section A4.4.
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Costs of services

Tables 3.14 and 3.15 show changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–09.

Table 3.14 Changes in costs (bp costs per value of trading), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	36	26	71
On-book order management	n/a	n/a	n/a
On-book total	36	26	71
Off-book trading	162	–8	141

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. For off-book trading, bp costs are calculated with reference to the value of off-book trading.
Source: Trading platform questionnaire, and Oxera analysis.

Table 3.15 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	–18	–23	–37
On-book order management	n/a	n/a	n/a
On-book total	–18	–23	–37
Off-book trading	0	0	0

Note: For on-book trading, on-book order management and on-book total, costs per transaction are calculated with reference to the number of on-book transactions. For 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 3.16 shows changes in the costs of CCP services for equities over the period 2006–09.

Table 3.16 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Central counterparty clearing	–58	–45	–77
Risk management services	n/a	n/a	n/a
Settlement instructions	–38	29	–20
Fail management	–33	–40	–60
Total	–57	–42	–75

Note: The costs per transaction are calculated with reference to the number of clearing transactions. The relevant provider of CCP services explained to Oxera that, following the initial request in 2006 for the data, process were put in place to improve the quality and underlying detail of the data provision going forward, potentially improving the robustness of the analysis between 2008 and 2009. A comparison of trends from 2006 and onwards should take this into account.
Source: CCP questionnaire, and Oxera analysis.

Tables 3.17 and 3.18 show changes in the costs of account provision and asset servicing and of clearing and settlement for total securities (equities and fixed income securities combined) over the period 2006–09.

Table 3.17 Changes in costs (bp costs per value of securities held), total securities

	2006–08[1] (% change)	2008–09 (% change)	2006–09[1] (% change)
Account provision and asset servicing	24[2] (24)[3]	–47[2] (–77)[3]	–34[2] (–71)[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. [1] For the change reported between 2006 and 2008, the CSD that provided the data explained to Oxera that the change in the costs of account provision and asset servicing does not reflect a change in the tariff schedule; rather, it is due to a change in the profile of its users. [2] When estimating the change in costs over time, Belgium, France and the Netherlands are treated as separate domiciles for each year. [3] For the figures reported in brackets, when estimating costs in 2006 and 2008, Belgium, France and the Netherlands are treated as separate domiciles (ie, the costs of services in 2006 and 2008 differ across these three domiciles); however, the costs in 2009 are estimated by treating the three domiciles as one market (ie, the costs of services in 2009 are the same across these three domiciles). This approach to estimating costs in 2009 has been adopted to reflect the way in which provision of CSD services in these markets was organised in 2009.
Source: CSD questionnaire, and Oxera analysis.

Table 3.18 Changes in costs (costs per transaction), total securities

	2006–08[1] (% change)	2008–09 (% change)	2006–09[1] (% change)
Clearing and settlement	82[2] (82)[3]	–72[2] (–79)[3]	–48[2] (–62)[3]

Note: The costs per transaction for clearing and settlement are calculated with reference to the number of clearing and settlement transactions. The figures denoting the change between 2006 and 2008 have been revised using amended data. [1] For the change reported between 2006 and 2008, the provider of CSD services explained to Oxera that the change in the clearing and settlement fee does not reflect a change in the underlying tariff structure; rather, it is due to a change in the user profile and trends in the market. [2] When estimating the change in costs over time, Belgium, France and the Netherlands are treated as separate domiciles for each year. [3] For the figures reported in brackets, when estimating costs in 2006 and 2008, Belgium, France and the Netherlands are treated as separate domiciles (ie, the costs of services in 2006 and 2008 differ across these three domiciles); however, the costs in 2009 are estimated by treating the three domiciles as one market (ie, the costs of services in 2009 are the same across these three domiciles). This approach to estimating costs in 2009 has been adopted to reflect the way in which provision of CSD services in these markets was organised in 2009.
Source: CSD questionnaire, and Oxera analysis.

3.5.3 Denmark

Distribution of activity

Table 3.19 shows the percentage change in the relative activity of cross-border members over the period 2006–09.

Table 3.19 Changes in activity of cross-border members over 2006–09: ratio of cross-border to all members

	Trading platforms (% change)	CSDs (% change)
By number of members	29	n/a
By equity activity	29	
By fixed income activity	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 and CSD questionnaires, and Oxera analysis.

Table 3.20 shows the percentage change in the relative activity in cross-border securities over the period 2006–09.

Table 3.20 Changes in activity in cross-border securities over 2006–09: ratio of cross-border to all securities

	Trading platforms (% change)	CSDs (% change)
By equity activity	–36	n/a
By fixed income activity	–48	n/a
By total activity	–45	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 questionnaire, and Oxera analysis.

Costs of services

Tables 3.21 and 3.22 below show changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–09. (Since the revenues for trading services were provided on an aggregated basis—across on- and off-book trading—the number of on- and off-book transactions was used to break these revenues down into those relating to on- and off-book activity, thereby introducing an approximation).

Table 3.21 Changes in costs (bp costs per value of trading), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	–23	30	0
On-book order management	n/a	n/a	n/a
On-book total	–23	30	0
Off-book trading	15	9	25

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. For off-book trading, bp costs are calculated with reference to the value of off-book trading. The relevant provider of trading services explained to Oxera that the reported changes in costs per value of trading show an increase due to the declining average size of executed orders—this does not mean that fees charged by trading platforms have increased.
Source: Trading platform questionnaire and Oxera analysis.

Table 3.22 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	–50	–3	–52
On-book order management	n/a	n/a	n/a
On-book total	–50	–3	–52
Off-book trading	–50	–3	–52

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

Tables 3.23 and 3.24 show changes in the costs of account provision and asset servicing, and clearing and settlement (equities and fixed income securities combined) over the period 2006–08. The CSD domiciled in Denmark did not provide sufficient data to undertake an analysis for 2006–09.

Table 3.23 Changes in costs (bp costs per value of securities held), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Account provision and asset servicing	–4	n/a	n/a

Note: Bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held.
Source: CSD questionnaire, and Oxera analysis.

Table 3.24 Changes in costs (costs per transaction), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Clearing and settlement	–3	n/a	n/a

Note: The 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.

3.5.4 France

Distribution of activity

Table 3.25 shows the percentage change in the relative activity of cross-border members over the period 2006–09.

Table 3.25 Changes in activity of cross-border members over 2006–09: ratio of cross-border to all members

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By number of members	16	15	–33 (–3)
By equity activity	5	n/a	
By fixed income activity	99	n/a	
By total activity	5		–40 (82)

Note: Equity, fixed income and total activity defined as transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs). In the case of central securities depositories, since 2009 a single operational facility has provided access to three European markets (Belgium, the Netherlands and France) and the same pricing schedule is applied to securities in these financial centres. Therefore, in the calculations in the table, users in these three financial centres are treated as domestic for 2009. For the figures reported in brackets for CSDs, only France is treated as domestic—Belgium and the Netherlands are treated as cross-border in each year.
Source: Trading platform, CCP and CSD questionnaire, and Oxera analysis.

Table 3.26 shows the percentage change in the relative activity in cross-border securities over the period 2006–09.

Table 3.26 Changes in activity in cross-border securities over 2006–09: ratio of cross-border to all securities

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By equity activity	n/a	844	–34 (–25)
By fixed income activity	n/a	–5	21 (21)
By total activity	n/a	–57[1]	43 (44)

Note: Equity, fixed income and total activity defined as transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs). In the case of central securities depositories, since 2009 a single operational facility has provided access to three European markets (Belgium, the Netherlands and France) and the same pricing schedule is applied to securities in these financial centres. Therefore, in the calculations in the table, securities across these three financial centres are treated as domestic for 2009. For the figures reported in brackets for CSDs, only France is treated as domestic—Belgium and the Netherlands are treated as cross-border in each year. [1] The percentage change in the ratio for all securities is outside of the range defined by the change for fixed income and for equities. This is consistent within the methodology used and explained in section A4.4.
Source: Trading platform, CCP and CSD questionnaire, and Oxera analysis.

Costs of services

Tables 3.27 and 3.28 below show changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–09.

Table 3.27 Changes in costs (bp costs per value of trading), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	36	26	71
On-book order management	n/a	n/a	n/a
On-book total	36	26	71
Off-book trading	162	–8	141

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. For off-book trading, bp costs are calculated with reference to the value of off-book trading.
Source: Trading platform questionnaire, and Oxera analysis.

Table 3.28 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	–18	–23	–37
On-book order management	n/a	n/a	n/a
On-book total	–18	–23	–37
Off-book trading	0	0	0

Note: For on-book trading, on-book order management and on-book total, costs per transaction are calculated with reference to the number of on-book transactions. For 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 3.29 shows changes in the costs of CCP services for equities over the period 2006–09.

Table 3.29 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Central counterparty clearing	–58	–45	–77
Risk management services	n/a	n/a	n/a
Settlement instructions	–38	29	–20
Fail management	–33	–40	–60
Total	–57	–42	–75

Note: The costs per transaction are calculated with reference to the number of clearing transactions. The relevant provider of CCP services explained to Oxera that, following the initial request in 2006 for the data, process were put in place to improve the quality and underlying detail of the data provision going forward, potentially improving the robustness of the analysis between 2008 and 2009. A comparison of trends from 2006 and onwards should take this into account.
Source: CCP questionnaire, and Oxera analysis.

Tables 3.30 and 3.31 below show changes in the costs of account provision and asset servicing, and clearing and settlement for total securities (equities and fixed income securities combined) over the period 2006–09.

Table 3.30 Changes in costs (bp costs per value of securities held), total securities

	2006–08[1] (% change)	2008–09 (% change)	2006–09[1] (% change)
Account provision and asset servicing	17[2] (17)[3]	–22[2] (–15)[3]	–9[2] (–1)[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. [1] For the change reported between 2006 and 2008, the relevant provider of CSD services explained to Oxera that the change in account provision and asset servicing fee does not reflect a change in the underlying tariff structure; rather, it is due to a change in the user profile and trends in the market. [2] When estimating the change in costs over time, Belgium, France and the Netherlands are treated as separate domiciles for each year. [3] For the figures reported in brackets, when estimating costs in 2006 and 2008, Belgium, France and the Netherlands are treated as separate domiciles (ie, the costs of services in 2006 and 2008 differ across these three domiciles); however, the costs in 2009 are estimated by treating the three domiciles as one market (ie, the costs of services in 2009 are the same across these three domiciles). This approach to estimating costs in 2009 has been adopted to reflect the way in which provision of CSD services in these markets was organised in 2009.
Source: CSD questionnaires, and Oxera analysis.

Table 3.31 Changes in costs (costs per transaction), total securities

	2006–08[1] (% change)	2008–09 (% change)	2006–09[1] (% change)
Clearing and settlement	11[2] (11)[3]	0[2] (–8)[3]	11[2] (2)[3]

Note: The costs per transaction for clearing and settlement are calculated with reference to the number of clearing and settlement transactions. [1] For the change reported between 2006 and 2008, the relevant provider of CSD services explained to Oxera that the change in clearing and settlement fee does not reflect a change in the underlying tariff structure; rather, it is due to a change in the user profile and trends in the market.[2] When estimating the change in costs over time, Belgium, France and the Netherlands are treated as separate domiciles for each year. [3] For the figures reported in brackets, when estimating costs in 2006 and 2008, Belgium, France and the Netherlands are treated as separate domiciles (ie, the costs of services in 2006 and 2008 differ across these three domiciles), however, the costs in 2009 are estimated by treating the three domiciles as one market (ie, the costs of services in 2009 are the same across these three domiciles). This approach to estimating costs in 2009 has been adopted to reflect the way in which provision of CSD services in these markets was organised in 2009.
Source: CSD questionnaires, and Oxera analysis.

Cost of services count France, the Netherlands and Belgium as one financial centre. Since 2009 a single operational facility has provided access to three European markets (Belgium, the Netherlands and France) and the same pricing schedule has been applied to securities in these financial centres. Table 3.32 shows the aggregate change in the costs of account provision and asset servicing for total securities (equities and fixed income securities combined) for these domiciles (Belgium, France and the Netherlands) over the period 2006–09.

Table 3.32 Aggregate changes in costs (bp costs per value of securities held), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Account provision and asset servicing	16	–18	–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. The costs for account provision and asset servicing in 2006 and 2008 reflect an average across the three domiciles (France, the Netherlands and Belgium), whereas the costs in 2009 are estimated by treating the three domiciles as one market (ie, the costs of services in 2009 are the same across these three domiciles). This approach to estimating costs in 2009 has been adopted to reflect the way in which provision of CSD services in these markets was organised in 2009.
Source: CSD questionnaire, and Oxera analysis.

Table 3.33 shows the aggregate change in the costs of clearing and settlement for total securities (equities and fixed income securities combined) for the three domiciles (Belgium, France and the Netherlands) over the period 2006–09.

Table 3.33 Aggregate changes in costs (costs per transaction), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Clearing and settlement	17	–24	–11

Note: The costs per transaction for clearing and settlement are calculated with reference to the number of clearing and settlement transactions. The costs for clearing and settlement services in 2006 and 2008 reflect an average across the three domiciles (France, the Netherlands and Belgium), whereas the costs in 2009 are estimated by treating the three domiciles as one market (ie, the costs of services in 2009 are the same across these three domiciles). This approach to estimating costs in 2009 has been adopted to reflect the way in which provision of CSD services in these markets was organised in 2009.
Source: CSD questionnaire, and Oxera analysis.

3.5.5 Germany

Table 3.34 shows the percentage change in the relative activity of cross-border members over the period 2006–09. (The data relevant to trading platforms in Germany does not include German regional stock exchanges or floor trading.) The table shows that although the proportion of cross-border CSD members declined, the proportion of trading activity by cross-border members increased. Both indicators (ie, the proportion of cross-border members of CSDs and their activity) are relevant measures of cross-border activity.

Table 3.34 Changes in activity of cross-border members over 2006–09: ratio of cross-border to all members

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By number of members	5	6	–6
By equity activity	16	18	
By fixed income activity	–15	n/a	
By total activity	15		8

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 3.35 shows the percentage change in the relative activity in cross-border securities over the period 2006–09.

Table 3.35 Changes in activity in cross-border securities over 2006–09: ratio of cross-border to all securities

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By equity activity	207	–25	n/a
By fixed income activity	11	n/a	n/a
By total activity	178	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

Tables 3.36 and 3.37 show changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–09.

Table 3.36 Changes in costs (bp costs per value of trading), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	0	8	8
On-book order management	n/a	n/a	n/a
On-book total	0	8	8
Off-book trading	–56	–96	–98

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. For off-book trading, bp costs are calculated with reference to the value of off-book trading.
Source: Trading platform questionnaire, and Oxera analysis.

Table 3.37 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	–36	–28	–54
On-book order management	n/a	n/a	n/a
On-book total	–36	–28	–54
Off-book trading	–24	–97	–98

Note: For on-book trading, on-book order management and on-book total, costs per transaction are calculated with reference to the number of on-book transactions. For 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 3.38 shows changes in the costs of CCP services for equity securities over the period 2006–09.

Table 3.38 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Central counterparty clearing	–42	–35	–63
Risk management services	n/a	n/a	n/a
Settlement instructions	–26	14	–16
Fail management	n/a	n/a	n/a
Total	–42	–34	–62

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

Tables 3.39 and 3.40 below show changes in the costs of account provision and asset servicing, and clearing and settlement for total securities (equities and fixed income securities combined) over the period 2006–09, respectively.

Table 3.39 Changes in costs (bp costs per value of securities held), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Account provision and asset servicing	–4	–4	–7

Note: Bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held. The fees for the years 2006 and 2008 presented in the Oxera 2009 report did not include fees for reporting services since these services were charged for separately. As a result of changes in the pricing schedule in 2010, there are no longer separate fees for reporting services—these services are now charged for through the custody fees. The revenue data has been adjusted to reflect this, which means that the total revenues from account provision and asset servicing include revenues from fees for reporting services across all three years.
Source: CSD questionnaire, and Oxera analysis.

Table 3.40 Changes in costs (costs per transaction), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Clearing and settlement	–13	–20	–30

Note: The 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.

3.5.6 Greece

Distribution of activity

Table 3.41 shows the percentage change in the relative activity of cross-border members over the period 2006–09. There was very little fixed income activity on the trading platform.

Table 3.41 Changes in activity of cross-border members over 2006–09: ratio of cross-border to all members

	Trading platforms (% change)	CSDs (% change)
By number of members	80	371
By equity activity	2,161	
By fixed income activity	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 and CSD questionnaire, and Oxera analysis.

Table 3.42 below shows the percentage change in the relative activity in cross-border securities over the period 2006–09.

Table 3.42 Changes in activity in cross-border securities over 2006–09: ratio of cross-border to all securities

	Trading platforms (% change)	CSDs (% change)
By equity activity	478	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); number of clearing transactions (CCPs); and value of securities held (CSDs).
Source: Trading platform and CSD questionnaire, and Oxera analysis.

Costs of services

Tables 3.43 and 3.44 show changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–09.

Table 3.43 Changes in costs (bp costs per value of trading), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	–34	0	–34
On-book order management	–39	59	–3
On-book total	–34	3	–32
Off-book trading	–50	–4	–52

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. For off-book trading, bp costs are calculated with reference to the value of off-book trading.
Source: Trading platform questionnaire, and Oxera analysis.

Table 3.44 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	–26	–33	–50
On-book order management	–32	7	–27
On-book total	–26	–31	–49
Off-book trading	3	–58	–57

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

Tables 3.45 to 3.47 below show changes in the costs of account provision and asset servicing, and clearing and settlement for total securities (equities and fixed income securities combined) over the period 2006–09. The fee charged for clearing and settlement in Greece is on a strict ad valorem basis; interpretation of results expressed per number and per value of transactions should take this into account.

There was insufficient data to estimate the change in costs for account provision and asset servicing over the period 2006–08.

Table 3.45 Changes in costs (bp costs per value of securities held), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Account provision and asset servicing	n/a	–39	n/a

Note: Bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held. In 2006, there was no specific fee for account provision and asset servicing, while in 2007 a fee was introduced.
Source: CSD questionnaire, and Oxera analysis.

Table 3.46 Changes in costs (bp costs per value of transaction), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Clearing and settlement	–18	–6	–23

Note: The 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.

Table 3.47 Changes in costs (costs per transaction), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Clearing and settlement	–3	–38	–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. The costs per transaction for clearing and settlement are calculated with reference to the number of clearing and settlement transactions. The fee charged for clearing and settlement in Greece is on an ad valorem basis.
Source: CSD questionnaire, and Oxera analysis.

3.5.7 Ireland

Distribution of activity

Table 3.48 shows the percentage change in the relative activity of cross-border members over the period 2006–09.

Table 3.48 Changes in activity of cross-border members over 2006–09: ratio of cross-border to all members

	Trading platforms (% change)	CSDs (% change)
By number of members	31	43
By equity activity	323	
By fixed income activity	3	
By total activity	233	–8

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 and CSD questionnaires, and Oxera analysis.

Table 3.49 below shows the percentage change in the relative activity in cross-border securities over the period 2006–09.

Table 3.49 Changes in activity in cross-border securities over 2006–09: ratio of cross-border to all securities

	Trading platforms (% change)	CSDs (% change)
By equity activity	17	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); number of clearing transactions (CCPs); and value of securities held (CSDs).
Source: Trading platform and CSD questionnaires, and Oxera analysis.

Costs of services

Tables 3.50 and 3.51 show changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–09. Only changes per transaction are reported since underlying data on the value of transactions was not available.

Table 3.50 Changes in costs (bp costs per value of trading), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	n/a	n/a	n/a
On-book order management	n/a	n/a	n/a
On-book total	n/a	n/a	n/a
Off-book trading	n/a	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. For off-book trading, bp costs are calculated with reference to the value of off-book trading.
Source: Trading platform questionnaire, and Oxera analysis.

Table 3.51 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	–82	2	–81
On-book order management	n/a	n/a	n/a
On-book total	–82	2	–81
Off-book trading	–82	2	–81

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

Tables 3.52 and 3.53 below show changes in the costs of account provision and asset servicing, and clearing and settlement for total securities (equities and fixed income securities combined) over the period 2006–09.

Table 3.52 Changes in costs (bp costs per value of securities held), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Account provision and asset servicing	n/a	n/a	n/a

Note: Bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held.
Source: CSD questionnaire, and Oxera analysis.

Table 3.53 Changes in costs (costs per transaction), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Clearing and settlement	–40	36	–18

Note: The 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.

3.5.8 Italy

Distribution of activity

Table 3.54 shows the percentage change in the relative activity of cross-border members over the period 2006–09. (The data relevant to trading platforms does not include the MTS Group.)

Table 3.54 Changes in activity of cross-border members over 2006–09: ratio of cross-border to all members

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By number of members	52	49	21
By equity activity	9	31	
By fixed income activity	n/a	n/a	
By total activity			–79

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 questionnaire, and Oxera analysis.

Table 3.55 below shows the percentage change in the relative activity in cross-border securities over the period 2006–09.

Table 3.55 Changes in activity in cross-border securities over 2006–09: ratio of cross-border to all securities

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By equity activity	–49	n/a	130
By fixed income activity	86	n/a	85
By total activity	–28	n/a	94

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

Tables 3.56 and 3.57 show changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–09. On-book order management is not charged for separately.

Table 3.56 Changes in costs (bp costs per value of trading), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	32	44	90
On-book order management	n/a	n/a	n/a
On-book total	32	44	90
Off-book trading	n/a	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. For off-book trading, bp costs are calculated with reference to the value of off-book trading. The relevant provider of trading services explained to Oxera that that the fee charged did not change during 2006-2009 period and hence the change in costs reflected in the table is due to changes in underlying market conditions.
Source: Trading platform questionnaire, and Oxera analysis.

Table 3.57 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	–2	2	0
On-book order management	n/a	n/a	n/a
On-book total	–2	2	0
Off-book trading	n/a	n/a	n/a

Note: For on-book trading, on-book order management and on-book total, costs per transaction are calculated with reference to the number of on-book transactions. For 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 3.58 below shows changes in the costs of CCP services for equities over the period 2006–09. Settlement instructions are not charged for separately.

Table 3.58 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Central counterparty clearing	11	–7	3
Risk management services	–25	–12	–34
Settlement instructions	n/a	n/a	n/a
Fail management	42	–37	–11
Total	16	–16	–3

Note: The costs per transaction calculated with reference to the number of clearing transactions. Central counterparty clearing fees includes fees charged for settlement instructions. The relevant CCP explained to Oxera that the fees charged did not change over the 2006–09 period, and hence the change in costs for the various services is due to changes in the user profile and the underlying trends in the Italian market.
Source: CCP questionnaire, and Oxera analysis.

Tables 3.59 and 3.60 show changes in the costs of account provision and asset servicing, and clearing and settlement for total securities (equities and fixed income securities combined) over the period 2006–09, respectively.

Table 3.59 Changes in costs (bp costs per value of securities held), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Account provision and asset servicing	–1	–5	–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.
Source: CSD questionnaire, and Oxera analysis.

Table 3.60 Changes in costs (costs per transaction), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Clearing and settlement	–6	–6	–12

Note: The 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.

3.5.9 Luxembourg

Distribution of activity

Table 3.61 below shows the percentage change in the relative activity of cross-border members over the period 2006–09. The proportion of activity is expressed in terms of number of members, trading volume in equities and trading volume in fixed income.

Table 3.61 Changes in activity of cross-border members over 2006–09: ratio of cross-border to all members

	Trading platforms (% change)
By number of members	115
By equity activity	1,890
By fixed income activity	75
By total activity	345

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

Table 3.62 shows the percentage change in the relative activity in cross-border securities over the period 2006–09.

Table 3.62 Changes in activity in cross-border securities over 2006–09: ratio of cross-border to all securities

	Trading platforms (% change)
By equity activity	–95
By fixed income activity	–16
By total activity	–80

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

Costs of services

Tables 3.63 and 3.64 show changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–09.

Table 3.63 Changes in costs (bp costs per value of trading), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	–84	n/a	n/a
On-book order management	n/a	n/a	n/a
On-book total	–84	n/a	n/a
Off-book trading	n/a	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. For off-book trading, bp costs are calculated with reference to the value of off-book trading.
Source: Trading platform questionnaire, and Oxera analysis.

Table 3.64 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	–36	n/a	n/a
On-book order management	n/a	n/a	n/a
On-book total	–36	n/a	n/a
Off-book trading	n/a	n/a	n/a

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

3.5.10 The Netherlands

Distribution of activity

Table 3.65 shows the percentage change in the relative activity of cross-border members over the period 2006–09.

Table 3.65 Changes in activity of cross-border members over 2006–09: ratio of cross-border to all members

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By number of members	16	35	–50 (141)
By equity activity	5	n/a	
By fixed income activity	99	n/a	
By total activity	5		–39 (91)

Note: Equity, fixed income and total activity are defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs). The analysis in this table for CCPs uses data received from more than one firm domiciled in the Netherlands in 2009. In the case of central securities depositories, since 2009 a single operational facility has provided access to three European markets (Belgium, the Netherlands and France) and the same pricing schedule is applied to securities in these financial centres. Therefore, in the calculations in the table, users in these three financial centres are treated as domestic for 2009. For the figures reported in brackets for CSDs, only the Netherlands is treated as domestic—Belgium and France are treated as cross-border in each year.
Source: Trading platform, CCP and CSD questionnaire, and Oxera analysis.

Table 3.66 below shows the percentage change in the relative activity in cross-border securities over the period 2006–09.

Table 3.66 Changes in activity in cross-border securities over 2006–09: ratio of cross-border to all securities

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By equity activity	n/a	1,342	–16 (–16)
By fixed income activity	n/a	–5	–60 (–59)
By total activity	n/a	–45[1]	–46 (–45)

Note: Equity, fixed income and total activity are defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs). The analysis in this table across equities for CCPs uses data received from more than one firm domiciled in the Netherlands in 2009. In the case of central securities depositories, since 2009 a single operational facility has provided access to three European markets (Belgium, the Netherlands and France) and the same pricing schedule is applied to securities in these financial centres. Therefore, in the calculations in the table, securities across these three financial centres are treated as domestic for 2009. For the figures reported in brackets for CSDs, only the Netherlands is treated as domestic—Belgium and France are treated as cross-border in each year. [1] The percentage change in the ratio for all securities is outside of the range defined by the change for fixed income and for equities. This is consistent within the methodology used and is explained in section A4.4.
Source: Trading platform, CCP and CSD questionnaire, and Oxera analysis.

Costs of services

Tables 3.67 and 3.68 show changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–09.

Table 3.67 Changes in costs (bp costs per value of trading), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	36	26	71
On-book order management	n/a	n/a	n/a
On-book total	36	26	71
Off-book trading	162	–8	141

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. For off-book trading, bp costs are calculated with reference to the value of off-book trading.
Source: Trading platform questionnaire and Oxera analysis.

Table 3.68 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	–18	–23	–37
On-book order management	n/a	n/a	n/a
On-book total	–18	–23	–37
Off-book trading	0	0	0

Note: For on-book trading, on-book order management and on-book total, costs per transaction are calculated with reference to the number of on-book transactions. For 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 3.69 below shows changes in the costs of CCP services for equities over the period 2006–09.

Table 3.69 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Central counterparty clearing	–58	–65	–85
Risk management services	n/a	n/a	n/a
Settlement instructions	–38	29	–20
Fail management	–33	–40	–60
Total	–57	–42	–75

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

Tables 3.70 and 3.71 show changes in the costs of account provision and asset servicing, and clearing and settlement for total securities (equities and fixed income securities combined) over the period 2006–09.

Table 3.70 Changes in costs (bp costs per value of securities held), total securities

	2006–08[1] (% change)	2008–09 (% change)	2006–09[1] (% change)
Account provision and asset servicing	17[2] (17)[3]	30[2] (0)[3]	52[2] (17)[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. The figures denoting the change between 2006 and 2008 have been revised using amended data. [1] For the change reported between 2006 and 2008, the relevant provider of CSD services explained to Oxera that the change in account provision and asset servicing fee does not reflect a change in the underlying tariff structure; rather, it is due to a change in the user profile and trends in the market. [2] When estimating the change in costs over time, Belgium, France and the Netherlands are treated as separate domiciles for each year. [3] For the figures reported in brackets, when estimating costs in 2006 and 2008, Belgium, France and the Netherlands are treated as separate domiciles (ie, the costs of services in 2006 and 2008 differ across these three domiciles); however, the costs in 2009 are estimated by treating the three domiciles as one market (ie, the costs of services in 2009 are the same across these three domiciles). This approach to estimating costs in 2009 has been adopted to reflect the way in which provision of CSD services in these markets was organised in 2009.
Source: CSD questionnaires, and Oxera analysis.

Table 3.71 Changes in costs (costs per transaction), total securities

	2006–08[1] (% change)	2008–09 (% change)	2006–09[1] (% change)
Clearing and settlement	0[2] (0)[3]	–44[2] (–22)[3]	–44[2] (–20)[3]

Note: The costs per transaction for clearing and settlement are calculated with reference to the number of clearing and settlement transactions. The figures denoting the change between 2006 and 2008 have been revised using amended data. [1] For the change reported between 2006 and 2008, the relevant provider of CSD services explained to Oxera that the change in clearing and settlement fee does not reflect a change in the underlying tariff structure; rather, it is due to a change in the user profile and trends in the market. [2] When estimating the change in costs over time, Belgium, France and the Netherlands are treated as separate domiciles for each year. [3] For the figures reported in brackets, when estimating costs in 2006 and 2008, Belgium, France and the Netherlands are treated as separate domiciles (ie, the costs of services in 2006 and 2008 differ across these three domiciles); however, the costs in 2009 are estimated by treating the three domiciles as one market (ie, the costs of services in 2009 are the same across these three domiciles). This approach to estimating costs in 2009 has been adopted to reflect the way in which provision of CSD services in these markets was organised in 2009.
Source: CSD questionnaires and Oxera analysis.

3.5.11 Norway

Distribution of activity

Table 3.72 shows the percentage change in the relative activity of cross-border members over the period 2006–09. The proportion of activity is expressed in terms of number of members, trading volume in equities and trading volume in fixed income.

Table 3.72 Changes in activity of cross-border members over 2006–09: ratio of cross-border to all members

	Trading platforms (% change)
By number of members	7
By equity activity	23
By fixed income activity	131
By total activity	63

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

Table 3.73 shows the percentage change in the relative activity in cross-border securities over the period 2006–09.

Table 3.73 Changes in activity in cross-border securities over 2006–09: ratio of cross-border to all securities

	Trading platforms (% change)
By equity activity	–76
By fixed income activity	88
By total activity	–85[1]

Note: Equity, fixed income and total activity are defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs). [1] The percentage change in the ratio for all securities is outside of the range defined by the change for fixed income and for equities. This is consistent within the methodology used and is explained in section A4.4.
Source: Trading platform questionnaire, and Oxera analysis.

Costs of services

Tables 3.74 and 3.75 show changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–09. On-book order management is not charged for separately.

Table 3.74 Changes in costs (bp costs per value of trading), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	51	–25	13
On-book order management	n/a	n/a	n/a
On-book total	51	–25	13
Off-book trading	17	7	25

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. For off-book trading, bp costs are calculated with reference to the value of off-book trading.
Source: Trading platform questionnaire, and Oxera analysis.

Table 3.75 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	–8	–57	–60
On-book order management	n/a	n/a	n/a
On-book total	–8	–57	–60
Off-book trading	38	–43	–21

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

3.5.12 Poland

Distribution of activity

Table 3.76 shows the percentage change in the relative activity of cross-border members over the period 2006–09.

Table 3.76 Changes in activity of cross-border members over 2006–09: ratio of cross-border to all members

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By number of members	44	n/a	–5
By equity activity	311	n/a	
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 3.77 shows the percentage change in the relative activity in cross-border securities over the period 2006–09.

Table 3.77 Changes in activity in cross-border securities over 2006–09: ratio of cross-border to all securities

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By equity activity	108	272	0
By fixed income activity	n/a	14,752	492
By total activity	n/a	286	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.

Costs of services

Tables 3.78 and 3.79 below show changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–09.

Table 3.78 Changes in costs (bp costs per value of trading), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	–26	6	–22
On-book order management	n/a	n/a	n/a
On-book total	–26	6	–22
Off-book trading	–35	–63	–76

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. For off-book trading, bp costs are calculated with reference to the value of off-book trading.
Source: Trading platform questionnaire, and Oxera analysis.

Table 3.79 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	–4	–35	–38
On-book order management	n/a	n/a	n/a
On-book total	–4	–35	–38
Off-book trading	–69	–57	–87

Note: For on-book trading, on-book order management and on-book total, costs per transaction are calculated with reference to the number of on-book transactions. For 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 3.80 shows changes in the costs of CCP services for equities over the period 2006–09. Settlement instructions were not charged for separately and there was insufficient data to estimate changes in fail management costs.

Table 3.80 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Central counterparty clearing	–46	–12	–52
Risk management services	n/a	203	n/a
Settlement instructions	n/a	n/a	n/a
Fail management	n/a	n/a	n/a
Total	n/a	–5	n/a

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

Tables 3.81 and 3.82 below show changes in the costs of account provision and asset servicing, and clearing and settlement for total securities (equities and fixed income securities combined) over the period 2006–09, respectively.

Table 3.81 Changes in costs (bp costs per value of securities held), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Account provision and asset servicing	–31	12	–23

Note: Bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held.
Source: CSD questionnaire, and Oxera analysis.

Table 3.82 Changes in costs (costs per transaction), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Clearing and settlement	–15	–1	–16

Note: The 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.

3.5.13 Portugal

Distribution of activity

Table 3.83 shows the percentage change in the relative activity of cross-border members over the period 2006–09. The proportion of activity is expressed in terms of number of members, trading volume in equities and trading volume in fixed income.

Table 3.83 Changes in activity of cross-border members over 2006–09: ratio of cross-border to all members

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By number of members	16	15	n/a
By equity activity	5	n/a	
By fixed income activity	99	n/a	
By total activity	5		n/a

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

Table 3.84 shows the percentage change in the relative activity in cross-border securities over the period 2006–09.

Table 3.84 Changes in activity in cross-border securities over 2006–09: ratio of cross-border to all securities

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By equity activity	n/a	844	n/a
By fixed income activity	n/a	–5	n/a
By total activity	n/a	–57[1]	n/a

Note: Equity, fixed income and total activity are defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs). [1] The percentage change in the ratio for all securities is outside of the range defined by the change for fixed income and for equities. This is consistent within the methodology used and is explained in section A4.4.
Source: Trading platform, CCP and CSD questionnaire, and Oxera analysis.

Costs of services

Tables 3.85 and 3.86 show changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–09.

Table 3.85 Changes in costs (bp costs per value of trading), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	36	26	71
On-book order management	n/a	n/a	n/a
On-book total	36	26	71
Off-book trading	162	–8	141

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. For off-book trading, bp costs are calculated with reference to the value of off-book trading.
Source: Trading platform questionnaire, and Oxera analysis.

Table 3.86 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	–18	–23	–37
On-book order management	n/a	n/a	n/a
On-book total	–18	–23	–37
Off-book trading	0	0	0

Note: For on-book trading, on-book order management and on-book total, costs per transaction are calculated with reference to the number of on-book transactions. For 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 3.87 shows changes in the costs of CCP services for equities over the period 2006–09.

Table 3.87 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Central counterparty clearing	–58	–45	–77
Risk management services	n/a	n/a	n/a
Settlement instructions	–38	29	–20
Fail management	–33	–40	–60
Total	–57	–42	–75

Note: The costs per transaction are calculated with reference to the number of clearing transactions. The relevant provider of CCP services explained to Oxera that, following the initial request in 2006 for the data, process were put in place to improve the quality and underlying detail of the data provision going forward, potentially improving the robustness of the analysis between 2008 and 2009. A comparison of trends from 2006 and onwards should take this into account.
Source: CCP questionnaire, and Oxera analysis.

Tables 3.88 and 3.89 below show changes in the costs of account provision and asset servicing, and clearing and settlement for total securities (equities and fixed income securities combined) over the period 2006–09, respectively.

Table 3.88 Changes in costs (bp costs per value of securities held), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Account provision and asset servicing	–11	–2	–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.
Source: CSD questionnaire, and Oxera analysis.

Table 3.89 Changes in costs (costs per transaction), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Clearing and settlement	–13	–45	–52

Note: The 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.

3.5.14 Spain

Distribution of activity

Table 3.90 shows the percentage change in the relative activity of cross-border members over the period 2006–09.

Table 3.90 Changes in activity of cross-border members over 2006–09: ratio of cross-border to all members

	Trading platforms (% change)	CSDs (% change)
By number of members	n/a	12
By equity activity	n/a	
By fixed income activity	n/a	
By total activity		203

Note: Equity, fixed income and total activity are 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 3.91 shows the percentage change in the relative activity in cross-border securities over the period 2006–09.

Table 3.91 Changes in activity in cross-border securities over 2006–09: ratio of cross-border to all securities

	Trading platforms (% change)	CSDs (% change)
By equity activity	n/a	–30
By fixed income activity	n/a	–55
By total activity	n/a	–44

Note: Equity, fixed income and total activity are 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

Tables 3.92 and 3.93 show changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–09. (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, thereby introducing an approximation.)

Table 3.92 Changes in costs (bp costs per value of trading), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	6	19	26
On-book order management	n/a	n/a	n/a
On-book total	6	19	26
Off-book trading	n/a	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. There were no on-book order management fees. For off-book trading, bp costs are calculated with reference to the value of off-book trading.
Source: Trading platform questionnaire, and Oxera analysis.

Table 3.93 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	–28	–6	–32
On-book order management	n/a	n/a	n/a
On-book total	–28	–6	–32
Off-book trading	n/a	n/a	n/a

Note: For on-book trading, on-book order management and on-book total, costs per transaction are calculated with reference to the number of on-book transactions. There were no on-book order management fees. For off-book trading, costs per transaction are calculated with reference to the number of off-book transactions.
Source: Trading platform questionnaire, and Oxera analysis.

Tables 3.94 and 3.95 show changes in the costs of account provision and asset servicing, and clearing and settlement for total securities (equities and fixed income securities combined) over the period 2006–09.

Table 3.94 Changes in costs (bp costs per value of securities held), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Account provision and asset servicing	1	–3	–2

Note: Bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held.
Source: CSD questionnaire, and Oxera analysis.

Table 3.95 Changes in costs (costs per transaction), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Clearing and settlement	–4	–2	–6

Note: The costs per transaction for clearing and settlement are calculated with reference to the number of clearing and settlement transactions. The figures denoting the change between 2006 and 2008 have been revised based on amended data.
Source: CSD questionnaire, and Oxera analysis.

3.5.15 Sweden

Distribution of activity

Table 3.96 shows the percentage change in the relative activity of cross-border members over the period 2006–09. The proportion of activity is expressed in terms of number of members and their trading in equities and fixed income securities.

Table 3.96 Changes in activity of cross-border members over 2006–09: ratio of cross-border to all members

	Trading platforms (% change)	CSDs (% change)
By number of members	2	26
By equity activity	3	
By fixed income activity	24	
By total activity	20	n/a

Note: Equity, fixed income and total activity are defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs). The analysis in this table for trading platforms uses data received from more than one firm domiciled in Sweden.
Source: Trading platform, CCP and CSD questionnaire, and Oxera analysis.

Table 3.97 shows the percentage change in the relative activity in cross-border securities over the period 2006–09.

Table 3.97 Changes in activity in cross-border securities over 2006–09: ratio of cross-border to all securities

	Trading platforms (% change)	CSDs (% change)
By equity activity	–2	n/a
By fixed income activity	–60	n/a
By total activity	–53	n/a

Note: Equity, fixed income and total activity are defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs). The analysis in this table across equities for trading platforms uses data received from more than one firm domiciled in Sweden.
Source: Trading platform, CPP and CSD questionnaire, and Oxera analysis.

Costs of services

Tables 3.98 and 3.99 below show changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–09. (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, thereby introducing an approximation).

Table 3.98 Changes in costs (bp costs per value of trading), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	–5	14	8
On-book order management	n/a	n/a	n/a
On-book total	–5	14	8
Off-book trading	–23	–4	–26

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. For off-book trading, bp costs are calculated with reference to the value of off-book trading. The relevant provider of trading services explained to Oxera that the reported changes in costs per value of trading show an increase due to the declining average size of executed orders—this does not mean that fees charged by trading platforms have increased.
Source: Trading platform questionnaire, and Oxera analysis.

Table 3.99 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	–43	–29	–60
On-book order management	n/a	n/a	n/a
On-book total	–43	–29	–60
Off-book trading	–43	–29	–60

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

Tables 3.100 and 3.101 show changes in the costs of account provision and asset servicing, and clearing and settlement for total securities (equities and fixed income securities combined) over the period 2006–09.

Table 3.100 Changes in costs (bp costs per value of securities held), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Account provision and asset servicing	n/a	n/a	n/a

Note: Bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held.
Source: CSD questionnaire, and Oxera analysis.

Table 3.101 Changes in costs (costs per transaction), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Clearing and settlement	–13	–14	–25

Note: The 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.

3.5.16 Switzerland

Distribution of activity

Table 3.102 shows the percentage change in the relative activity of cross-border members over the period 2006–09.

Table 3.102 Changes in activity of cross-border members over 2006–09: ratio of cross-border to all members

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By number of members	–10	51	13
By equity activity	–31	279	
By fixed income activity	–60	n/a	
By total activity	–33		20

Note: Equity, fixed income and total activity are 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 3.103 shows the percentage change in the relative activity in cross-border securities over the period 2006–09.

Table 3.103 Changes in activity in cross-border securities over 2006–09: ratio of cross-border to all securities

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By equity activity	–99	4,470	–7
By fixed income activity	–3	n/a	95
By total activity	–85	n/a	28

Note: Equity, fixed income and total activity are 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

Tables 3.104 and 3.105 show changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–09.[64]

Table 3.104 Changes in costs (bp costs per value of trading), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	23	–41	–27
On-book order management	n/a	n/a	n/a
On-book total	23	–41	–27
Off-book trading	–27	–31	–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. For off-book trading, bp costs are calculated with reference to the value of off-book trading.
Source: Trading platform questionnaire, and Oxera analysis.

Table 3.105 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	–40	–38	–63
On-book order management	n/a	n/a	n/a
On-book total	–40	–38	–63
Off-book trading	145	–60	–3

Note For on-book trading, on-book order management and on-book total, costs per transaction are calculated with reference to the number of on-book transactions. For 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 3.106 shows changes in the costs of CCP services for equities over the period 2006–09.

[64] 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 3.106 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Central counterparty clearing	–60	–42	–77
Risk management services	n/a	n/a	n/a
Settlement instructions	n/a	n/a	n/a
Fail management	498	–71	73
Total	–32	–55	–69

Note: The costs per transaction calculated with reference to the number of clearing transactions. Central counterparty clearing fees includes fees charged for risk management services. The provider of CCP services explained to Oxera that the change in fail management fee does not reflect a change in the fee for late settlement; rather it is due to a change in the user profile and underlying trends in the Swiss market. In particular, late settlement fees are applied to securities domiciled only in Switzerland, whereas volumes relate to both Swiss and UK domiciled securities, explaining the decrease in late settlement fee income between 2008 and 2009.
Source: CCP questionnaire, and Oxera analysis.

Tables 3.107 and 3.108 show changes in the costs of account provision and asset servicing, and clearing and settlement for total securities (equities and fixed income securities combined) over the period 2006–09.

Table 3.107 Changes in costs (bp costs per value of securities held), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Account provision and asset servicing	–11	–2	–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.
Source: CSD questionnaire, and Oxera analysis.

Table 3.108 Changes in costs (costs per transaction), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Clearing and settlement	–64	–2	–65

Note: The 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.

3.5.17 UK

Distribution of activity

Table 3.109 shows the percentage change in the relative activity of cross-border members over the period 2006–09. The proportion of activity is expressed in terms of the number of members, trading value in equities and trading value in fixed income.

Table 3.109 Changes in activity of cross-border members over 2006–09: ratio of cross-border to all members

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By number of members	13	–29	43
By equity activity	–18	137	
By fixed income activity	n/a	n/a	
By total activity			–8

Note: Equity, fixed income and total activity are defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs). The analysis in this table for trading platforms and CCPs uses data received from more than one firm domiciled in the UK for 2009.
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Table 3.110 shows the percentage change in the relative activity in cross-border securities over the period 2006–09.

Table 3.110 Changes in activity in cross-border securities over 2006–09: ratio of cross-border to all securities

	Trading platforms (% change)	CCPs (% change)	CSDs (% change)
By equity activity	523	122	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 are defined as: transaction volumes (trading platforms); number of clearing transactions (CCPs); and value of securities held (CSDs). The analysis in this table for trading platforms and CCPs uses data received from more than one firm domiciled in the UK for 2009.
Source: Trading platform, CCP and CSD questionnaires, and Oxera analysis.

Costs of services

Tables 3.111 and 3.112 below show changes in on-book trading, on-book order management and off-book trading costs for equities over the period 2006–09.

Table 3.111 Changes in costs (bp costs per value of trading), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	–9	–16	–24
On-book order management	116	–85	–67
On-book total	–3	–23	–26
Off-book trading	–83	–19	–86

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. For off-book trading, bp costs are calculated with reference to the value of off-book trading. Furthermore, the results for trading platforms include four trading platforms for 2009—ie, the three MTFs are included in the analysis.
Source: Trading platform questionnaire, and Oxera analysis.

Table 3.112 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
On-book trading	–57	–57	–82
On-book order management	1	–92	–92
On-book total	–55	–61	–82
Off-book trading	–79	–38	–87

Note: For on-book trading, on-book order management and on-book total, costs per transaction are calculated with reference to the number of on-book transactions. For off-book trading, costs per transaction are calculated with reference to the number of off-book transactions. Furthermore, the results for trading platforms include four trading platforms for 2009—ie, the three MTFs are included in the analysis.
Source: Trading platform questionnaire, and Oxera analysis.

Table 3.113 shows changes in the costs of CCP services for total securities (equity and fixed income securities combined) over the period 2006–09.

Table 3.113 Changes in costs (costs per transaction), equities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Central counterparty clearing	–71	–23	–78
Risk management services	n/a	n/a	n/a
Settlement instructions	n/a	n/a	n/a
Fail management	n/a	n/a	n/a
Total	–71	–23	–78

Note: The costs per transaction calculated with reference to the number of clearing transactions. The results for the CCPs include two central counterparties domiciled in the UK in 2009.
Source: CCP questionnaire, and Oxera analysis.

Tables 3.114 and 3.115 below show changes in the costs of account provision and asset servicing, and clearing and settlement for total securities (equities and fixed income securities combined) over the period 2006–09.

Table 3.114 Changes in costs (bp costs per value of securities held), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Account provision and asset servicing	n/a	n/a	n/a

Note: Bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held.
Source: CSD questionnaire, and Oxera analysis.

Table 3.115 Changes in costs (costs per transaction), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Clearing and settlement	–40	36	–18

Note: The 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.

3.5.18 International central securities depositories

Tables 3.116 and 3.117 show changes in the costs of account provision and asset servicing, and clearing and settlement for Eurobonds over the period 2006–09. (The data from the international CSDs is presented in this sub-section only and not in any of the previous sub-sections in section 3.)

Table 3.116 Changes in costs (bp costs per value of securities held), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Account provision and asset servicing	–19	–9	–26

Note: Bp costs per value of securities held for account provision and asset servicing are calculated with reference to the value of securities held. Oxera has computed these figures on the assumption that the data provided by the two ICSDs is consistent. The figures denoting the change between 2006 and 2008 have been revised based on amended data.
Source: ICSD questionnaires, and Oxera calculations.

Table 3.117 Changes in costs (costs per transaction), total securities

	2006–08 (% change)	2008–09 (% change)	2006–09 (% change)
Clearing and settlement	–5	–14	–18

Note: The 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. The figures denoting the change between 2006 and 2008 has been revised based on amended data.
Source: ICSD questionnaires, and Oxera calculations

4 Use of channels for trading and post-trading activities

This section measures the changes in the fund managers' and brokers' use of channels 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. The indicators in this section are useful 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 the costs of trading and post-trading over time.

4.1 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. Analysis of the data reveals that there are no significant differences between 2006 and 2009.

– In the major financial centres, between 30% and 70% 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 40% and 95% of the trading of the retail brokerage firms in the sample is in domestic securities.[65]

– 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 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.[66] Such bias can be due to a combination of factors, such as provisions in the (local) laws and regulations that

[65] 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.

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.

4.2 Channels for trading activities

4.2.1 Fund managers' use of channels for trade execution

Trade execution starts 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 4.1 below shows what proportion of fund managers in the survey sample use these trading routes for transactions in equity and fixed income securities. It shows that there are no significant changes in the use of trading routes between 2006 and 2009. There appears to be a very small movement away from internal and external crossing towards the direct use of trading platforms. The use of brokerage firms remains the most important execution channel for the consistent sample of fund managers in both years.

There is a significant variation in the experience among fund managers. For example, looking at the fund managers that provided data for both years, of the fund managers that crossed transactions internally or used a trading platform directly in 2009, only one-half used such channels in 2006, while, for external crossing, two-thirds of the sample remains the same in 2009 as in 2006.

[66] 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 4.1 Trading channels used by fund managers

	Fund managers using these channels	
	2006 (%)	2009 (%)
Internal crossing[1]	32	24
External crossing	29	24
Brokerage firms	100	100
Trading platforms	34	40

Note: [1] This analysis uses the full sample of survey respondents for each year. 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 other small and major financial centres do.[67] The use of external crossing is also limited to a small range of financial centres—mainly France and the UK—but is also evident in smaller financial centres such as Greece, Denmark, Sweden and the Netherlands. Those that use external crossing networks on average have access to four or five such networks.

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 up to 70. The typical fund manager uses between ten and 25 brokers to handle its significant transaction volumes (for more than 1% of its total trading). There is no significant change in the average number of brokers used in 2009 and 2006—in both years fund managers used on average around 20 brokers.

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 particular trades is evident from the way in which the transaction business is divided up.

Tables 4.2 and 4.3 below show the proportion of trading sent to the different channels for equities and fixed income securities respectively. Although around 30% of fund managers have access to internal and external crossing facilities, they were used for under 3% of trading over the 2006–09 period.

In the previous survey, fund managers indicated that there was a trend towards using external crossing networks and trading platforms directly. In relation to fixed income securities, this is indeed reflected in the data: the proportion of trades sent to trading platforms increased from 9% to 26%. In the case of equities, for the full sample of firms, the use of brokerage firms has increased at the expense of trading platforms. However, because

[67] For example, fund management firms from the Netherlands, Austria, Germany, Spain and the UK report the use of internal crossing.

the firms in the sample change across years and there is wide variation in the pattern of channel usage by fund managers, this may not be an indication of the underlying trend.

Table 4.2 Use of trading channels by fund managers (equities)

	Proportion of trade (%)	
	2006	2009
Internal crossing	2	2
External crossing	1	1
Brokerage firms	89	93
Trading platforms	8	4

Note: This analysis uses the full sample of survey respondents for each year. The table may not sum to 100% due to rounding.
Source: Fund management firm questionnaire, and Oxera analysis.

Table 4.3 Use of trading channels by fund managers (fixed income)

	Proportion of trade (%)	
	2006	2009
Internal crossing	0	3
External crossing	<1	0
Brokerage firms	91	71
Trading platforms	9	26

Note: This analysis uses the full sample of survey respondents for each year. Tables may not sum to 100% due to rounding.
Source: Fund management firm questionnaire, and Oxera analysis.

4.2.2 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). Using a consistent sample of brokers through time, Table 4.4 below shows the proportion of brokers' trading in the survey sample channelled through these trading routes for equity. On average, the proportion of equity trades to trading platforms has decreased and the use of other channels increased. (However, the number of brokers reporting in both years is limited and, although this pattern is typical of the underlying individual results, the absolute values need to be treated with caution.)

The data available for fixed income securities was even more limited. This meant that a consistent sample across the years could not be produced (and therefore is not reported on). However, the underlying individual results suggest a different pattern of the use of trading channels, with 70–80% of trades (by value) executed through the OTC channel and direct use of trading platforms being the next most popular.

Table 4.4 Use of trade execution channels by all brokers (% of equity trades)

	Equity trades	
	2006	2009
Internalisation	<1	<1
OTC	2	1
Trading platform	97	90
Other	<1	9

Note: The table may not sum to 100% due to rounding.
Source: Brokerage firm questionnaire, and Oxera analysis.

4.2.3 Crossing the border

The brokerage firm questionnaire provides insight into the extent to which brokers' clients are domestic or cross-border. Table 4.5 presents the proportion of domestic and cross-border clients from the perspective of brokerage firms.

Table 4.5 Domestic and cross-border clients (% of trading)

	2006		2009	
	Domestic clients	Cross-border clients	Domestic clients	Cross-border clients
Global brokers	70	30	73	27
Local brokers	34	66	43	57

Source: Brokerage firm questionnaire, and Oxera analysis.

Of global brokers' total trading, 30% originated from 'cross-border' clients in 2006 and this did not change substantially in 2009. For local brokers this proportion is higher, at around 66% in 2006 and also did not change substantially in 2009. The difference between global and local brokers 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. There is a slight decline in the proportion of cross-border clients, although the split remains fairly stable over the time period examined.

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 4.6 presents a breakdown of the types of client for all brokers in 2009. There is variation across individual brokers, but on average the split by clients has remained fairly stable over time.

Table 4.6 Type of client (% of trading) in 2009

	Institutional funds or fund managers	Hedge funds	Other brokers or market counterparties	Other
All brokers	48	18	20	14

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 4.7 below 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 2009.[68]

Domestic members accounted for around 65% of trading platform members in 2006 and around 61% in 2009. Table 4.8 shows the proportion of trades coming from domestic and cross-border members for the same group. This information shows no significant change in the proportion of trades from domestic members.

Table 4.7 Provision of trading platform services for domestic and cross-border members (by number of members)

	By number of members	
	Domestic	Cross-border
2006	65	35
2008	61	39
2009	61	39

Note: The table reports revised figures for 2006 and 2008 based on amended data.
Source: Trading platform questionnaire, and Oxera analysis.

Table 4.8 Provision of trading platform services for domestic and cross-border members (by value of transactions)

	Domestic members		Cross-border members		Total securities	
	Equity	Fixed income	Equity	Fixed income	Domestic	Cross-border
2006	69	90	31	10	76	24
2008	60	88	40	12	71	29
2009	68	91	32	9	79	21

Note: The table reports revised figures for 2006 and 2008 based on amended data
Source: Trading platform questionnaire, and Oxera analysis.

Table 4.9 below shows that, for trading platforms, 85% of members in 2006 and 81% in 2009 were brokers. This may indicate that the way in which users access trading platforms is changing somewhat, with the proportion represented by brokers declining slightly over time.

Table 4.9 Trading platform members by type (%)

	Proportion of clients in:		
	2006	2008	2009
Brokers	85	80	81
Fund managers	3	4	3
Other trading platforms	0	0	0
Other	12	16	16

Note: 'Other' includes central banks, commercial banks, global investment banks, CCPs and proprietary trading houses.
Source: Trading platform questionnaire, and Oxera analysis.

[68] As explained in section 3.5, in 2009 the blue-chip segment of the Swiss stock exchange (formerly Virt-X) was integrated into the SIX Swiss exchange. The analysis of data for the UK and Switzerland adjusts for the integration by considering the Swiss stock exchange blue-chip segment as domiciled in Switzerland in both 2006 and 2008, as opposed to the UK. This applies to Tables 4.7 and 4.8.

4.3 Channels for post-trading activities

4.3.1 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 4.10 shows that most fund managers use custodians more than the CSDs directly, with around 75% of all fund managers using a custodian for some custody services in 2006 and 2009, with the proportion of fund managers directly using a CSD remaining around 40%. In comparison, a similar proportion of fund managers used CCPs directly (18%) and indirectly (21%) in 2006. In 2009, the use of the indirect CCP channel fell to 12%, and the use of the direct CCP channel increased to 24%.

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

More than 80% of fund managers that use custodians used only one or two in 2006 and 2009. 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 4.10 Post-trading channels used by fund managers (by number of respondents, %)

	2006	2009
CCPs	18	24
CSDs	43	41
Custodians, for any custodian service	75	76
Agents, for CCP service	21	12

Note: This analysis uses the full sample of survey respondents for each year.
Source: Fund management firm questionnaire, and Oxera analysis.

Fund managers' use of CSDs and custodians for clearing and settlement services varies significantly from fund manager to fund manager. Given the limited data that fund managers were able to provide on the make-up of their purchases across time, it is not possible to discern any particular time trend.

Tables 4.11 and 4.12 below show the use of post-trading channels by brokers. It is difficult to identify a clear pattern of usage 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 for domestically domiciled securities only. 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. The analysis indicates that the channels used have remained fairly stable over the time period.

Table 4.11 Post-trading channels used by brokers by number of respondents (%)

	Number of respondents (%)	
	2006	2009
CCPs	71	86
CSDs	88	93
Custodians, for any custodian service	92	86
Agents, for CCP service	42	43
Custodian, for clearing and settlement, and custody and safekeeping	83	71

Note: This analysis uses the full sample of survey respondents for each year.
Source: Brokerage firm questionnaire, and Oxera analysis.

Crossing the border

Table 4.12 shows the proportion of custodians' clients that are domiciled locally, with the remainder being across the border. Across all custodians surveyed, more than 90% served domestic clients. For custody banks providing global custody services, the proportion is similar, but for those that do not, the proportion is around 60%. Over time, the proportions have remained fairly stable. When measuring the proportion of domestic clients served according to the value of securities held, 46% of these securities were for domestic clients. This proportion was around 55% for custodians that did not provide global custody services. Over the period measured, the proportion of local clients' securities has fallen slightly.

Table 4.12 Provision of custodian services for domestic and cross-border clients (%)

Types of custodian	% of domestic clients in 2006	% of domestic clients in 2009	% of custody services provided to local clients in 2006	% of custody services provided to local clients in 2009
All custodians	92	87	46	38
Custodians supplying global custody services	93	87	45	35
Custodians not supplying global custodian services	58	60	55	53

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 4.13 to 4.15. Similar findings on the degree of market integration are derived from analysis of the data provided by CSDs, as Tables 4.16 to 4.18 illustrate.

A significant proportion of CCP members are counted as cross-border (see Table 4.13). As explained, cross-border means that they are not domiciled in the same financial centre as the CCP. This proportion is increasing through time, and the significant change between 2008 and 2009 is due, in particular, to the inclusion in 2009 of two new CCPs (these are pan-European CCPs, a large proportion of whose members are located mainly outside the financial centre where the CCP's head office is located). In addition, the proportion of transactions coming from cross-border members to CCPs is significant and is increasing, as

shown in Table 4.14. Again, the significant change in 2009 is driven, in particular, by the inclusion of the new CCPs.

Table 4.15 shows that, across all CCPs, in 2006 only 4% of securities (by number of clearing transactions) for which services were provided were cross-border, and that this proportion was increasing through time, equalling around 33% in 2009. The entry of the new CCPs causes this large change in 2009.

If the new CCPs are excluded from the sample, the proportion of clearing transactions for cross-border securities decreases. Excluding the new entrants in 2009 from Table 4.13, the ratios of cross-border members decreases from 37% to 31%. Similarly, for Tables 4.14 and 4.15, excluding the new entrants in 2009 reduces the ratio of the number of clearing transactions by cross-border members from 48% to 19%, and from 33% to 6% in the case of clearing transactions by domicile.

Table 4.13 Provision of CCP services for domestic and cross-border members

	By number of members	
	Domestic	Cross-border
2006	70	30
2008	68	32
2009	63	37

Source: CCP questionnaire, and Oxera analysis.

Table 4.14 Provision of CCP services for domestic and cross-border members (by number of clearing transactions in equities, %)

	By number of clearing transactions	
	Domestic	Cross-border
2006	84	16
2008	80	20
2009	52	48

Note: The table reports revised figures for the provision of CCP services by number of clearing transactions for 2006 and 2008 based on amended data.
Source: CCP questionnaire, and Oxera analysis.

Table 4.15 Provision of CCP services by domicile of equity (by number of clearing transactions in equities, %)

	Domestic	Cross-border
2006	96	4
2008	94	6
2009	67	33

Note: The sample of firms for 2009 includes two new entrants offering central counterparty clearing services.
Source: CCP questionnaire, and Oxera analysis.

Table 4.16, which shows the proportion of a CSD's members that are considered to be domiciled in domestic or cross-border financial centres, indicates that around 2% of members in 2006 and 3% in 2009 were not domiciled domestically. Table 4.18 shows the proportion of transactions coming from each type of member, by value of securities held. The proportion of securities that they hold remained relatively stable over time.

Table 4.16 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
2009	97	3

Note: In the calculations, Belgium, the Netherlands, and France were considered one domicile (as explained in the notes to Tables 3.12, 3.25, and 3.65); since 2009 a single operational facility has provided access to three European markets (Belgium, the Netherlands and France). However, it should be noted that treating Belgium, the Netherlands, and France as separate domiciles results in the same percentages as presented in this table.
Source: CSD questionnaire, and Oxera analysis.

Table 4.17 Provision of CSD services for domestic and cross-border members (by value of securities held, %)

	Domicile of member	
	Domestic	Cross-border
2006	92 (88)	8 (12)
2008	91 (86)	9 (14)
2009	91 (85)	9 (15)

Note: The table reports revised figures for 2008 based on amended data for Belgium, the Netherlands, and France, as explained in the notes to Tables 3.17, 3.18, 3.30, 3.31, 3.70, and 3.71. The figures in brackets treat Belgium, the Netherlands, and France each as a separate domicile. The figures not in brackets treat these three CSDs as a single unit, with cross-border customers defined as only those outside these three domiciles. As explained in the notes to Tables 3.12, 3.25, and 3.65, since 2009 a single operational facility has provided access to three European markets (Belgium, the Netherlands and France).
Source: CSD questionnaire, and Oxera analysis.

Table 4.18 below presents the provision of CSD services by domicile of security. It shows that, in the case of equity securities, a relatively small proportion of the value of securities held comes from cross-border securities. For fixed income securities, the value of securities held associated with cross-border securities is higher, and increasing over time. In general, this indicates that clients predominantly use a CSD for securities local to the CSD, given the high proportion of the value of securities held associated with domestic securities. This reflects the tendency for CSDs to hold the securities (in particular for equities) for which they are the home CSD when these securities are issued in dematerialised form.

Table 4.18 Provision of CSD services by domicile of security (by value of securities held, %)

	Equities		Fixed income securities	
	Domestic	Cross-border	Domestic	Cross-border
2006	94	6	87	13
2008	96	4	85	15
2009	95	5	84	16

Note: The table reports revised figures for 2006 for equities, and for 2006 as well as 2008 for fixed income securities based on amended data.
Source: CSD questionnaire, and Oxera analysis.

4.4 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 parts of the infrastructure.

The analysis is presented at an aggregated level, across all participating financial centres. The cost and use of individual elements of the infrastructures and the use of different 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 (which the analysis requires) 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.

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 and is based on transactions where intermediaries are acting as agents for end-investors at any point where they hold securities. (Institutional brokerage firms typically trade fixed income securities on a net (ie, not commission) basis and a different methodology would be needed to estimate costs along the value chain for these transactions.)

4.4.1 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, clearing and settling 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 sizes and across financial centres, which is discussed in Appendix 3.) However, because this fee contains a significant element that is not related to trading and post-trading costs, no analysis of the change over time has been undertaken.

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, in the case of trading commissions). In addition, the costs external to the fund manager associated with clearing and settlement, and holding the securities (eg, custody services) are typically paid for directly by the fund, or passed back to the fund. Generally, therefore, the costs incurred by end-investors with respect to capital market infrastructures and their directly related services to actually hold (dematerialised) securities or to undertake a specific trade in a security (ie, cost

of using the trading platform, clearing and settlement costs of that transactions, etc) are paid for by the investor (ie, fund) outside, and in addition to, the management fee paid by the fund to the fund manager.[69] The remainder of this section is concerned only with these additional fees paid by funds and where these payments end up.

Additional fees—general

Given the relationships between the different market participants at different levels in the value chain, the additional fees paid by the end-investor (funds in this case) do not necessarily remain with the institution that they pay the monies to. The purpose of the following analysis is to trace how a payment at one level in the chain results in subsequent payments to other market participants, so as to identify (approximately—see above) where the payments made by the end-investors finally end up.

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. This is done in a number of ways, including:

– the fund holds the securities in its own name in the (home) CSD;
– the fund holds the securities with a local custodian (with the account in the fund's name), and the custodian 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/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, or another CSD.

The analysis indicates that, averaged across all its customers, the home CSD will typically charge around 0.17bp 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 custodians). Hence, overall, whatever the fund or fund manager pays out for custody, around 0.17bp will end up with the home CSDs. This fee has been largely stable between 2006 and 2009 with, if anything, a slight decline (from around 0.19bp to 0.17bp over the period).[70]

If the fund contracts with a custodian it can expect to pay around 3bp for custody, more if it contracts with a global custodian, and less if it goes to a local custodian (typically reflecting the broader range of services that are offered by (global) custodians).[71] Custodians as a group will therefore take around 3bp of a fund's value per annum (but subject to considerable variation), out of which around 0.17bp is passed on to the home CSD. Although there has been quite a lot of change in the prices charged by custodians (see section 6 below), overall this safekeeping fee charged by custodians to fund managers has been falling—from around

[69] This boundary is not watertight. In particular the practice of softing and bundling in relation to commission payments made by funds to brokers can result in funds paying fees to fund managers via brokers for costs that are not directly caused by a transaction—for example, research. See Oxera (2006), 'Soft Commissions and Bundled Brokerage Services: Post-implementation Review', October.

[70] In the earlier report a fee of 0.15bp was reported for CSDs for 2006. Because only those CSDs reporting in all years are used in this analysis, the 2006 and 2008 results already reported have changed.

[71] The 3bp is based on the analysis of the pricing information provided by custodians for this service as provided to fund managers. The overall average custody fee charged by custodians across all their customers is lower—see section 6.5.

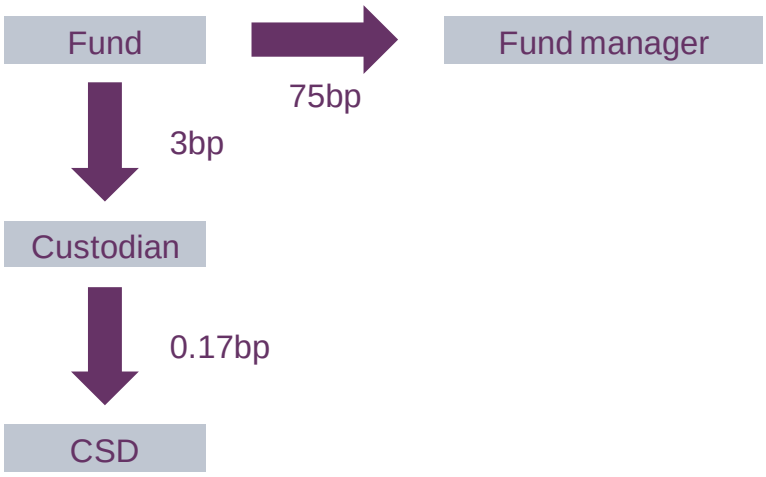
4bp in 2006 to 3bp in 2009. (To the extent that custodians represent the large customers of CSDs, and CSDs often have volume discounts built into their pricing structures, the actual amount spent by custodians on CSDs will be lower than the average price.)

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 3bp is charged by custodians as a class (a combination of both local and global), out of which about 0.17bp is paid on to the (home) CSDs, leaving around 2.83bp for custodian services;
– 0.17bp is charged by CSDs.

These flows are summarised in Figure 4.1.

Figure 4.1 High-level summary of financial flows (in bp) relating to holding equities



Source: Oxera.

Trading and post-trading transactions

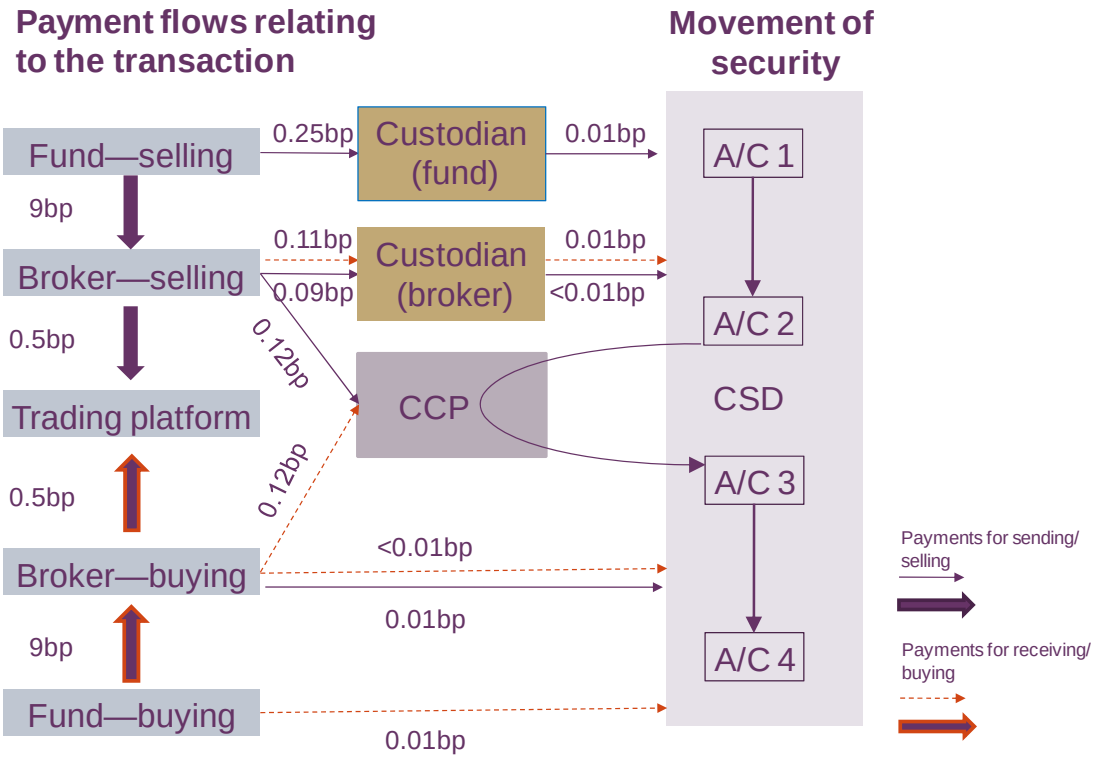
In addition to the costs of holding, there will be costs associated with transactions. The financial flows relating to transactions are more complex than those relating to holding securities and there is a multitude of ways in which any individual transaction can be carried out. However, by looking at a typical transaction type an indication of the final distribution of costs through the value chain can be established.

The costs of undertaking a transaction include the costs of using trading platforms, CCPs, CSDs, custodians and brokers. In the case of CSDs and custodians, these transaction costs are, in general, in addition to the holding costs described above.

As with the costs of holding securities, it is the investor (in this instance, funds) that ends up paying the costs of transactions. Funds purchase clearing and settlement services from custodians (or CSDs) directly or indirectly via fund managers. For trading, fund managers 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 proprietary 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 provider directly. In 2006, 80–90% (by value) of fund managers' equity trades were sent to brokers and, if anything, slightly more (as a percentage) in 2009. Therefore, for trading purposes, the funds are essentially paying two types of fees: a commission rate to brokers, and transaction-related fees either to custodians or CSDs directly. (See Figure 4.2 below, where the buy transaction has a direct relationship between the fund and the CSD.)

Figure 4.2 High-level summary of financial flows (in bp) relating to trading equities with CCP netting



Source: Oxera.

Fees initially paid to brokers

Although the fee paid to brokers tends to be expressed in bp per value of transaction, the fees paid to custodians or CSDs tend to be expressed (and charged) in a fee per transaction. In most cases the institutions reporting in the survey were unable to provide the transaction value data. In addition, the fees that are charged to brokers by trading platforms and CCPs are also charged in relation to transactions, without necessarily recording the value of that transaction. In order to express these costs in bp in relation to the value transaction as experienced by the fund (investor) a number of assumptions have to be made.

With regard to trading services, when a broker was used, the weighted average commission rate incurred by the fund (through the fund manager) was approximately 12bp (in 2006) of the value of transactions, and had generally fallen to 9bp by 2009—see Table 5.4. 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 a trading platform (approximately 10% of equity trades by value), the average fee is lower, at approximately 5bp.[72] (This reflects the more limited scope of services provided by trading platforms compared with brokers, and the larger average size of trades that flow directly to a 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 8bp of the value of the transaction.

[72] Oxera analysis of the fund manager responses.

Out of the fee paid by funds to brokers, brokers will themselves have to pay the fees of the trading platform. Looking at it from the trading platform perspective these are in the order of 0.5bp across all of their customers, while brokers (especially large brokers) may pay on average less than this; around 0.2bp (see Table 5.7 and accompanying text).[73] (As indicated above, where brokers are bypassed by fund managers, a higher amount is paid to the trading platform (5bp), but fund managers are likely to have to undertake themselves some of the activities that would otherwise be undertaken by the brokers.)

Brokers also pay CCPs out of the 9bp they receive from funds/fund managers. The CCP fees were around €0.40 per cleared transaction in 2006, and had fallen significantly, to around €0.12, by 2009. (See Table A5.10) The transactions here are the trades executed by brokers, so their total size is not necessarily the same as the total of trade orders sent from the fund/fund manager to the broker (for example, because it may include proprietary trading). In addition, there is not necessarily a one-to-one relationship between an order sent by a fund manager to a broker, and how that broker executes that trade. (Indeed, working an order is one of the functions carried out by brokers.) In general, the average value of trades executed by brokers is substantially smaller than the average value of trade orders received from fund managers. Over the last few years the average value of trade orders sent to trading platforms has fallen significantly. Across all brokers, the average trade executed on a trading platform was approximately €25,000 in 2006, and in 2009 was around €10,000.[74] Although, therefore, the costs per transaction of using a CCP have fallen, when the reduction in the average transaction size is taken into account the cost in bp has remained much more similar. The CCP costs in bp have, therefore, reduced from around 0.15bp to around 0.12bp as a result of this interaction (see Table 6.6.)

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 proprietary trading on their own behalf. Costs relating to proprietary 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 proprietary 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 (eg, by using a CCP), 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 that occur in the broker's account is the number of transactions executed on the trading platform. In 2006 the average size of this transaction was in the order of €25,000, and the transaction price for brokers, as charged by custodians, was in the order of €5.[75] This represented 2bp of the value of the transaction. (To

[73] Trading platforms often have price schedules with significant volume discounts.

[74] FESE data for incumbent European exchanges.

[75] The overall average price paid to custodians in 2006, and measured by reference to revenues and volumes, was €9 in 2006 and €5 in 2009—see section 6 below. The pattern of prices offered indicates that brokers will pay below this average price, reflecting both their size and the limited services they require. However, the pricing data also indicates that price differentials

the extent that netting takes place, the corresponding bp fee will fall.) In 2009 the average transaction value had fallen to around €10,000, and the average custodian fee had fallen slightly (the pricing data suggests a very small fall, including for brokers, while the revenue data suggests that prices have actually fallen slightly more taken across all customers). This suggests that, in terms of bp, the (upper boundary) price had risen to around 4–4.5bp. Where netting takes place, the number of transactions at the custodian will fall, which will reduce the effective bp price. This payment from the broker to the custodian is likely to produce a flow-on transaction, and hence payment to, the relevant CSDs. The average CSD charge per transaction (all securities) was around €0.50 in 2006, and has since fallen to around €0.35. (See Table A5.13.[76]) At the upper bound (no netting) every transaction on the exchange has a corresponding move in the CSD, which produces an upper bound in 2006 of around 0.20bp and in 2009 of around 0.35bp.[77]

Impact of netting at the CCP

Where there is a CCP in the capital market system then transactions on an exchange are very likely to be netted by that CCP before they are passed on to the CSD. As a result, the number of transactions at the trading platform level is not the same as the number of transactions that then occur at the CSD level. The netting efficiency dictates the relationship between these two numbers.

The first stage of the netting process has the effect of doubling the number of transactions. Each transaction between brokers across a trading platform is turned into two transactions by the CCP, as the CCP becomes the buyer to ever seller, and the seller to every buyer. The CCP then aggregates all of its bilateral transactions over a day, and at the end of the day provides the net position of all participants with respect to individual securities (and overall money position). So, for example, if a broker receives a sell order from its client of €1,000,000, which it then breaks up into 100 * €10,000 parcels before sending it to the exchange over the day, these 100 sell transactions will induce 100 buy transactions on the other side, and will be recorded as 100 complete transactions at the trading platform level. These are then turned into 200 transactions going into the CCP, 100 transactions where the CCP is the buyer, and 100 transactions where the CCP is a seller. The 100 transactions where the CCP is the buyer (ie, the 100 sell transaction which have come down from the trading platform) will be netted by the CCP to one transaction because they have got the same (selling) broker.

If we also have a buy order for €1,000,000 for the same security the same pattern repeats itself on the buying side. The 100 buy transactions at the trading platform are turned into 100 complete transactions going into the CCP, and one complete transaction on leaving the CCP. Putting the buy and sell sides at the trading platform together, we end up with:

– 100 complete transactions at the trading platform;
– 200 complete pre-netting transactions at the input side of the CCP;
– two complete post-netting transactions leaving the CCP into the CSD, which moves €1,000,000 of security from the selling broker's account to the buying broker's account.

In addition, at the CSD level, there will be one complete transaction (or its equivalent) to move the €1,000,000 of security from the selling fund to the broker, and another to move €1,000,000 of security from the buying broker to the buying fund. Altogether, there are four

between brokers and others may have narrowed. As a result, this analysis uses an average transaction price for brokers of €5 in 2006 and €4–€4.50 in 2009.

[76] Table A5.13 reports the transaction fee for all securities as a result of data limitations. In the 2009 report the costs of clearing and settlement for equities was below that of fixed income, so the combined average of €0.60 and €0.40 are likely to be slightly above the values for equities.

[77] The average transaction size on the exchange in 2006 is around €25,000 and the CSD cost is around €0.50, the cost per value of transaction is 0.20bp. In 2009 the average transaction size is around €10,000 and the CSD cost around €0.35, resulting in a cost per value of 0.35bp.

CSD complete transactions, 100 complete trading platform transactions and 200 complete pre-netting, and two post-netting, CCP transactions.

In the absence of a CCP and netting, the same final outcome is achieved with the following transactions:

– 100 complete transactions at the trading platform;
– 102 complete transactions at the CSD level.

The effect of netting is to displace CSD transactions (102 down to four) and to add CCP transactions (200). In relation to this service the end-investors will pay less to achieve the same objective if the costs of the 98 CSD transactions saved are bigger than the costs of the 200 CCP transactions incurred. In 2009, these were around €0.35 and €0.12 respectively, implying that there would be an overall saving.[78] If the netting efficiency of the CCP is 99%, then for every 100 transactions entering the CCP, there is one transaction at the CSD level. Measured against the number of transactions at the trading platform level, for every 50, there is one CSD transaction; so for every 100 at the trading platform level there are two at the CSD level. In the above example, a netting efficiency of 98% (measured relative to trading platform transactions) would imply that the costs at the CSD level per value of transaction at the trading platform level should be divided by 50—or 0.005bp in 2006 and 0.008bp in 2009.

The same effect will be occur if the broker uses a custodian to purchase clearing and settlement services; the number of transactions going to the custodian will reduce by a factor of 50, so when measured in relation to the value of transactions at the trading platform level, the bp cost falls from 4–4.5bp to around 0.09bp.

However, if the netting efficiency is itself varying through time then the direction of the cost change may also vary. So, for example, if the netting efficiency was 96% in 2006 and 98% in 2009, this would imply a cost in 2006 of 0.01bp, slightly higher than the cost in 2009. Where there is netting and where prices are set in relation to transactions, there is a complex relationship between the initial buy or sell transaction and the subsequent transactions at the different levels in the value chain that are needed to complete the end-to-end process (ie, to move a security from one end-investor to another).

Consistent time series data on netting efficiency is not readily available; however, from the information available to Oxera, netting efficiencies in the region of 96% (98% measured at the CCP level) are not uncommon, and it is likely that netting efficiency is increasing over time.[79] As a result, for financial centres with CCPs the cost per value (at the trading platform level) of the necessary CSD transaction-related services is likely to be in the order of 0.01bp, and is probably fairly stable through time, notwithstanding the changes in average transaction size at the trading platform level. However, in financial centres without netting the CSD costs are likely to be higher, and the reduction in transaction size at the trading platform level will result in increases in the number of transactions at the CSD level.

Fees initially paid to custodians (or directly to CSDs)

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 per transaction than brokers, reflecting both volumes and the level and range of services provided. From the customer profile pricing data, the weighted average cost per clearing and settlement transaction for funds/fund managers was around twice that charged to brokers. Using the average fee to brokers (see above) of around €4.50 the fee for funds/fund managers can be expected to be in the region

[78] The availability of a CCP on a market has benefits over and above the ability to net transactions, and could be valuable to end-investors in its own right.

[79] Based on information from some CCPs and from the theoretical view that if all other things are equal (including total value of transactions) except for a fall in the average transaction size at the trading platform level, netting efficiency would be expected to increase.

of €10 in 2009. (See Table 6.5.) On the assumption that the average transaction size is €400,000 as sent from the fund manager to the broker, this fee is 0.25bp.[80] (Unfortunately, insufficient information is available to understand whether the size of the orders being sent from the fund managers to the brokers is changing over time.)

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 fund/fund manager clients.)

The average transaction cost across equities reported by CSDs was around €0.50 in 2006, falling to around €0.35 in 2009. (See Table A5.13.) 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 CSD to custodian costs is around 1:30 (€0.35:€10) in 2009, at most one-thirtieth of the transaction fee received by custodians flows on to CSDs. This suggests that this cost will be in the order of 0.01bp.

Impact of netting by custodians

Independently of the CCP, in cases where a custodian holds omnibus accounts at CSDs on behalf of all or some of their clients, it may be possible for that custodian to net transactions sent to it by its customers before these transactions are transmitted to the CSD. For example, if a custodian has two fund clients that wish to sell the same security, and that use the same broker, rather than send two instructions to the CSD to move the security from the fund's custodian account to the broker's custodian account, these two transfers can be combined into a single instruction. If the movements are offsetting (ie, one buy and one sell transaction), the movements may net to zero and there would be no movement within the CSD.

Although market participants indicated that this form of netting takes place, no data was readily available on the extent of this practice. As a result, no account has been taken of the impact of such netting. However, to the extent that it takes place, it will tend to reduce the income flowing to the CSDs, and increase the income retained by the custodians.

4.4.2 Consolidation of costs

Overall, this evidence provides some insights into the final distribution of costs along the value chain as a result of a decision to hold and trade securities by an end-investor. Funds are paying out:

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

ii) 8bp for the trading part of the transaction, largely paid to brokers (9bp), but brokers are sometimes bypassed (1.5bp);

iii) 0.25 bp for clearing and settlement (value of transaction), largely paid to custodians;

iv) 3bp 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 (around 0.5bp and relatively stable through time) and CCPs (0.12bp in 2009, having declined from around 0.15bp in 2006). In addition, some of these fees flow-on to custodians and then onwards to CSDs. At a maximum this is likely to be 0.1bp to the custodian, and 0.01bp onward to the CSD, and could be lower. Of the 9bp paid to brokers, therefore, around 8bp (~90%) remains with the broker (subject to other

[80] Average fund transaction size is based on the 2006 data from fund managers, reported in the 2009 publication.

external costs). Fees in iii) will also flow-on to CSDs. Of the 0.25bp, around 0.01bp (4%) flows on to the CSD. Fees in iv) will also flow-on to CSDs. Of the 3bp, around 0.17bp (5%) flows on to the CSD.

Therefore if the fees paid by funds for *holding* are set at 100%, and made up of the 75bp for fund management and 3bp for custody services, the final distribution along the value chain approximates the following: around 96% ends up with the fund manager; 3.6% ends up with the custodian, and less than 0.4% ends up with the CSD. This distribution is reasonably stable between 2006 and 2009.

For *transactions* where the fees paid by funds are 100%, and made up of 9bp for brokers (ignoring direct access to trading platforms for simplicity) and 0.25bp for clearing and settlement, the distribution in 2009 is as follows: around 90% ends up with the broker; 5% ends up with the trading platform; around 1% ends up with the CCP; 4% with the custodian and less than 0.5% with the CSD.[81] (Where there is no CCP and, therefore, no netting of the trades between the trading platform and the CSD/custodians, the CSD (and custodians) would deal with many more transactions and would, therefore, end up with a significantly higher proportion of the total amount.)

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, 3bp for safekeeping, 11.7bp in commissions, and 0.3bp for clearing and settlement, giving a total of around 90bp of assets held. Using the flow-on calculations above, the final distribution along the value chain approximates the following: around 83% for fund management; 12% for the broker; 0.7% for the trading platform; 0.2% for the CCP; 4% ends up with the custodians and less than 0.3% 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 3bp for safekeeping (to custodians), 11.7bp in commissions (to brokers), and 0.3bp for clearing and settlement (to custodians), giving a total of around 15bp, all based on value of assets. The final distribution is as follows: around 71% for the broker; 4.5% for the trading platforms; 1% for the CCP; 22% for the custodians and 1.5% for the CSD.[82]

If the turnover of the fund is lower—say, 0.3 rather than 1.3—the total transaction-related costs fall. Excluding fund management costs, overall costs (all expressed in bp) fall from 15bp to around 6bp, with the final distribution as follows: around 42% for the broker; 2.5% for the trading platforms; 0.6% for the CCP; 51% for the custodians and 3.4% 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).

[81] For the purposes of this calculation, a netting efficiency at the CCP level of 98% has been assumed.

[82] The figures do not sum to 100%, as a result of rounding.

5 Cost of trading services: key indicators

This section identifies the trends and factors that affect the cost of trading services. It analyses the cost of trading and differences between the cost of domestic and cross-border trading. It shows that although there is considerable variation across brokers and fund managers and across domiciles of security, on average the costs of trading have come down significantly when measured from the perspectives of both brokerage firms and fund management firms.

5.1 Factors affecting the cost of trade execution offered by brokerage firms

To assess the cost of trade execution and monitor changes over time, 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, some of which are having a downward impact on commission rates. These include increases in the choice of trading venues and competition between them (including MTFs) resulting in lower exchange fees, increases in trading volumes, 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.

Survey participants also listed factors that could raise the cost of trading in the short or long term, such as 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).

The pricing of services also depends on the client's profile. Brokers confirmed that the most relevant factors are as follows.[83]

– **Mix of transaction methods**. The survey shows that commission rates for electronic trading and programme trading are generally lower than for core brokerage. 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. Data submitted by fund managers suggests that there can be significant variation in the use of transaction methods across fund managers, with some of them using core brokerage for only 25% of their transactions, whereas others use it for almost 100%.

– **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 value of total trades sent by that fund manager over a certain period (usually a year). As

[83] A few fund managers cited the type of stocks (eg, small 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.

a result of economies of scale, the higher the value of total trades in equities (and other securities), the lower the rate.[84]

– **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.[85] 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. Only a few (global) brokerage firms fund management firms in France, Ireland, Spain, Sweden and the UK provided breakdowns of commissions into trade execution and research. Typically, these are rough estimates (eg, in many cases, a 60/40 split or a 75/25 split between execution and research was provided).[86] Fund managers in a number of other financial centres (eg, Italy and the Denmark) 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, 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 the future.

5.2 The cost of trade execution offered by brokerage firms

5.2.1 Securities' view on the cost of trade execution

Table 5.1 below shows the changes in the cost of trading from the perspective of a domicile of securities, based on data from the brokerage firm questionnaire.

[84] A 2006 study for the UK Financial Services Authority (FSA), for example, 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). See Oxera (2006), 'Soft Commissions and Bundled Brokerage Services: Post-implementation Review', October, pp. 9 and 70.

[85] 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.

[86] This is consistent with a 2009 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 5.1 Weighted average commission rates charged by institutional brokerage firms for trade execution services (by domicile of security)

Domicile of securities	Cost of trading (bp) in 2006	Cost of trading (bp) in 2009	% change
All financial centres			
Weighted average	8.9	7.0	–21
Major financial centres			
Weighted average	9.4	7.6	–19
France	11.0	9.1	–18
Germany	9.2	7.2	–21
Italy	8.0	4.1	–48
Spain	9.2	6.9	–25
Switzerland	8.2	7.4	–10
UK	9.3	8.1	–12
Secondary financial centres			
Weighted average	9.1	7.9	–13
Other financial centres			
Weighted average	10.9	8.8	–19

Source: Brokerage firm questionnaire, and Oxera analysis.

The analysis shows that, in 2006, trading in equities domiciled in major and secondary financial centres cost on average around 9bp and in other financial centres 11bp. For all major financial centres, the cost decreased between 2006 and 2009 by 19% on average. The average cost for trade execution in secondary financial centres decreased by 13% and in other financial centres by 19%. Since institutional brokerage firms typically trade fixed income securities on a net (ie, not commission) basis, the table presents data on commissions related to equities trading only.[87]

There is considerable variation in commission rates across the major financial centres, ranging from between 4.1bp for Italian equities and 9.1bp for French equities. There is also considerable variation in rates between major financial centres (eg, Poland and the Czech Republic, where trading costs are around 23bp) and smaller ones (eg, Greece, where the cost is approximately 13bp—not shown in Table 5.1). 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. 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 financial centres, trade execution is offered in a bundle with other services, such as research, while in other financial centres it is not. As explained in section 2, it is relevant to look at the changes over time rather than comparing the absolute levels of costs across financial centres.

Table 5.2 below identifies the importance of core brokerage, electronic trading and programme trading within the domicile of securities in the financial centres using 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. In the period 2006–09 core brokerage declined and both electronic and programme trading increased. This is most pronounced in major financial centres, where electronic trading has almost doubled. It should be noted that

[87] 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.

the fund managers in the survey sample showed a general decline in trading activity by value of trade orders, in particular for those fund managers domiciled in major financial centres.

Table 5.2 Use of transaction methods by fund management firms (by value of equity trade orders, %)

	Proportion of equity trade orders	
Execution service	**2006**	**2009**
Major financial centres		
Core brokerage	69	49
Electronic trading	17	30
Programme trading	13	21
Secondary and other financial centres		
Core brokerage	63	54
Electronic trading	33	36
Programme trading	4	10

Source: Fund management questionnaire, and Oxera analysis.

Table 5.3 below identifies the importance of different transaction methods by domicile of security, based on data from brokers. The results are consistent with those from fund managers, in that core brokerage is the dominant transaction channel for brokerage firms. The size of the core brokerage channel decreased over the period 2006–09, with an increase in the importance of programme trading. In addition, electronic trading is observed to have fallen in and across all financial centres as well. These observations are consistent for the results whether the equities are domiciled in major, secondary or other financial centres. There is broad consistency between the results from fund managers (which are buying the trading services) and the results from brokers (which are selling them). Of the two datasets, there has been a greater consistency through time in the information from brokers.

Table 5.3 Use of transaction methods by brokerage firms (by value of equity trade orders, %)

Execution service	2006	2009
All financial centres		
Core brokerage	74	65
Electronic trading	19	12
Programme trading	7	23
Major financial centres		
Core brokerage	75	67
Electronic trading	19	11
Programme trading	6	22
Secondary financial centres		
Core brokerage	64	54
Electronic trading	24	14
Programme trading	12	32
Other financial centres		
Core brokerage	71	53
Electronic trading	25	21
Programme trading	4	26

Note: This table presents the breakdown by domicile of the security traded.
Source: Institutional brokerage firm questionnaires, and Oxera analysis.

5.2.2 Investors' perspective on the cost of trade execution

Table 5.4 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. The table is based on a sample of firms that provided a consistent response for both the 2006 and the 2009 rounds of the survey.

Table 5.4 Weighted average commission rates paid by institutional and retail investors for trade execution services for equities offered by brokerage firms

Type of investor	Domicile of investor	Cost (bp) in 2006	Cost (bp) in 2009
Institutional	Major financial centre	12	9
	Secondary and other financial centre	10	9
Retail	Major financial centre	29	19
	Secondary and other financial centre	46	30

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

For individual institutional investors, there is a mixed experience in terms of fees paid, with some investors experiencing rising fees and others falling fees. This is particularly the case for investors domiciled in secondary and other financial centres, where approximately half the investors surveyed experience a significant rise in their fee, as reflected in the smaller decline in average fees. However, on average, the fees paid by institutional investors have come down.

There is also a significant reduction in the fees experienced by retail investors, in both major and secondary and other financial centres. In part, this reflects the increasing market share

of retail investors with lower fees in the sample, as well as a reduction in costs for each individual retail investor. The rates charged to fund managers 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 5.6 further below presents a comparison, in index form, between the costs of domestic and cross-border transactions.

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.[88]

5.2.3 Average transaction size

Table 5.5 indicates the average size of orders executed by institutional brokerage firms, as measured by the value of executed trades divided by number of orders. The average order size has been estimated for each domicile of security and grouped into major, secondary and other financial centres. It is clear that the trade orders have become much smaller over time.

Table 5.5 Average equity order size of institutional brokers

Domicile of security	Average value of transaction in 2006 (€)	Average value of transaction in 2009 (€)	% change
Major financial centre	50,205	16,910	–66
Secondary financial centre	69,063	17,215	–75
Other financial centre	101,457	31,302	–69

Note: This analysis uses the full sample of survey respondents for each year.
Source: Institutional brokerage firm questionnaires, and Oxera analysis.

5.3 The cost of cross-border transactions offered by brokerage firms

Table 5.6 below shows the cost of domestic and cross-border trading (from an investor's perspective) for both 2006 and 2009. For institutional investors domiciled in major financial centres, the cost of cross-border transactions is around 1.5 and 1.4 times higher than that of domestic transactions for 2006 and 2009, respectively. However in secondary/other financial centres, domestic transactions are slightly more expensive than cross-border transactions for 2009.

For retail investors in 2009, the ratio of the cost of cross-border transactions to the cost of domestic transactions across all financial centres is around 1.3.[89]

[88] The sample of retail brokerage firms consists mainly of the traditional retail banks, in general does not distinguish between sales channels, and may not fully capture Internet brokers. This could bias the results to some extent.
[89] No or insufficient data was provided by retail brokerage firms in Austria, the Czech Republic, Ireland, Norway and Poland.

Table 5.6 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 2006 (index) (bp)	Cost of cross-border transactions relative to cost of domestic transactions 2006 (index) (bp)	Cost of domestic transaction 2009 (index) (bp)	Cost of cross-border transactions relative to cost of domestic transactions 2009 (index) (bp)
Institutional	Major financial centre	100	146	100	137
	Secondary and other financial centre	100	127	100	92
Retail	All financial centres	100	123	100	134

Source: Fund management 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.

5.4 The cost of services offered by external crossing networks to investors

As explained above, fund managers use external crossing networks to cross trades of different investors. In 2009, the average cost was 5.5bp, similar to that in 2006.

While there is some variation in the fees paid between fund managers according to their domicile (with fund managers domiciled in smaller financial centres typically paying more than those in major financial centres), for each fund manager there is not much variation in the cost according to the domicile of the security crossed. In 2009, the maximum relative cost of cross-border transactions for any fund manager was 150%.

Based on a relatively small number of respondents, it would seem that external crossing networks are increasingly being used to execute cross-border transactions (rather than domestic transactions), and that the costs of cross-border transactions have fallen over time to approach (or even fall below) the costs of domestic transactions.

5.5 The costs of services offered by trading platforms

The pattern shown in Table 5.7 below indicates that the on-book trading costs in equities, expressed as a cost per transaction, have decreased significantly (60%), while the costs in basis points per value of trading have increased somewhat (14%).[90] At the same time, Table

[90] 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.

5.8 shows that there has been significant reduction in the off-book trading costs, on both a per transaction (77%) and per value of transaction basis (75%). The average size of off-book transactions is significantly higher than on-book transactions. In addition, although the average size has declined, this decline has not been as steep as for on-book trading.[91]

Table 5.7 Changes in costs: on-book trading, equities

	Cost per value of trading (bp)	Cost per transaction (€)
2006	0.43	1.18
2008	0.47	0.79
2009	0.49	0.47
2006–09 % change	14	–60

Source: Trading platform questionnaire, and Oxera analysis.

Table 5.8 Changes in costs: off-book trading, equities

	Cost per value of trading (bp)	Cost per transaction (€)
2006	0.06	1.19
2008	0.027	0.55
2009	0.02	0.26
2006–09 % change	–75	–77

Source: Trading platform questionnaire, and Oxera analysis.

As explained above, both fund managers and brokers use trading platforms. In 2009, fund managers paid trading platforms between 0.40bp and 9.2bp for trade execution (for equities) (with an average of 5bp), while brokers tended to pay between 0.03bp and 7.0bp (with an average of around 0.2bp).

There is considerable variation in the costs across trading platforms. For example, data from brokers suggests that the costs of using trading platforms for transactions in UK equities ranged from €0.03 to around €0.30 per transaction in 2009 for a typical large broker.

[91] See, for example, the FESE statistics. These show that, across all European exchanges reporting, the ratio of off-book to on-book transaction size has moved from around 3 times in 2006 to around 5.5 times in 2009.

6 Cost of post-trading services: key indicators

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

6.1 Factors affecting the 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, institutional investors 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 the way in which custodians operate means that there is no 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 characteristics varying 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. Furthermore, custodians provided aggregate data on their revenues (and number of clearing and settlement transactions, and value of securities in custody).

In the analysis of custodian data, institutional investors refer to institutional funds and institutional fund management firms.

6.2 Main trends in the cost of services for custodians

This sub-section examines the main trends in the costs of custodian services between 2006 and 2009. It compares the weighted average price of custodian services in 2006 with the corresponding value in 2009 for all the firms included in the consistent sample (ie, those firms that provided data consistently across both 2006 and 2009).

The results of the analysis, presented in Table 6.1 below, show that, in general, both the 'clearing and settlement' and the 'custody and safekeeping' fees declined over the period 2006 to 2009, when measured by reference to the pricing information provided (for customer profiles). For both 'custody and safekeeping' and 'clearing and settlement' fees, around 70–85% of survey respondents reported a decline in their average charges or average unit revenues in this period.

Within this overall trend there is significant variation in the degrees of the decline—indeed, for some custodians, average prices have risen. For all custodians included in the sample, the percentage drop experienced in prices for clearing and settlement services varied from 1% to 52%.

Table 6.1 Comparison between prices charged for custodian services between 2006 and 2009

Financial centre	Proportion of firms for which prices declined (%)	Range of percentage decline (%)[1]
All financial centres, safekeeping, pricing (bp)	85	5 – 50
All financial centres, safekeeping, implied fees (bp)	69	5 – 40
All financial centres, settlement, pricing (per transaction)	77	1 – 50
All financial centres, settlement, implied fees (per transaction)	77	4 – 50

Note: [1] Where respondents significantly restructured their prices by rebalancing between 'safekeeping and custody' and 'clearing and settlement', they have been removed from the range.
Source: Oxera analysis of the custodian questionnaire.

6.3 Key factors affecting the costs of custodian services

This section presents an analysis of the costs of using custodians in relative terms. It looks at the relationship between costs and the size of the client or contract and at the ratio of costs of cross-border transactions to domestic transactions, while section 6.5 presents an analysis of the costs of using custodians in absolute terms.

Custodians provided price data for a wide range of customer profiles with characteristics varying in terms of type of client, size of contract and domicile of securities (see Appendix 2). To assess the impact of the two factors above, the average prices of custodian services are compared between different categories of customer under each of the factors. For instance, 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 cross-border nature of the transaction, average prices were compared between domestic and cross-border transactions. The difference in average prices was found to be significant in most cases. These findings are summarised below.

6.3.1 The relationship between the cost of transactions and the size of client

This sub-section examines the relationship between the size of the client (or contract) and the price offered for custodian services. The results presented here are based on an analysis of the prices quoted by custodians to establish weighted average prices by customer type.

The data provided on customer profiles distinguished between small, medium and large users, with size 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 was, in general, a negative relationship between price and size in both 2006 and 2009 (see Table 6.2). For example, for 2009 the average price of clearing and settlement services

for small clients was around 1.5 times the price charged to medium/large clients.[92] Moreover, according to Table 6.2, the 'size effect' was smaller for settlement services and larger for safekeeping services in both 2006 and 2009.

Table 6.2 Comparison between mean prices charged to small and medium/large clients (custodian services) (indices)

	Settlement fees (base data is € per transaction)		Safekeeping fees (base data is bp of assets held)	
	Small clients	Medium/large clients	Small clients	Medium/large clients
2006	138	100	123	100
2009	142	100	176	100

Note: A series of two-sample t-tests for both types of fee 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 except for the difference in safekeeping fees between small and medium/large clients in 2006.
Source: Custodian questionnaire, and Oxera analysis.

The difference between prices charged to small and medium/large clients increased between 2006 and 2009. In other words, medium/large clients benefited more from price reductions than small clients.

The pattern of prices observed persists over time, whereby brokers tend to pay less than custodians, which in turn tend to pay less than institutional investors. However, once size is also accounted for, the differences tend not to be significant at the 5% level, and are therefore not reported.

6.3.2 The ratio of the cost of cross-border transactions to domestic transactions

In this section, prices are further broken down by reference to the prices quoted in relation to services for specific domiciled securities.[93] The average costs of cross-border transactions for the two types of post-trading service were compared against the corresponding values for domestic transactions, both within and between the two years, using 2006 as the base. This cost comparison was carried out separately for each type of client. The disaggregation was intended to control for the influence of client type on the prices they were charged.

Before providing an explanation of the results, it is important to set out the convention that was followed to distinguish between domestic and cross-border transactions. The study identified the following types of custodian: local; multi-market; global; multi-market/local; global/local; and global/multi-market/local (see Table 6.3).

Table 6.3 Types of custodian included in the survey

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

Source: Custodian questionnaire, and Oxera analysis.

[92] Due to the small number of observations for medium and large clients for both 2006 and 2009, the two categories were combined to form a separate category of medium/large clients.
[93] In this case there is no weighting of different domiciles within each firm. As a result, firms reporting prices for more domiciles in one of the years can change their apparent cross-border prices without the price for a transaction across a particular cross-border pair changing.

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 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 to be domestic; otherwise they were considered to be cross-border.

Table 6.4 compares (in indices) the average cost of cross-border transactions with that of domestic transactions for each type of client. The base data used for the comparison were the domestic custodian services costs in 2006.

For the clearing and settlement services offered in 2006, the difference between domestic and cross-border fees is greatest for clients that are brokers (cross-border costs are more than twice the domestic costs for custodian clients). On the other hand, for custody and safekeeping services offered in 2006, the difference between domestic and cross-border fees is greatest for clients that are institutional investors (cross-border costs are around three times the domestic costs for clients that are institutional investors). Moreover, in the case of custody and safekeeping services, the difference between the cross-border fees in 2009 and the domestic fee in 2006 (which is the base) is also greatest for clients that are institutional investors.

Table 6.4 also shows that, in most cases, the prices for clearing and settlement and for custody and safekeeping have come down (for both domestic and cross-border transactions), while the difference between the costs of domestic and cross-border transactions has increased somewhat.

Table 6.4 Comparison between mean prices of cross-border and domestic transactions (custodian services) (indices)

	Settlement fees (base data is € per transaction) (2006)		Settlement fees (base data is € per transaction) (2009)		Safekeeping fees (base data is bp of assets held) (2006)		Safekeeping fees (base data is bp of assets held) (2009)	
	Domestic	Cross-border	Domestic	Cross-border	Domestic	Cross-border	Domestic	Cross-border
Custodian	100	219[1]	38[1]	131[1]	100	139	67[1]	170[1]
Institutional investor	100	176[1]	82	165[1]	100	272[1]	161	211[1]
Broker	100	227[1]	69[1]	292[1]	100	157[1]	86	186

Note: [1] p<0.05. 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 except for the following: the difference between the safekeeping fees for cross-border and domestic transactions in 2006 for clients that were custodians; the difference in settlement fees for domestic transactions between 2006 and 2009 for clients that were institutional investors; the difference in domestic safekeeping fees between 2006 and 2009 for clients that were institutional investors and brokers; and the difference between the 2009 cross-border safekeeping fees and the 2006 domestic safekeeping fees for clients that were brokers.
Source: Custodian questionnaire, and Oxera analysis.

Table 6.5 shows the relative prices that custodians charge to their different client types. In both 2006 and 2009 brokers were charged less than other customer types, with institutional investors being charged most. However, the analysis suggests that over this time period the price differentials were narrowing slightly.

Table 6.5 Comparison between mean prices charged to different types of client (custodian services) (indices)

	Settlement fees (base data is € per transaction)			Safekeeping fees (base data is bp of assets held)		
	Custodians	Institutional investors	Brokers	Custodians	Institutional investors	Brokers
2006	100	164	62	100	116	53
2009	100	159	80	100	133	76

Note: A series of two-sample t-tests for both types of fee 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 except for the following: the difference in settlement fees between other custodians and brokers in 2009; the difference in safekeeping fees between other custodians and institutional investors in 2006 and 2009; and the difference in safekeeping fees between other custodians and brokers in 2009.
Source: Custodian questionnaire, and Oxera analysis.

6.4 Distribution of custodian clients

This sub-section identifies the main trend in the distribution of custodian clients between 2006 and 2009. It compares the proportions of local and cross-border clients that custodians have in each of the two years.

Table 6.6 shows the proportion of custodians' clients that are domiciled domestically and across the border. The convention that is followed to distinguish between domestic and cross-border clients is similar to that used to differentiate between domestic and cross-border transactions.

The tables identify three broad categories of custodians from the data provided in the custodian questionnaires: all custodians; custodians supplying global custody services; and

custodians not supplying global custody services. For the first two categories, a significant majority of clients were domestic[94] in both 2006 and 2009, although the proportion of local clients declined slightly. On the other hand, for custodians not supplying global custody services, the proportion of local clients was much lower, at just over half, and the domestic client base increased slightly between 2006 and 2009.

The high proportion of domestic clients for the 'custodians supplying global custody services' is largely a result of local clients being defined here as those in domiciles where a global, global/local and/or global/multi-market custodian has an office.

Overall, the trend through time has been a slight decrease in the proportion of local customers, in terms of both number of clients and volume of services provided.

Table 6.6 Provision of custodian services for domestic clients (% of clients)

	Local clients		% of custody services provided to local customers	
	2006	2009	2006	2009
All custodians	92	87	46	38
Custodians supplying global custody services	93	87	45	35
Custodians not supplying global custody services	58	60	55	53

Source: Custodian questionnaire, and Oxera analysis.

6.5 Cost of post-trading services

6.5.1 Data provided by custodians

From the analysis of the revenue data provided by custodians (see above), and using a consistent sample across 2006 and 2009, the average fee per clearing and settlement transaction declined from around €9 to around €5 per transaction, while safekeeping fees remained broadly constant, at around 1bp.[95] These changes in average prices are not uniform across firms, but there was a reduction in revenue per transaction for almost all custodians.

Analysis of the pricing schedules provided by the custodians shows a similar pattern, with prices tending to fall over time for both clearing and settlement (by 22%), and custody services. In general, custodians have reported pricing schedules that produce weighted average prices similar to their actual average price derived from the revenue and volume data provided, with the pricing schedules tending to produce higher prices than actually charged (based on the revenue data). This is consistent with custodians reporting typical prices that they would quote, which may be slightly higher than the prices actually charged as a result of negotiations between the custodian and its client.

6.5.2 Data provided by CCPs

The average central counterparty cost per transaction levied by CCPs[96] was €0.37 in 2006, and decreased significantly in 2009 (see Table 6.7).[97]

[94] The terms 'domestic' and 'local' are used interchangeably in this section.

[95] In the 2009 report, the average clearing and settlement fee and custody fee were reported as €7 and 1.5bp for 2006. The new results are based on a smaller sample—ie, only those custodians reporting in both years.

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

[97] Appendix 5 describes in detail the approach used to estimate aggregated CCP costs.

Table 6.7 Costs of central counterparty clearing services, equities

	Cost (€ per transaction)
2006	0.37
2008	0.18
2009	0.10
2006–09 % change	–73

Source: CCP questionnaire, and Oxera analysis.

6.5.3 Data provided by CSDs

Table 6.8 sets out the costs for account provision and asset servicing, and clearing and settlement for equities and fixed income securities separately.[98] Overall, the costs of account provision and asset servicing decreased by 9% and 7% for equities and fixed income securities, respectively, whereas the cost for clearing and settlement declined by around 25% and 35% for equities and fixed income securities, respectively, between 2006 and 2009. (The group of CSDs that could provide the breakdown between equities and fixed income was, in general, cheaper than the full set of CSDs, and this is reflected in the table below. In addition in a majority of financial centres the clearing and settlement of fixed income securities is cheaper than equities. However, because the volume weights of fixed income and equities vary within a financial centre – and through time – the relative position of the average unit costs of fixed income and equities can change without changing the relative positions within each financial centre.)

Table 6.8 Costs of services provided by CSDs, equities and fixed income securities

	Account provision and asset servicing (costs per value of securities held, bp)			Clearing and settlement (€ per transaction)		
	Equities	Fixed income securities	Total[1]	Equities	Fixed income securities	Total[1]
2006	0.19	0.18	0.18	0.48	0.53	0.62
2008	0.21	0.18	0.19	0.41	0.35	0.46
2009	0.17	0.17	0.16	0.36	0.34	0.46
2006–09 % change	–9	–7	-11	–25	–35	–26

Note: The reported estimates for 2006 and 2008 have changed compared with the previous report, as a consistent sample of respondents across all three years has been used (rather than the full sample of respondents). [1] These totals are calculated for all those CSDs reporting, including those who could not split transactions between equities and fixed income.
Source: CSD questionnaire, and Oxera analysis.

6.5.4 Data provided by fund managers and retail brokers

In 2009 the response rate from fund managers and retail brokers for relevant questions has not made it possible to reach any definitive conclusions in relation to trends in costs of post-trading services over time.

The variation among what different fund managers pay for post-trading services is very large—from less than €10 to more than €100 per transaction, and a variation in custody and safekeeping fee from less than 0.05bp to 2bp or more. This is consistent with customer profile data from custodians, which indicates that institutional investors are charged prices for both clearing and settlement services and custody within the same range.

[98] 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.

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 higher post-trading costs on average. Similarly, the 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 reported by custodians**.**

Data provided by retail brokers in relation to retail investors also shows significant variation (as would be expected, given the heterogeneity of retail investors and retail brokers), from less than 0.1bp to 20bp or more for custody and safekeeping services.

The pattern observed in relation to 2006 data—that post-trading costs for fixed income securities are generally lower than for equities—remains, at the level of prices paid both by retail investors and by fund managers.

6.5.5 Data provided by brokers

Tables 6.8–6.10 present data on the cost of post-trading services used by the full sample of institutional brokerage firms. The average clearing and settlement costs reported have fallen from €0.43 and €2.44 per transaction to between €0.13 and €1 per transaction. Custody and safekeeping costs have also fallen, to approximately 0.15bp for services purchased from CSDs. For these services, brokers are using both CSDs directly and custodians, and as with fund management firms, 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, costs have fallen from between €0.48 and €0.65 per CCP transaction to €0.10–€0.15 depending on who is providing the service.

Although this analysis indicates a significant reduction in the costs facing brokers, there is an important caveat. A number of brokers reported for both years, but there are insufficient data points to conduct the analysis on a pure panel basis. The characteristics of the full sample of brokers in each year are different along dimensions that are related to unit costs (even for those reporting in both years). In particular, the average number and value of transactions per broker have increased significantly. It would therefore be expected that, from pure volume effects, the unit prices they face from their suppliers would fall. Part of the reduction in prices reported here is therefore likely to be a volume effect, rather than all of it being attributed to a fall in the prices offered by their suppliers for the same volume of service. The analysis needs to be interpreted in this light.

Table 6.9 Weighted average costs for brokerage firms for CCP clearing services (equities, €/transaction)

	Cost	
Service provider	**2006**	**2009**
Custodian	0.48	0.15
CCP	0.65	0.10

Note: This analysis uses the full sample in all years.
Source: Brokerage firm questionnaire, and Oxera analysis.

Table 6.10 Weighted average costs for brokerage firms for clearing and settlement services (equities, €/transaction)

	Cost	
Service provider	**2006**	**2009**
Custodian	2.44	1.00
(I)CSD	0.43	0.13

Note: This analysis uses the full sample in both years.
Source: Brokerage firm questionnaire, and Oxera analysis.

Table 6.11 Weighted average costs for brokerage firms for custody and safekeeping (equities, per value of securities held, bp)

	Cost	
Service provider	**2006**	**2009**
Custodian	n/a[1]	n/a[1]
(I)CSD	0.69	0.15

Note: [1] The characteristics of the brokers reporting in the two years are so different that a comparison would not be meaningful. This analysis uses the full sample in both years.
Source: Brokerage firm questionnaire, and Oxera analysis.

By analysing data on an individual respondent basis, a negative relationship can be observed between the volume of services purchased and the post-trading costs. 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. Economies of scale may account for part of the substantial decrease in (I)CSD fees paid. For both clearing and settlement and account provision, the average volume of services purchased by brokers from (I)CSDs rose by between ten and 20 times between 2006 and 2009 in the sample. This is not the case for services purchased from agents, where the number of transactions rose, but the value of securities held fell.

The difference in post-trading costs for brokerage and fund management firms is consistent with the analysis in section 6.1of the data reported by custodian firms. This shows significant and persistent differences in the costs that customers face. There can be several explanations for these differences—the main one arguably being the mix of services, as fund management firms tend to 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. Hence, different investment strategies (in terms of the distribution of the domicile of securities) will result in different unit costs. 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**.**

6.6 Cost of cross-border transactions

6.6.1 Data from custodian questionnaires

The results of the analysis relating to custodian services, as set out above, show that cross-border services tend to be more expensive than domestic services, for both safekeeping and settlement.

It should noted that given that cross-border transactions and holdings tend to be at a smaller scale than domestic activity for customers, at least some of the difference between the costs of cross-border and domestic transactions is size-related, rather than being a specific feature of the cross-border nature of the services. Furthermore, although the prices for clearing and settlement and for custody and safekeeping have come down in most cases (for both domestic and cross-border transactions), the difference between the costs of domestic and cross-border transactions has increased somewhat.

6.6.2 Data provided by fund managers

There is insufficient data from fund managers to present an analysis of the costs of domestic and cross-border activities. However, detailed analysis of the data of individual fund managers confirms the custodian analysis regarding the relative costs of cross-border activities. For both clearing and settlement and account provision, the cost for cross-border securities is at least as high as for domestic securities across the full sample of fund managers, but there is some variation between respondents. For example, some firms pay a blended fee for services across all domiciles, while others pay up to 4.5 times more for cross-border securities.

There is also considerable variation in costs across all cross-border securities (in some cases the range may exceed ten times the lowest fee). There are no clear factors explaining this variation. For example, it is not explained by differences in transaction volumes or by the size of the financial centre—purchasing services from smaller financial centres does not necessarily result in higher fees.

6.6.3 Data provided by brokers

Similar to what is observed in the data reported by fund management firms, the post-trading costs for institutional brokerage firms vary substantially according to the domicile of the security. However, in the case of institutional brokerage, there is no general trend in the relative price of cross-border services. For some institutional brokerage firms, costs are on average lower for cross-border securities, while for other firms the opposite holds.

This suggests that other factors, including the volumes purchased and the specific market for which the post-trading service is purchased, can be more important than whether the purchase is for a cross-border security. This may reflect the fact that most brokers have multiple domiciles, so the scope of securities that can be accessed at domestic rates is much wider for brokers than for fund managers.

6.6.4 Data provided by CCPs

Most CCPs provided data on the costs for domestic securities only. Due to the NDA restrictions, the relative costs for domestic and cross-border securities can therefore not be presented. However, where data was provided, the costs of central counterparty clearing services for domestic and cross-border transactions were found to be very similar (for example, in 2006, cross-border costs were about 97% of domestic costs), and this relationship remained stable over the 2006–09 period.

6.6.5 Data provided by CSDs

The costs of domestic and cross-border services provided by CSDs are compared in Table 6.12 below for total securities (ie, equities and fixed income securities combined). The table shows that account provision and asset servicing, and clearing and settlement for cross-border securities, are considerably more costly than for domestic securities. However, this difference has become smaller over time.[99]

At an individual financial centre basis, the variation in the ratio of costs between cross-border and domestic securities is considerable. In some financial centres the costs of some or all cross-border securities are the same as, or very similar to, those of domestic securities, while

[99] For more detail, see Tables A5.14 and A5.15.

in others the difference is considerable. As a result, the range of ratios is high, from at or around 100% to over 1,000%.

Table 6.12 Comparison between costs of cross-border and domestic CSD services, total securities

Post-trading service	Ratio of cross-border to domestic costs (%)		
	Total	Equities	Fixed income
Account provision and asset servicing			
2006 (bp)	430	340	500
2008 (bp)	390	260	470
2009 (bp)	380	310	470
2006–09 % change	–12	–7	–4
Clearing and settlement			
2006 (€/transaction)	410	480	950
2008 (€/transaction)	290	330	900
2009 (€/transaction)	260	330	560
2006–09 % change	–36	–30	–41

Note: The table reports estimates across total securities, as well as for equity and fixed income securities. The sample includes only those infrastructure providers that were able to provide data on the costs of domestic and cross-border transactions—in three of the major financial centres, no data was available on this. The sample used for total securities includes those who could not split their data between equities and fixed income. Only those reporting in all three years are included. This implies that the estimates have changed for 2006 and 2008, and direct comparisons with the previous report are not relevant.
Source: CSD questionnaire, and Oxera analysis.

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.[100] 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.

[100] In 2009, the 13 stock exchanges that relate most closely to the sample covered in the survey had 11,097 companies listed, of which 1,322 were overseas (cross-border) listings (ie, 11.9%). Source: World Federation of Exchanges (2009), 'Annual Report and Statistics 2009', p. 104 and Oxera analysis. No information on the Prague Stock Exchange was available in the source table, and NASDAQ OMX Nordic Exchange covered markets outside of the survey sample (ie, Finland and Iceland).

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 the 2009 Oxera report, 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.

Within the sample of firms that provided data for both years (2006 and 2009), in 2006 for around 85% of the custodians the profiles covered at least 75% of their clients, while around 5% indicated that more than 25% of their customers could not be classified under any of the predefined customer profiles. For 2009 all the custodians used in the analysis indicated that the 39 predefined profiles covered at least 75% of their clients. 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.)

All the custodians used in the analysis provided aggregated data on revenues and volumes, broken down by type of service for both 2006 and 2009. This allowed for cross-checking of the data on changes in prices for individual customer profiles by aggregating them across the customer profiles and comparing them with the changes over time in implied fees calculated from aggregated revenues and volumes data. The changes in prices based on the customer profiles were indeed consistent with the changes in the implied fees based on revenue data—there was only a very small number of custodians for which this was not the case. 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.

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: passive and active. With the former, 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 the latter, 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.[101] 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.

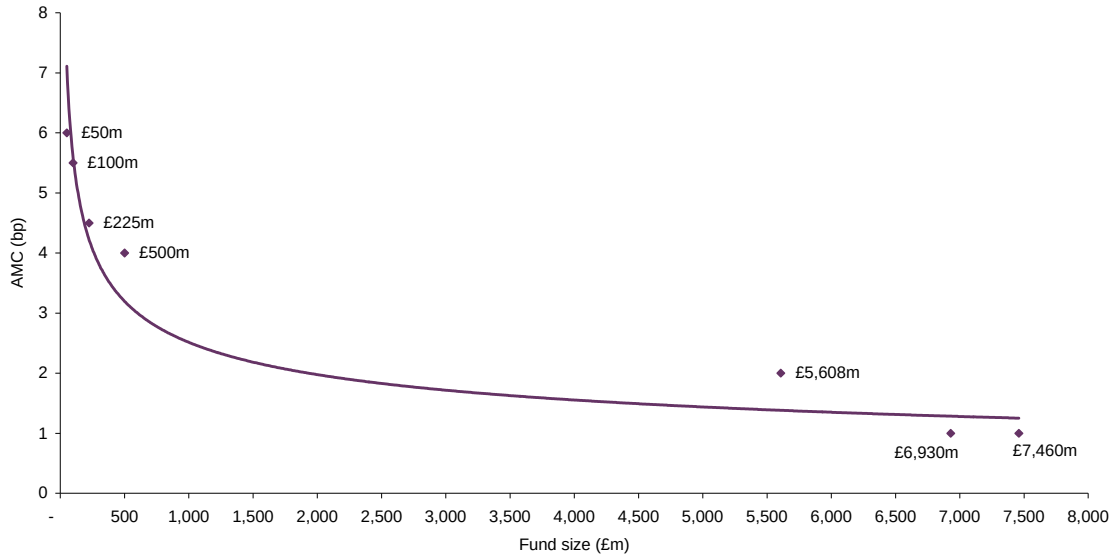
  Figure A3.1 shows passive fund management fees relative to the size of fund under management. The management fees are based on data provided by a representative sample of UK fund management firms, and reflect typical fund management fees charged to UK pension funds averaged across the sample of fund management firms. The figure includes a number of large pension funds in the USA. It indicates that there

[101] 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. As this includes discounts, for example, the effective cost may differ from the fee in 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:

– the distribution of activity;
– the cost of services;
– changes in relative costs of cross-border transactions.

Table A4.1 below describes the calculations for the change in the distribution of activity. In each case, the change in the non-domestic to total ratio is calculated.[102] For example, if there were a total of ten members in 2006, of which three were non-domestic, and in 2009 there were a total of 20 members, 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 2009, 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.

[102] 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** $= (r_{09} - r_{06}) / r_{06}$	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 2009 $r_{09} = (m_{n-d} / m_t)$	Number of non-domestic members in 2009 (m_{n-d})
		Total number of members in 2009 (m_t)
Percentage change in the proportion of equity trading by **non-domestic members** $= (r_{09} - r_{06}) / r_{06}$	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 2009 $r_{09} = (m_{n-d}^{Eq} / m_t^{Eq})$	Value of equity trading by non-domestic members in 2009 $\left(m_{n-d}^{Eq}\right)$
		Total value of equity trading in 2009 $\left(m_t^{Eq}\right)$
Percentage change in the proportion of **non-domestic equity trading** $x = (r_{09} - r_{06}) / r_{06}$	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 2009 $r_{09} = Eq_{n-d} / Eq_t$	Value of non-domestic equity trading in 2009 $\left(Eq_{n-d}\right)$
		Total value of equity trading in 2009 $\left(Eq_t\right)$

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) $= (p_{09} - p_{06}) / p_{06}$	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 2009 $p_{09} = 10{,}000 * \left(\pi^{Eq}_{on-book}\right) / \left(Eq^{value}_{on-book}\right)$	Revenue from on-book equity trading in 2009 $\left(\pi^{Eq}_{on-book}\right)$
		Value of transactions in relation to on-book equity trading in 2009 $\left(Eq^{value}_{on-book}\right)$
Percentage change in cost of **on-book equity trading** (cost per transaction) $= (p_{09} - p_{06}) / p_{06}$	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 2009 $p_{09} = \left(\pi^{Eq}_{on-book}\right) / \left(Eq^{number}_{on-book}\right)$	Revenue from on-book equity trading in 2009 $\left(\pi^{Eq}_{on-book}\right)$
		Number of transactions in relation to on-book equity trading in 2009 $\left(Eq^{number}_{on-book}\right)$

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 2009 $= \frac{p_{n-d}}{p_d}$	Cost of trading in cross-border securities in 2009 $p_{n-d} = 10{,}000 * (\pi_{n-d}) / (EQ + FI)^{value}_{n-d}$	Revenue from trading in cross-border securities in 2009 (π_{n-d})
			Value of trading in cross-border securities in 2009 $(EQ + FI)^{value}_{n-d}$
		Cost of trading in domestic securities in 2009 $p_d = 10{,}000 * (\pi_d) / (EQ + FI)^{value}_{d}$	Revenue from trading in domestic securities in 2009 (π_d)
			Value of trading in domestic securities in 2009 $(EQ + FI)^{value}_{d}$

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:

– distribution of activity;
– cost of services;
– changes in relative costs of cross-border transactions.

Table A4.4 below describes the calculations for the change in distribution of activity. In each case the change in the non-domestic to total ratio is calculated.[103] For example, if there were a total of ten members in 2006, of which three were non-domestic, and in 2009 there were a total of 20 members, 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 2009, 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.

[103] 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** = $(r_{09} - r_{06}) / r_{06}$	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 2009 $r_{09} = (m_{n\text{-}d} / m_t)$	Number of non-domestic members in 2009 ($m_{n\text{-}d}$)
		Total number of members in 2009 (m_t)
Percentage change in the proportion of equities transactions executed by **non-domestic members** = $(r_{09} - r_{06}) / r_{06}$	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 2009 $r_{09} = \left(\left(m_{n-d}^{Eq+FI}\right) / \left(m_t^{Eq+FI}\right)\right)$	Number of equities transactions cleared by non-domestic members in 2009 $\left(m_{n-d}^{Eq+FI}\right)$
		Total number of equities transactions cleared in 2009 $\left(m_t^{Eq+FI}\right)$
Percentage change in the proportion of **non-domestic equities transactions executed** = $(r_{09} - r_{06}) / r_{06}$	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 2009 $r_{09} = \left(Eq_{n-d}^{number}\right) / \left(Eq_t^{number}\right)$	Number of non-domestic equities transactions cleared in 2009 $\left(Eq_{n-d}^{number}\right)$
		Total number of equities transactions cleared in 2009 $\left(Eq_t^{number}\right)$

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) $= (p_{09} - p_{06}) / p_{06}$	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 2009 $p_{09} = \left(\pi^{Eq}_{CCPC}\right) / \left(n^{Eq}_{CCPC}\right)$	Revenue from central counterparty clearing of equities in 2009 $\left(\pi^{Eq}_{CCPC}\right)$
		Number of central counterparty clearing transactions for equities in 2009 $\left(n^{Eq}_{CCPC}\right)$

Source: Oxera.

CCPs also provide the following services: risk management; settlement instruction; and 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 $p_{n-d} = \left(\pi^{Eq+FI}_{n-d}\right) / \left(n^{Eq+FI}_{n-d}\right)$	Revenue from central counterparty clearing of cross-border securities in 2006 $\left(\pi^{Eq+FI}_{n-d}\right)$
			Number of cleared transactions for cross-border securities in 2006 $\left(n^{Eq+FI}_{n-d}\right)$
		Cost of clearing domestic securities in 2006 $p_{n-d} = \left(\pi^{Eq+FI}_{n-d}\right) / \left(n^{Eq+FI}_{n-d}\right)$	Revenue from central counterparty clearing of domestic securities in 2006 $\left(\pi^{Eq+FI}_{n-d}\right)$
			Number of cleared transactions in domestic securities in 2006 $\left(n^{Eq+FI}_{n-d}\right)$
	Ratio of cross-border: domestic costs in 2009 $= \frac{p_{n-d}}{p_d}$	Cost of clearing cross-border securities in 2009 $p_{n-d} = \left(\pi^{Eq+FI}_{n-d}\right) / \left(n^{Eq+FI}_{n-d}\right)$	Revenue from central counterparty clearing of cross-border securities in 2009 $\left(\pi^{Eq+FI}_{n-d}\right)$
			Number of cleared transactions for cross-border securities in 2009 $\left(n^{Eq+FI}_{n-d}\right)$
		Cost of clearing domestic securities in 2009 $p_{n-d} = \left(\pi^{Eq+FI}_{n-d}\right) / \left(n^{Eq+FI}_{n-d}\right)$	Revenue from central counterparty clearing of domestic securities in 2009 $\left(\pi^{Eq+FI}_{n-d}\right)$
			Number of cleared transactions for domestic securities in 2009 $\left(n^{Eq+FI}_{n-d}\right)$

Source: Oxera.

The cross-border to domestic cost ratio can also be calculated for the following services provided by CCPs: risk management; settlement instruction; and 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:

– distribution of activity;
– cost of services;
– changes in relative costs of cross-border transactions.

Table A4.7 below describes the calculations for the change in distribution of activity. In each case the change in the non-domestic to total ratio is calculated.[104] if there were a total of ten members in 2006, of which three were non-domestic, and in 2009 there were a total of 20 members, 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 2009, 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.

[104] This is different to the percentage increase of non-domestic 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** = $(r_{09} - r_{06}) / r_{06}$	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 2009 $r_{09} = (m_{n\text{-}d} / m_t)$	Number of non-domestic members in 2009 ($m_{n\text{-}d}$)
		Total number of members in 2009 (m_{total})
Percentage change in the proportion of **securities held by non-domestic members** = $(r_{09} - r_{06}) / r_{06}$	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 2009 $r_{09} = (\left(m_{n-d}^{Eq+FI}\right) / \left(m_t^{Eq+FI}\right))$	Value of securities held by non-domestic members in 2009 $\left(m_{n-d}^{Eq+FI}\right)$
		Total value of securities held in 2009 $\left(m_t^{Eq+FI}\right)$
Percentage change in the proportion of **non-domestic equities held** = $(r_{09} - r_{06}) / r_{06}$	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 2009 $r_{09} = \left(Eq_{n-d}\right) / \left(Eq_t\right)$	Value of non-domestic equities held in 2009 $\left(Eq_{n-d}\right)$
		Total value of equities held in 2009 $\left(Eq_t\right)$

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) $= (p_{09} - p_{06}) / p_{06}$	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 2009 $p_{09} = (10{,}000 * \left(\pi_{AP}^{Eq}\right) / v_{09})$	Revenue from account provision and asset servicing for equities in 2009 $\left(\pi_{AP}^{Eq}\right)$
		Value of securities held in relation to account provision and asset servicing for equities in 2009 (v_{09})
Percentage change in cost of **clearing and settlement** for equities (cost per transaction) $= (p_{09} - p_{06}) / p_{06}$	Cost per transaction for clearing and settlement for equities in 2006 $p_{09} = \left(\pi_{CS}^{Eq}\right) / n_{06}$	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 2009 $p_{06} = \left(\pi_{AP}^{Eq}\right) / n_{09}$	Revenue from clearing and settlement of equities in 2009 $\left(\pi_{CS}^{Eq}\right)$
		Number of clearing and settlement transactions for equities in 2009 (n_{09})

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 $= (r_{09} - r_{06}) / r_{06}$	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 2009 $r_{09} = c_{n\text{-}d} / c_d$	Cost of account provision and asset servicing for cross-border securities in 2009 $p_{n\text{-}d} = 10{,}000 * (\pi_{n-d}) / (v_{n-d})$	Revenue from account provision and asset servicing for cross-border securities in 2009 (π_{n-d})
			Value of securities held for account provision and asset servicing in relation to cross-border securities in 2009 (v_{n-d})
		Cost of account provision and asset servicing for domestic securities in 2009 $p_d = 10{,}000 * (\pi_d) / (v_d)$	Revenue from account provision and asset servicing for domestic securities in 2009 (π_d)
			Value of securities held for account provision and asset servicing in relation to domestic securities in 2009 (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** = $(r_{09} - r_{06}) / r_{06}$	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 2009 $r_{09} = p_{n-d} / p_d$	Cost of clearing and settlement for cross-border securities in 2009 $p_{n-d} = (\pi_{n-d})/(n_{n-d})$	Revenue from clearing and settlement of cross-border securities in 2009 (π_{n-d})
			Number of clearing and settlement transactions in relation to cross-border securities in 2009 (n_{n-d})
		Cost of clearing and settlement for domestic securities in 2009 $p_d = (\pi_d)/(n_d)$	Revenue from clearing and settlement of domestic securities in 2009 (π_d)
			Number of clearing and settlement transactions in relation to domestic securities in 2009 (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** = $(r_{09} - r_{06}) / r_{06}$	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 2009 $r_{09} = p_{n-d} / p_d$	Cost of settlement instruction for cross-border securities in 2009 $p_{n-d} = (\pi_{n-d})/(n_{n-d})$	Revenue from settlement instruction of cross-border securities in 2009 (π_{n-d})
			Number of settlement instruction transactions in relation to cross-border securities in 2009 (n_{n-d})
		Cost of settlement instruction for domestic securities in 2009 $p_d = (\pi_d)/(n_d)$	Revenue from settlement instruction of domestic securities in 2009 (π_d)
			Number of settlement instruction transactions in relation to domestic securities in 2009 (n_d)

Source: Oxera.

A4.4 General note on the results presented

Where there is a calculation which tracks the changes through time in the form of changes in ratios (for example, the ratio of cross-border transactions to total transactions), there are circumstances in which the changes measured for total securities will lie outside the range defined by the change in the two components of that total (ie, equities and fixed income securities). A hypothetical example is set out below in Table A4.12.

Table A4.12 Hypothetical example of the relationship between the changes in ratios of total securities, equities and fixed income

	2006	2009	% change in the ratio 2006–09
Total securities			
Total	3,501	9,430	
Cross-border	1,001	1,030	
Ratio of cross-border to total	29%	11%	–62%
Equities			
Total	3,000	6,000	
Cross-border	1,000	1,000	
Ratio of cross-border to total	33%	17%	–50%
Fixed income			
Total	501	3,430	
Cross-border	1	30	
Ratio of cross-border to total	0.2%	0.9%	338%

Source: Oxera.

A5 Aggregated analysis (infrastructure providers)

This appendix presents the results for trading platforms, CCPs and CSDs aggregated across financial centres.

A5.1 Approach

Aggregating data across financial centres provides greater 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 2006–09, it is 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 3.

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 over time, it is excluded from the aggregate estimate for this indicator. The exception is that new entrants such as MTFs and new CCPs are included in the analysis for all indicators in 2009 even though there was no data for 2006 and 2008. By including these new entrants, the indicators provide a reflection of the changes in costs over time across the entire market, rather than just those using the incumbent infrastructure providers. New entrants are included in the financial centres where they are domiciled. Although most of the new entrants are pan-European firms, they are included only in the analysis of the financial centre where they have their head office.

Due to the specific nature of ICSDs, they are not included in the aggregate analysis across financial centres in this appendix. The analysis of data from ICSDs is presented in section 3.5.18.

In this section the costs of using trading platforms and CCPs refer to transactions in equities and the cost of using CSDs is broken down by transactions in equities and fixed income securities. 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 over time) 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 the 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 over time. The cost is then estimated at the aggregate financial centre level, and therefore weights the data reported by each respondent by its relative activity.

In some cases, the estimates previously reported for infrastructure providers for 2006 and 2008 across various tables have changed compared with those reported in the previous study. This is driven by a number of factors, including (but not restricted to) the following:

– the analysis is based on a consistent sample of firms over time, with comparable quality and level of detail of the underlying data. The benchmark for selecting the firms to be

included in the current sample is the quality of the response for the 2009 financial year, whereas for the previous study it was based on the response for 2008. Given that the quality of data has changed over time, this has caused the sample of firms to change over time as well;

– a number of firms provided revised data for 2006 and 2008, including changes over time to the services provided. For example, in the case of Clearstream, the data for the years 2006 and 2008 presented in the Oxera 2009 report did not include fees for reporting services since these services were charged for separately. As a result of changes in the pricing schedule in 2010, this is no longer the case—reporting services are now charged for through the custody fees, and hence the estimates have been updated retrospectively to reflect this change;

– across certain infrastructure providers, the methodology for estimating trends over time in the provision of services has been revised slightly to reflect changes in how services in these markets were provided in 2010. For example, in the case of Euroclear, since 2009 a single operational facility has provided access to three European markets (Belgium, the Netherlands and France) and the same pricing schedule has been applied to securities in these financial centres. Therefore, in the calculations in the table, the approach is reflected retrospectively for 2006 and 2008. Another example is SWX Europe, which was previously domiciled in the UK, but has now been integrated into SWX Switzerland. The analysis reflected in the tables adjusts for the integration by considering SWX Europe as domiciled in Switzerland in both 2006 and 2008.

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 3. However, for each type of infrastructure, there is some variation in the sample of respondents on 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 2006, 2008 and 2009 follow the same sample of firms through time (with the exception that new entrants were included in the analysis for 2009, as explained above).

Similar issues as identified in the individual financial centre analysis in section 3 also apply here. The analysis has focused on how the *effective unit* costs that users of relevant services face changed between 2006 and 2009. 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 below shows the activity of cross-border members within trading platforms over the period 2006–09. 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, although there have been some small changes in the proportion of trading platforms' cross-border membership (by member and value of transactions) in the period 2006–09, it has remained broadly stable.

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	65	35	69	31	90	10
2008	61	39	60	40	88	12
2009	61	39	68	32	91	9

Note: The table reports revised figures for 2006 and 2008 based on amended data.
Source: Trading platform questionnaire, and Oxera analysis.

Table A5.2 shows how the proportion of activity in cross-border securities for trading platforms has increased by around ten percentage points for equities and two percentage points for fixed income securities over the period of 2006–09. The proportion of activity is expressed in terms of the total value of transactions executed for cross-border securities.

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	97	3	99	1
2008	90	10	99	1
2009	87	13	97	3

Note: The table reports revised figures for 2006 and 2008 based on amended data.
Source: Trading platform questionnaire, and Oxera analysis.

Table A5.3 shows the membership profile of trading platforms over the period of 2006–09. 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 four percentage point decrease in the proportion of members that are brokers, and a four percentage point increase in the proportion of members that are classified as 'other' over the 2006–09 period.

Table A5.3 Trading platform clients by type (%)

	Proportion of clients in:		
	2006	2008	2009
Brokers	85	80	81
Fund managers	3	4	3
Other trading platforms	0	0	0
Other	12	16	16

Note: 'Other' includes central banks, domestic and cross-border commercial banks, CCPs and personal members
Source: Trading platform questionnaire, and Oxera analysis.

A5.3.2 Costs of services

Tables A5.4 to A5.5 below show how the costs for different trading platform services have changed over the period 2006–09. 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 60% per transaction and rose by 14% per value of transaction. Table A5.5 shows that, for off-book trading, the reduction in the costs for equities was approximately 77% per transaction and 75% per value of transaction. It follows that the average transaction size for on-book trading has been falling (and is now around €10,000), while for off-book trading it has remained stable (at around €130,000).

Table A5.4 Changes in costs: on-book trading, equities

	Costs per value of trading (bp)	Costs per transaction (€)
2006	0.43	1.18
2008	0.47	0.79
2009	0.49	0.47
2006–09 % change	14	–60

Source: Trading platform questionnaire, and Oxera analysis.

Table A5.5 Changes in costs: off-book trading, equities

	Costs per value of trading (bp)	Costs per transaction (€)
2006	0.06	1.19
2008	0.027	0.55
2009	0.02	0.26
2006–09 % change	–75	–77

Source: Trading platform questionnaire, and Oxera analysis.

Tables A5.6 to A5.7 show how the costs of trading in domestic and cross-border securities changed over the period 2006–09. The number of trading platforms that could provide data on the breakdown between domestic and cross-border costs is less 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

	Costs per value of trading, domestic (bp)	Costs per value of trading, cross-border (bp)	Ratio of cross-border: domestic costs (%)	Costs per transaction, domestic (€)	Costs per transaction, cross-border (€)	Ratio of cross-border: domestic costs (%)
2006	0.45	0.39	86	1.23	1.30	105
2008	0.48	0.41	85	0.76	1.22	160
2009	0.49	0.36	73	0.45	0.47	104
2006–09 % change	9	–8	–15	–63	–64	–0.9

Note: The table reports revised figures for 2006 and 2008 based on amended data.
Source: Trading platform questionnaire, and Oxera analysis.

Table A5.7 Changes in the relative costs of off-book trading in cross-border equities

	Costs per value of trading, domestic (bp)	Costs per value of trading, cross-border (bp)	Ratio of cross-border: domestic costs (%)	Costs per transaction, domestic (€)	Costs per transaction, cross-border (€)	Ratio of cross-border: domestic costs (%)
2006	0.04	0.03	75	0.85	0.88	103
2008	0.02	0.01	50	0.36	0.44	122
2009	0.01	0.01	100	0.14	0.38	271
2006–09 % change	–75	–66	33	–83	–57	163

Note: The table reports revised figures for 2006 and 2008 based on amended data.
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 2006–09. 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 an increase in the relative activity of cross-border members within CCPs. In terms of the number of members, there has been an increase of 7 percentage points over 2006–09. The number of clearing transactions undertaken by cross-border members has increased by 32 percentage points over the same period.

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	84	16
2008	68	32	80	20
2009	63	37	52	48

Note: The table reports revised figures for the provision of CCP services by number of clearing transactions for 2006 and 2008 based on amended data.
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 2006–09. The table suggests that there has been a significant increase in the relative activity in cross-border equities over time.

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
2009	67	33

Note: The sample of firms for 2009 includes two new entrants offering central counterparty clearing services.
Source: CCP questionnaire, and Oxera analysis.

A5.4.2 Costs of services

Table A5.10 shows how the costs for central counterparty clearing services[105] changed over the 2006–09 period. The costs are presented for equities, and represent the average cost incurred by CCPs across financial centres, measured on a double-counted basis. The table shows that, on average across the financial centres, the CCP clearing cost for equities has declined from €0.37 per transaction to €0.10 per transaction—a reduction of 73% between 2006 and 2009.

Table A5.10 Costs of central counterparty clearing services, equities

	Cost (€ per transaction)
2006	0.37
2008	0.18
2009	0.10
2006–09 % change	–73

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 securities were very similar (for example, in 2006, cross-border costs represented about 97% of domestic costs), and this relationship remained stable over the period between 2006 and 09.

Consistent with the analysis in section 3.4, the CCP cost can also be expressed as a proportion of the value of transaction at trading level. For 2006, the CCP cost per value of transaction amounted to 0.15bp and in 2009 to 0.12bp for each side of the transaction.[106]

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 2006–09 period. The proportion of activity is expressed in terms of the number of members and 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 an increase of one percentage points over the period 2006–09. The value of securities held on behalf of cross-border members has also increased slightly over time.

[105] This measure includes the costs of central counterparty clearing services only, and does not include the costs of other services, such as fail management.
[106] Based on average transactions sizes of €25,000 in 2006 and €10,000 in 2009.

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
2009	97	3	85	15

Note: The table reports revised figures for 2008 based on amended data.
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 was a decrease of one percentage point in the relative amount of activity in cross-border securities between 2006 and 2009. For fixed income securities, the table shows that the activity in cross-border securities increased by around three percentage points between 2006 and 2009.

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	94	6	87	13
2008	96	4	85	15
2009	95	5	84	16

Note: The table reports revised figures for 2006 for equities, and 2006 as well as 2008 for fixed income securities based on amended data.
Source: CSD questionnaire, and Oxera analysis.

A5.5.2 The costs of services

Table A5.13 shows how the costs for different CSD services changed over the period 2006–09. 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 declined by 9% for equities and by around 7% for fixed income securities between 2006 and 2009. In terms of clearing and settlement services, on average the cost declined by 25% and 35% for equities and fixed income securities, respectively, between 2006 and 2009. (The group of CSDs that could provide the breakdown between equities and fixed income was, in general, cheaper than the full set of CSDs, and this is reflected in the table below. In addition in a majority of financial centres the clearing and settlement of fixed income securities is cheaper than equities. However, because the volume weights of fixed income and equities vary within a financial centre – and through time – the relative position of the average unit costs of fixed income and equities can change without changing the relative positions within each financial centre.)

Table A5.13 Costs of services provided by CSDs, equities and fixed income securities

	Account provision and asset servicing (costs per value of securities held, bp)			Clearing and settlement (€ per transaction)		
	Equities	Fixed income securities	Total[1]	Equities	Fixed income securities	Total[1]
2006	0.19	0.18	0.18	0.48	0.53	0.62
2008	0.21	0.18	0.19	0.41	0.35	0.46
2009	0.17	0.17	0.16	0.36	0.34	0.46
2006–09 % change	–9	–7	–11	–25	–35	–26

Note: The reported estimates for 2006 and 2008 have changed compared with the previous report, as a consistent sample of respondents across all three years has been used (rather than the full sample of respondents). [1] The total are calculated for all those CSDs reporting, including those who could not split transactions between equities and fixed income.
Source: CSD questionnaire, and Oxera analysis.

Tables A5.14 to A5.19 show how the costs for account provision and asset servicing, and for clearing and settlement changed over the period 2006–09 for total securities and broken down by equity and fixed income securities. The costs are presented separately for domestic and cross-border securities and represent the average cost for CSDs across all financial centres that could make this split. 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 and fixed income securities decreased over the period 2006–09. For equities, the cross-border cost fell by 9%, and compared to 3% for domestic securities. For fixed income securities, the cross-border cost decreased by 11% in absolute terms, compared to a decrease of 7% for domestic securities. For both equities and fixed income the cross border costs are declining slightly faster than domestic costs, so the average costs are converging.

Table A5.14 Changes in the relative costs of cross-border account provision and asset servicing: equities

	Domestic cost (costs per value of securities held, bp)	Cross-border cost (costs per value of securities held bp)	Ratio of cross-border: domestic costs (%)
2006	0.22	0.74	340
2008	0.21	0.55	260
2009	0.21	0.67	310
2006–09 % change	–3	–9	

Note: The reported estimates for 2006 and 2008 have changed compared with the previous report as a consistent sample of respondents was used for the analysis. The analysis is based on the firms that provided data on the cost of domestic and cross-border transactions (which is a sub-set of the firms used for the analysis in Tables A.5.13 and 6.8). For three of the major financial centres, no data on the costs of domestic and cross-border transactions was available.
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 (costs per value of securities held, bp)	Cross-border cost (costs per value of securities held bp)	Ratio of cross-border: domestic costs (%)
2006	0.13	0.64	500
2008	0.12	0.57	470
2009	0.12	0.57	470
2006–09 % change	–7	–11	

Note: The reported estimates for 2006 and 2008 have changed compared with the previous report as a consistent sample of respondents was used for the analysis. The analysis is based on the firms that provided data on the cost of domestic and cross-border transactions (which is a sub-set of the firms used for the analysis in Tables A.5.13 and 6.8). For three of the major financial centres, no data on the costs of domestic and cross-border transactions was available.
Source: CSD questionnaire, and Oxera analysis.

For clearing and settlement, the cost for cross-border securities decreased both for equities and fixed income securities between 2006 and 2009. Table A5.16 shows that the cross-border cost for equities decreased by 51%, while the cost for domestic securities decreased by 30%. Table A5.17 shows that, for fixed income securities, the cross-border cost decreased by 58% in absolute terms compared with 29% for domestic securities. For both equities and fixed income the cross border costs are declining faster than domestic costs, so the average costs are converging. On an individual financial centre basis, the variation in the ratio of costs between cross-border and domestic securities is considerable. In some financial centres the costs of some or all cross-border securities are the same as, or very similar to, those of domestic securities, while in others the difference is considerable. As a result, the range of ratios is high, from at or around 100% to over 1,000%.Tables A5.18 and A5.19 present the costs of domestic and cross-border transactions for total securities (ie, equities and fixed income securities combined).

Consistent with the analysis in section 3.4, and including an assumption of a constant netting efficiency of 98%, the CSD cost can also be expressed as a proportion of the value of the transaction at trading level. For 2006, the CSD cost per value of transaction amounted to 0.003bp, and to 0.006bp in 2009 (based on the costs of the CSDs in financial centres with a CCP).[107]

[107] As explained in section 3.4, if the netting efficiency is increasing as the average value of transactions at the trading platform level declines, then this will help to reduce, or even reverse, the direction of the change in costs expressed in the form of bp per value of transaction at the trading platform level.

Table A5.16 Changes in the relative costs of cross-border clearing and settlement services: equities

	Domestic cost (€ per transaction)	Cross-border cost (€ per transaction)	Ratio of cross-border: domestic costs (%)
2006	0.39	1.83	480
2008	0.31	1.01	330
2009	0.27	0.90	330
2006–09 % change	–30	–51	

Note: The reported estimates for 2006 and 2008 have changed compared with the previous report as a consistent sample of respondents was used for the analysis. The analysis is based on the firms that provided data on the cost of domestic and cross-border transactions (which is a sub-set of the firms used for the analysis in Tables A.5.13 and 6.8). For three of the major financial centres, no data on the costs of domestic and cross-border transactions was available.
Source: CSD questionnaire, and Oxera analysis.

Table A5.17 Changes in the relative costs of cross-border clearing and settlement services: fixed income securities

	Domestic cost (€ per transaction)	Cross-border cost (€ per transaction)	Ratio of cross-border: domestic costs (%)
2006	0.42	4.00	950
2008	0.30	2.66	900
2009	0.30	1.68	560
2006–09 % change	–29	–58	

Note: The reported estimates for 2006 and 2008 have changed compared with the previous report as a consistent sample of respondents was used for the analysis. The analysis is based on the firms that provided data on the cost of domestic and cross-border transactions (which is a sub-set of the firms used for the analysis in Tables A.5.13 and 6.8). For three of the major financial centres, no data on the costs of domestic and cross-border transactions was available.
Source: CSD questionnaire, and Oxera analysis.

Table A5.18 Changes in the relative costs of cross-border account provision and asset servicing: total securities

	Domestic cost (costs per value of securities held, bp)	Cross-border cost (costs per value of securities held, bp)	Ratio of cross-border: domestic costs (%)
2006	0.18	0.76	430
2008	0.16	0.60	390
2009	0.16	0.61	380
2006–09 % change	–10	–20	

Note: The reported estimates for 2006 and 2008 have changed compared with the previous report as a consistent sample of respondents was used for the analysis. The analysis is based on the firms that provided data on the cost of domestic and cross-border transactions (which is a sub-set of the firms used for the analysis in Tables A.5.13 and 6.8). For three of the major financial centres, no data on the costs of domestic and cross-border transactions was available.
Source: CSD questionnaire, and Oxera analysis.

Table A5.19 Changes in the relative costs of cross-border clearing and settlement services: total securities

	Domestic cost (€ per transaction)	Cross-border cost (€ per transaction)	Ratio of cross-border: domestic costs (%)
2006	0.57	2.34	410
2008	0.46	1.34	290
2009	0.36	0.96	260
2006–09 % change	–32	–44	

Note: The reported estimates for 2006 and 2008 have changed compared with the previous report as a consistent sample of respondents was used for the analysis. The analysis is based on the firms that provided data on the cost of domestic and cross-border transactions (which is a sub-set of the firms used for the analysis in Tables A.5.13 and 6.8). For three of the major financial centres, no data on the costs of domestic and cross-border transactions was available.
Source: CSD questionnaire, and Oxera analysis.

A6 Average value of on- and off-book transactions

Table A6.1 shows the change in average value of transactions across on- and off-book trading for a range of domiciles where data was available. Consistent with the evidence above, the average value of transactions has consistently declined over time across the majority of the financial centres.

Table A6.1 Trends in average value of transactions in equities at the trading platform level (on- and off-book trading combined)

Trading platform(s) domiciled in	2006–08 (%)	2008–09 (%)	2006–09 (%)
Major financial centres			
France	–42	–39	–65
Germany	–35	–33	–57
Italy	–25	–29	–47
Spain	–32	–21	–46
Switzerland	–60	1	–59
UK	–59	–51	–80
Secondary financial centre			
Belgium	–42	–39	–65
Luxembourg	298	–48	108
The Netherlands	–42	–39	–65
Norway	–47	–41	–69
Poland	28	–38	–21
Sweden	–48	–38	–68
Other financial centres			
Austria	–44	–38	–65
Czech Republic			
Denmark	–43	–24	–57
Greece	35	–48	–29
Ireland	–83	–50	–91
Portugal	–42	–39	–65
Other European			

Note: The percentage change in average value of transactions reported for Ireland is based on FESE data.
Source: Trading platform questionnaire, and Oxera analysis.

A7 Changes in activity and costs in individual financial centres between 2006 and 2008

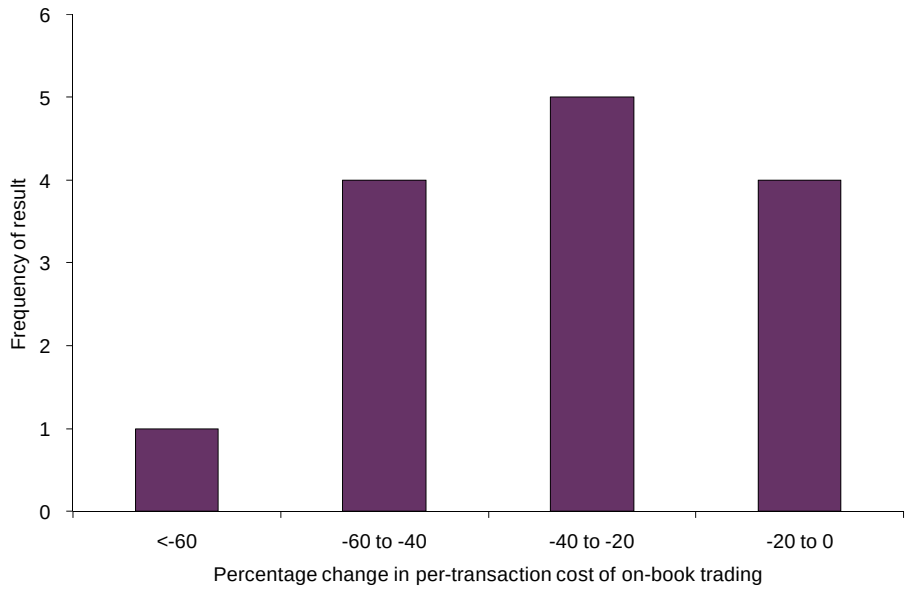
The evidence on changes in activity and costs in various individual financial centres between 2006 and 2008 provides a number of insights.

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.

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.

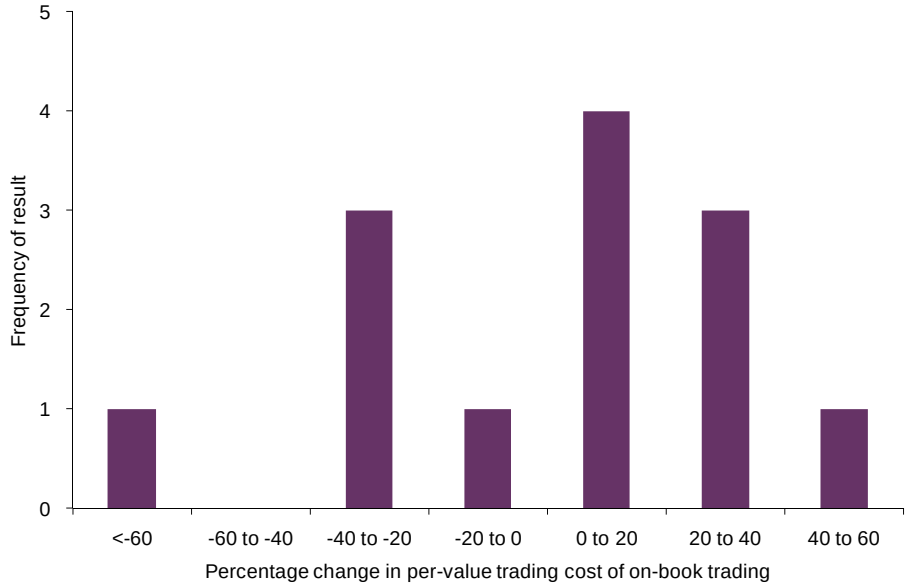
Across financial centres, there has been a reduction in on-book trading costs expressed in terms of costs per transaction (see Figures A7.1 and A7.2). In other words, in most financial centres, the average cost per trade incurred by market participants in 2008 was significantly lower than in 2006. At the same time, expressed in terms of cost per value of trading, the pattern of changes is different; using this measure, the trading costs 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 trends similar to those observed for the on-book trading.

Figure A7.1 Changes in on-book trading costs between 2006 and 2008 (per number of transactions)



Source: Trading platform questionnaire, and Oxera analysis.

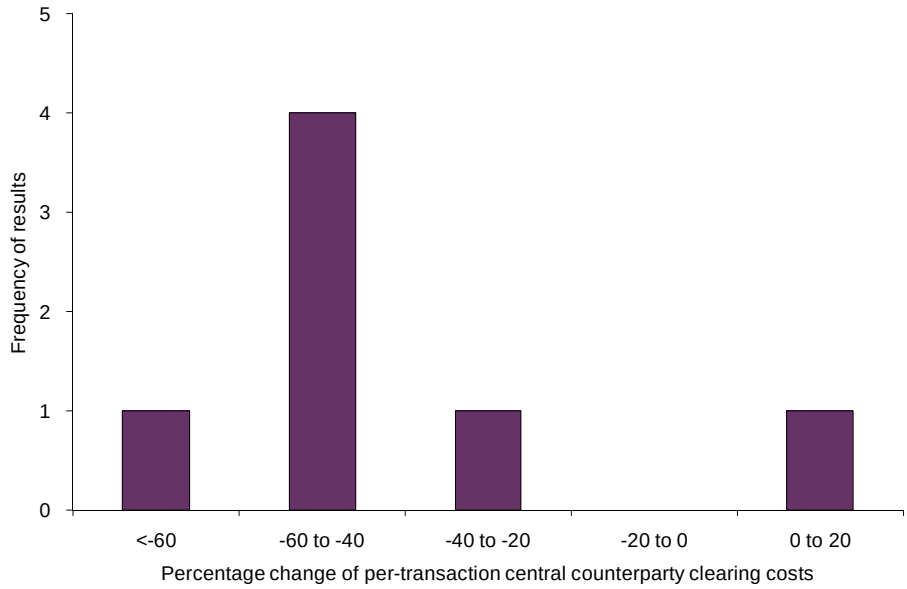
Figure A7.2 Changes in on-book trading costs between 2006 and 2008 (per value of transactions)



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 A7.3). 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.

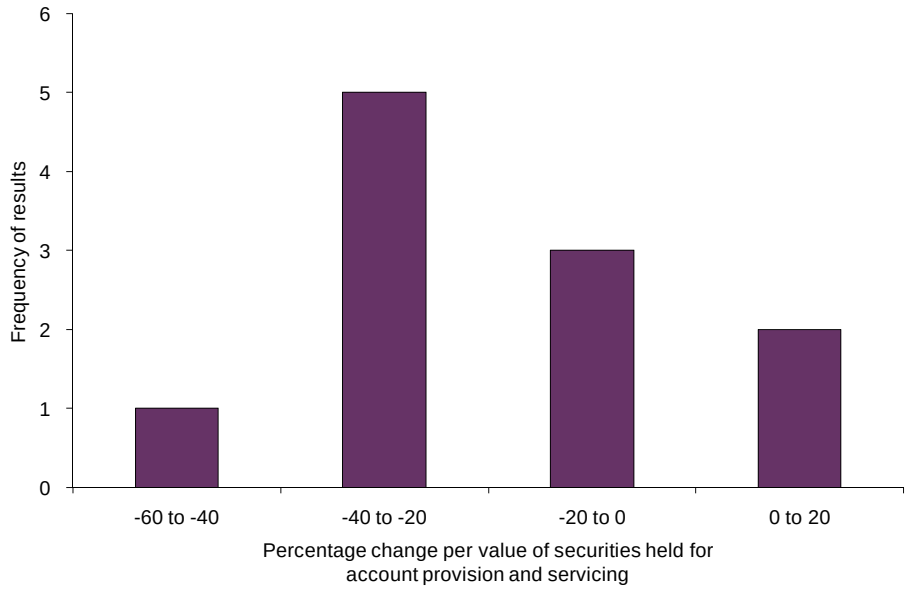
Figure A7.3 Changes in central counterparty clearing costs between 2006 and 2008



Source: CCP questionnaire, and Oxera analysis.

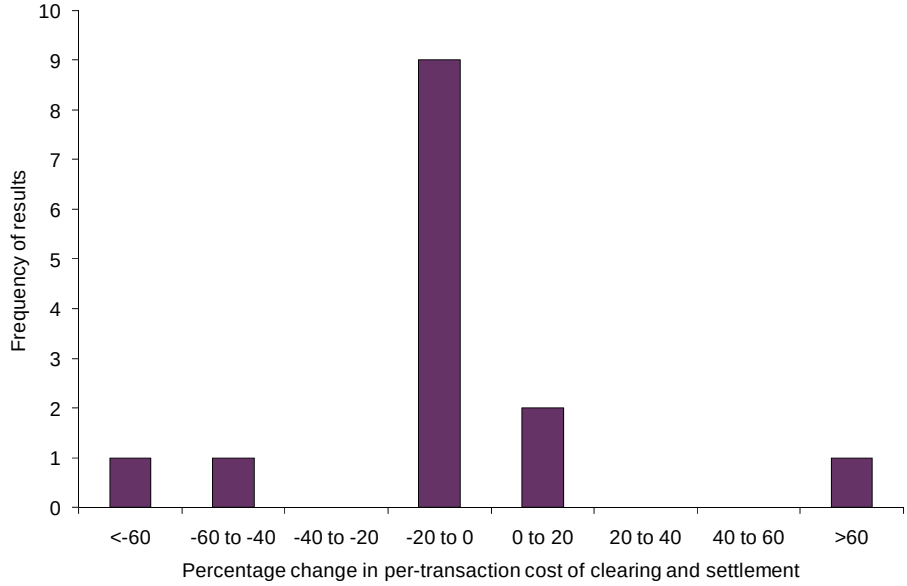
The data on CSDs across financial centres does not reveal a systematic trend in the costs of account provision and servicing, and clearing and settlement services (see Figures A7.4 and A7.5 below). In particular, there are a significant number of financial centres where these costs have increased and a significant number where they have decreased.

Figure A7.4 Changes in account provision and servicing costs between 2006 and 2008



Source: CSD questionnaire, and Oxera analysis.

Figure A7.5 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.

A8 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 trades	Trades that are not executed through an electronic order book on an exchange, but confirmed through a system managed, directly or indirectly, by an exchange or MTF where both seller and buyer agree on the transaction (price and quantity). This system checks automatically whether the transaction is compliant with the exchange rules
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 trades	Transfers of ownership by way of trades executed through the electronic order book of an exchange or MTF, where orders placed by trading members are usually exposed to all market users and automatically matched according to precise rules set up by the exchange/MTF and whose prices are displayed to the market. These trades may include floor trading organised by an exchange/MTF
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'

Terminology	Definition
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
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

Terminology	Definition
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
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. Transactions are double-counted, which means that each side of the transaction (buy and sell) counts as one transaction 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. Transactions are double-counted, which means that each side of the transaction (buy and sell) counts as one transaction
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

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