Terms of reference and conduct of the inquiry

Terms of reference

1. On 20 June 2011 the OFT sent the following reference to the CC:

    1. In exercise of its duty under section 33(1) of the Enterprise Act 2002 ('the Act') to make a reference to the Competition Commission ('the CC') in relation to an anticipated merger the Office of Fair Trading ('the OFT') believes that it is or may be the case that—

        (a) arrangements are in progress or contemplation which, if carried into effect, will result in the creation of a relevant merger situation in that:

            (i) enterprises carried on by or under the control of BATS Trading Limited will cease to be distinct from enterprises carried on by or under the control of Chi-X Europe Limited; and

            (ii) as a result, the conditions specified in section 23(4) of the Act will prevail, or will prevail to a greater extent, with respect to trading services for on-book UK-listed equities;[1] and

        (b) the creation of that situation may be expected to result in a substantial lessening of competition within any market or markets in the UK for goods or services, including trading services for on-book UK-listed equities.

    2. Therefore, in exercise of its duty under section 33(1) of the Act, the OFT hereby refers to the CC, for investigation and report within a period ending on 2 December 2011, on the following questions in accordance with section 36(1) of the Act—

        (a) whether arrangements are in progress or contemplation which, if carried into effect, will result in the creation of a relevant merger situation; and

        (b) if so, whether the creation of that situation may be expected to result in a substantial lessening of competition within any market or markets in the UK for goods and services.

    3. In relation to the question whether a relevant merger situation has been created, the CC shall exclude from consideration one of the subsections (1) and (2) of section 23 of the Act if they find that the other is satisfied.

(signed) ALI NIKPAY
Senior Director
Office of Fair Trading
20 June 2011

[1] On-book trading is trading carried out on a platform's order book. It is sometimes called on-exchange trading.

Interim measures

2. We took steps to ensure the separate and independent operation of BATS and Chi-X during the course of our inquiry.

3. Both BATS and Chi-X gave interim undertakings to the CC under section 71 of the Act on 27 July 2011 for the purpose of ensuring the separate management of BATS and Chi-X whilst proceedings were ongoing.

Conduct of the inquiry

4. On 20 June 2011, we posted on our website an invitation to express views to us about the merger, and, on 6 July 2011, we posted an administrative timetable for our inquiry.

5. We also invited a wide range of interested third parties to comment on the merger, including customers, competitors and shareholders. We sent detailed questionnaires to the customers of all the major UK MTFs and exchanges and we gathered oral evidence through 11 hearings with selected third parties. Evidence was also obtained from academic papers and through further written requests. Summaries of our hearings with third parties are published on our website.

6. Members of the Inquiry Group, accompanied by staff, visited the offices of both BATS and Chi-X and were given presentations on the operation of their businesses.

7. On 12 July 2011, we published an issues statement on our website, setting out the areas of concern on which the inquiry would focus.

8. We received written evidence from BATS and Chi-X, and a non-confidential version of their joint initial submission is on our website. We also held separate hearings with BATS and Chi-X on 16 September 2011.

9. We commissioned GfK NOP Social Research to manage an online questionnaire that was sent to 437 customers of all the major MTFs and exchanges.

10. Thirty customers completed the questionnaire. This amounted to approximately 7 per cent of the 437 customers targeted, but represented [✂] per cent of the BATS and Chi-X customer base in terms of value of UK equities traded in 2011 (to July 2011 for Chi-X and to August 2011 for BATS). According to BATS' categorization of customers, the 30 respondents to the questionnaire split into four institutional brokers, nine investment banks, seven proprietary trading firms and the remaining ten are undefined (because they do not currently trade in BATS).

11. We also held hearings with Customer A, Customer C, Customer D, GETCO, IG Group, Panmure Gordon and UBS, some of which did not respond to our questionnaire. In total, we received views from customers responsible for 56 per cent of the UK equities trading on BATS and 52.5 per cent of the UK equities trading on Chi-X.

12. In the course of our inquiry, we sent to BATS, Chi-X and other parties some working papers and extracts from those papers for comment.

13. A non-confidential version of the provisional findings report dated 20 October 2011 was placed on our website. We also published the LSEG response.

14. We thank all those who assisted in our inquiry.

Regulatory background

Introduction

1. This appendix sets out a summary of MiFID, the key piece of legislation that has affected the competitive landscape for trading in financial instruments including equities.

2. On 21 April 2004, the European Parliament and Council adopted MiFID, which had to be implemented in all EU member countries by November 2007. MiFID is a core pillar in EU financial market integration. It consists of a framework directive (Directive 2004/39/EC), an Implementing Directive (Directive 2006/73/EC) and an implementing regulation (Regulation No 1287/2006).[1]

3. MiFID's main objectives were to improve the competitiveness of EU financial markets by creating a genuine single market for investment services and activities, and to ensure a harmonized high degree of protection for investors in financial instruments, such as shares, bonds, derivatives and various structured products. Greater competition across Europe in the provision of services to investors and between trading venues was intended to contribute to deeper, more integrated and liquid financial markets, to drive down the cost of capital for issuers, to deliver better and cheaper services for investors, and thus to contribute to economic growth and job creation.[2]

4. MiFID replaced the Investment Services Directive (ISD) (93/22/EEC). In summary, it:

   - provided for the authorization of firms that engage in specified investment services and activities, such as investment banks, portfolio managers and securities dealers (investment firms), by the competent authorities of the EU member state in which they have their registered office. The FSA is the competent authority for the UK. The services and activities covered are broadly the same as in the ISD, but are expanded to cover investment advice as well as services relating to commodity derivatives;

   - prescribed the organizational requirements (broadly, prudential rules) and operational requirements (conduct of business rules) that apply to investment firms so that the rules in different member states will be more uniform; and

   - provided that, where a firm 'passports' into another member state by providing services from its home state (EU passport), the governing rules will be those of its home state. However, if it operates as a branch in another member state, the conduct of business rules of the 'host state' apply to activities carried out in the host state's territory but MiFID harmonizes these rules so that common standards are applied across the EU.

5. MiFID also introduced an entirely new regulatory regime for securities markets, including RMs, automated trading systems which are now called MTFs and firms which trade on their own book on a systematic basis (SIs), and imposed a set of transparency requirements which will apply to all these entities.

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[1] Public consultation, Review of the Markets in Financial Instruments Directive (MIFID), European Commission, 8 December 2010.
[2] ibid.

Abolition of concentration rules

6. Importantly, MiFID abolished the concentration rule which applied under the ISD (Article 14(3) of the 1993 ISD) which allowed countries to require that retail orders had to be executed on a regulated market, limiting the possibilities for creating new markets.[3]

7. MiFID sought to harmonize the trading structures across the member states by abolishing the requirement to concentrate the execution of trading orders by financial intermediaries in a single venue. This fostered entry by new players and so challenged the market power of existing national venues.

Organized public markets

8. MiFID enabled trading services to be provided by a variety of alternative providers: a Market Operator (also known as an RIE in the UK) can obtain regulatory approval to operate an RM and an MTF. An investment firm can obtain regulatory approval to operate an MTF or it may register as an SI.

9. Both RMs and MTFs are venues that bring together or facilitate the bringing together of multiple third party buying and selling interests in financial instruments. The national exchanges such as the LSE are RMs and exchanges such as Chi-X, BATS and Turquoise (majority owned by LSEG) are MTFs.

10. RMs and MTFs are required to have clear and transparent rules regarding the trading of financial instruments. The FSA regulates the operation of RMs and MTFs in the UK. Recognised Bodies (RBs) operating an RM and/or MTF must comply with the requirements applying to RBs set out in the Recognised Investment Exchanges and Recognised Clearing Houses (REC) sourcebook. An investment firm operating an MTF must comply with the FSA's rules for investment firms set out in the FSA Handbook, including MAR 5 of the FSA's Market Conduct (MAR) Handbook.

11. An SI is an investment firm, which on an organized frequent and systematic basis deals on its own account by executing client orders outside a regulated market or MTF.[4]

Market access (EU passport)

12. MiFID established an EU passport for investment firms. Member states are required to ensure that investment firms from other member states have the right to access *(a)* the regulated markets in their country, and *(b)* the clearing and settlement systems.[5]

Best execution

13. MiFID also prescribed certain operational rules for investment firms. The 'best execution' obligation requires investment firms to take all reasonable steps to obtain, when executing orders on behalf of clients, the best possible result for their clients, taking into account the execution factors: price, costs, speed, likelihood of execution

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[3] Hans Degryse, *Competition between financial markets in Europe*. Published online, 9 January 2009. CentER-Tilburg University, TILEC, and European Banking Centre.
[4] ibid.
[5] ibid.

and settlement, size and nature of the order or any other consideration relevant to the execution of the order.

14. Following MiFID, a financial intermediary desiring to trade a given security has a choice of trading venue. It can choose an RM like the LSE, NYSE Euronext or Frankfurt Stock Exchange; an MTF like Chi-X, BATS or Turquoise; or an SI like ABN AMRO, Goldman Sachs or UBS. In choosing the venue, the financial intermediary has an obligation to achieve best execution for its clients and each firm is required to have a specific best execution policy, which takes into account a number of factors that include transaction costs, price and liquidity, speed of execution, likelihood of execution, clearing and settlement arrangements.

15. The rules on best execution are set out in COBS 11.2 in the FSA Handbook.[6]

16. COBS 11.2.6 provides:

> When executing a client order, a firm must take into account the following criteria for determining the relative importance of the execution factors:
>
> *(a)* the characteristics of the client including the categorisation of the client as retail or professional;
>
> *(b)* the characteristics of the client order;
>
> *(c)* the characteristics of financial instruments that are the subject of that order;
>
> *(d)* the characteristics of the execution venues to which that order can be directed; and
>
> *(e)* for a management company, the objectives, investment policy and risks specific to the UCITS (Undertakings for Collective Investment in Transferable Securities) scheme or EEA UCITS scheme, as indicated in its prospectus or instrument constituting the scheme.

17. The role of price in best execution is set out in COBS 11.2.7:

> Where a firm executes an order on behalf of a retail client, the best possible result must be determined in terms of the total consideration, representing the price of the financial instrument and the costs related to execution, which must include all expenses incurred by the client which are directly related to the execution of the order, including execution venue fees, clearing and settlement fees and any other fees paid to third parties involved in the execution of the order.

18. The guidance explains that this means:

> For the purposes of ensuring that a firm obtains the best possible result for the client when executing a retail client order in the absence of specific client instructions, the firm should take into consideration all factors that will allow it to deliver the best possible result in terms of the total consideration, representing the price of the financial instrument

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[6] http://fsahandbook.info/FSA/html/handbook/COBS/11/2.

and the costs related to execution. Speed, likelihood of execution and settlement, the size and nature of the order, market impact and any other implicit transaction costs may be given precedence over the immediate price and cost consideration only insofar as they are instrumental in delivering the best possible result in terms of the total consideration to the retail client.

Client classification

19. MiFID requires firms to classify clients into one of three categories: Retail, Professional or Eligible Counterparty. The rules relating to client classification are set out in COBS 3.

20. COBS 3.4 defines a retail client as a client which is not a professional client or an Eligible Counterparty. COBS 3.5 defines a professional as being one of two types: a 'per se professional client' or an 'elective professional client'.

21. A 'per se professional client' is an entity required to be authorized or regulated to operate in the financial markets, such as an insurance company, a pension fund or the management company of a pension fund, a credit institution or investment firm. An 'elective professional client' is a client which is capable of making its own investment decisions and understanding the risks involved and carries out transactions of significant size on a relatively frequent basis.

22. COBS 3.6 provides that an Eligible Counterparty is similar to the categories of professional client, for example 'buy-side' professionals will generally be categorized as eligible counterparties, but will not have the right to be treated as a professional client to whom best execution is owed.

Transparency (pre- and post-trade)

23. Pre-trade transparency was one of the more controversial aspects of MiFID. It required MTFs, as well as RMs, to make available real-time interests to investors. SIs are required to disclose dealings in securities traded on an RM for sizes up to standard market size. Standard market size is determined broadly by: grouping shares into classes by reference to the average size of transactions across the EU; and taking the average transactions size of the class.

24. Pre-trade transparency refers to the availability of information on outstanding order flow accumulated in the order book, or dealer quotes before orders are submitted. This information concerns quotes and trading interest, and can contain information on different trading platforms.

25. Post-trade information must be made public, subject to certain delays for larger trades, as close to real time as possible and contain the time stamp, the instrument traded, the price, the quantity, and the execution venue.

Dark trading

26. Under MiFID, waivers are available from pre-trade transparency obligations based on the market model, or the type and size of orders including:

    - systems where the price is determined by reference to a price generated by another system;

- systems that formalize negotiated transactions, provided the transaction meets certain criteria;

- orders held in an order management facility maintained by an RM or MTF pending disclosure to the market; and

- transactions which are large in scale.

27. These waivers facilitated the development of 'dark books' (that may be operated by RMs or MTFs) as well as 'dark pools' operated by broker crossing networks. A dark pool is an electronic trading venue where trading participants can trade with each other and access liquidity pools on broker order books away from open trading platforms. With darker trading, orders can be executed without users knowing the identity or existence of other orders within the dark pool/order book. Users do not need to disclose the size or price at which they are willing to trade (other than to the operator), so orders can be matched by the operator and executed while keeping an investor's trading strategies hidden.

28. Post-trade transparency is not waived. This means that as soon as a dark order is executed, the trade details must be made available to the market on the facility's price feed, subject to certain delays for larger trades.

29. According to the European Securities and Markets Authority, which replaced the Committee of European Securities Regulators in January 2011, 90 per cent of trades are lit and 10 per cent are dark—but this is only for trades on an organized public market.[7]

[7] CESR Technical Advice to the European Commission in the Context of the MiFID Review—Equity Markets, 29 July 2010, p7. (http://esma.europa.eu/popup2.php?id=7004).

Barriers to entry and expansion

Introduction

1. This appendix: *(a)* reviews potential barriers to entry and expansion (paragraphs 2 to 63); *(b)* considers the commercial rationale to launch an MTF (paragraphs 64 to 77); and *(c)* sets out case studies on entry and expansion (paragraphs 78 to 103).

Potential barriers to entry and expansion

Regulation

2. Under MiFID, an operator of an MTF must obtain regulatory approval by the competent authority for the relevant EU member state in which it operates to ensure that the MTF is compliant with MiFID. The cost of FSA registration is £25,000 and it takes approximately six months.

3. There is a level playing field across the EU, so that an MTF can gain regulatory approval in any one of the 27 member states and then offer its services in another ('EU passport'). In the UK, the FSA is the competent authority, and both Chi-X and BATS are FSA-regulated MTFs. These rules were designed to encourage market entry including the removal of concentration rules that previously favoured the incumbent exchange before the entry into force of MiFID.

4. There is a regulatory capital requirement for operators of MTFs to provide confidence in their financial resilience. However, MTFs do not take trading positions because matched trades are sent immediately to a CCP for clearing, and therefore the regulatory capital requirements are largely determined by comparing the operating expenses and working capital of the trading platform (which are relatively predictable) with expected trading volumes (eg with stress tests to simulate lower trading volumes). For example, the BATS capital adequacy requirement in December 2010 was £1.96 million.[1]

5. There is an ongoing expense for MTFs to maintain close working relationships with the relevant regulator in relation to compliance with obligations (eg pre-trade transparency, waivers for dark pools, market surveillance etc), and this is likely to result in additional costs (mainly in terms of additional personnel) as the business grows.

6. The MiFID II review is examining equity trading activities by investment firms that may constitute organized markets (ie Organized Trading Facilities (OTFs)) which could affect market structure.

Market entry cost, timescale and operational issues

7. This section is subdivided into the following categories of potential barriers to entry:

   (a) cost and time required to enter the market;

   (b) technology and system development requirements;

[1] Source: BATS unaudited financial statements, 31 December 2010.

(c) personnel requirements and other costs; and

(d) sunk costs and exit costs.

Cost and time required to enter the market

8. We obtained a number of different estimates for the cost and time required to launch a new MTF:

   (a) Chi-X has been operating since March 2007. Chi-X incurred a cumulative negative operating cash flow of almost £[✂] million between 2007 and August 2010, and cumulative losses of £[✂] million in the same period. Chi-X achieved break-even in the first half of 2010 (approximately three years after launch) and generated a profit for the full year 2010. Chi-X has [✂] employees.[2]

   (b) BATS told us that it took six months to launch its MTF. Trading started in October 2008. BATS incurred a cumulative negative operating cash flow of £[✂] million between [✂] and the end of [✂]. [✂] BATS Europe had [✂] employees.[3]

   (c) Quote MTF estimated that its investment would be in the region of £3–£9 million. The business was founded in 2009 and it started trading in April 2011.

   (d) The parties estimated that a new entrant today would require investment in the region of £8–£10 million, and that the entrant should expect to break even after two to three years.

9. The proportion of market entry costs represented by fixed assets (ie computer equipment) was relatively low, with the remainder representing operating losses. For example:

   (a) The total cost of BATS tangible fixed assets at 31 December 2010 was £[✂] million ([✂] per cent of the cumulative cash outflow), and the net book value was £[✂] million.

   (b) The net book value of Chi-X fixed assets at 31 August 2010 was £[✂] million.

Technology and systems development

10. The core technology that an MTF requires is the matching engine and related software and hardware to connect with customers and execute orders. An MTF could choose from a number of alternatives. It may develop its own matching engine; license a matching engine from third party vendors; or acquire rights from a specialist developer (eg by acquiring the developer). For example:

    (a) Chi-X used technology developed by Instinet/Nomura, and currently pays a licence fee of $[✂] million (£[✂] million) for the matching engine and also has its own in-house development capability.

    (b) BATS developed matching and routing technology itself for the US market, and subsequently adapted for the European market.

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[2] Parties joint initial submission, 8 July 2011.
[3] Parties joint initial submission, 8 July 2011.

(c) Turquoise was originally developed using technology from a Swedish company, Cinnober, but was migrated to the Millennium platform in 2010.

(d) LSE's trading platform in operation since February 2011 was developed by Millennium IT, a Sri Lankan technology solutions provider serving the global capital markets industry which was acquired by LSEG in October 2009. Millennium Exchange is available to third party customers on commercial terms.[4]

(e) Quote MTF used Orbixa, an independent technology supplier based in Canada for its matching engine.

(f) NYSE Euronext offers its software to third party customers on commercial terms via the NYSE Technologies division,[5] as do NASDAQ and the LSE.

(g) PAVE (an MTF focused on the Spanish equities market) has chosen technology developed by Cinnober.

11. In the initial phase of market entry (ie immediately post-MiFID), it was necessary to overcome technology barriers by developing functional, cost-effective platforms to enable trading in multiple markets and currencies, and in the three years that have since elapsed numerous MTFs have overcome these challenges, and several competing commercial trading platform technology packages have become available to a potential entrant. Ongoing development is required to keep pace with innovations in the sector and to meet customer needs.

12. A new entrant would need to design and build an appropriate IT architecture (servers, PCs) in order to operate the trading platform. This system could be built by an experienced team with standard IT hardware, connectivity services and back-up facilities that are available from third party suppliers. Around the trading platform the MTF would need to implement business information systems (market data, regulatory/trade reporting, customer billing, accounting and finance) in order to operate the system efficiently. It appeared that such add-on functionality was relatively commonplace given the existence of several competitors and of several third party software vendors.

13. Electronic trading of equities used a standard messaging protocol, the FIX protocol, although some small differences still existed between the protocols that individual trading venues employed.[6] FIX is a specification around which software developers can create commercial or open-source software, as they see fit, and it is free and based on open standards. As the market's leading trade-communications protocol, FIX is integral to many order management and trading systems.

14. In order to enable connectivity between the MTF and its customers, the MTF requires contractual arrangements with connectivity partners, such as BT and data centre partners (eg Interxion, Savvis, Equinix), to host and operate the technology. Services of this nature are available on commercial terms. There is a choice of connectivity and data centre suppliers. Quote MTF told us that customers were becoming cost sensitive to communications and data centre costs.[7]

15. Since the initial market entry post-MiFID in 2008, it seems likely that technology costs have fallen for several reasons: there are independent vendors of matching engines

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[4] Source: company website.
[5] Source: company website.
[6] Source: www.fixprotocol.org.
[7] Summary of hearing with Quote MTF, 6 July 2011.

and associated trading technology and software; IT hardware costs have fallen; the development requirements are clearer; interfaces between market counterparties have been standardized; and customers have already invested in smart order routing technology. However, the pace of development and innovation means that technology (including IT personnel costs) continues to represent a large proportion of the costs. Cost and timescales are probably lower than when MiFID came into force due to the progress that the industry has made in standardizing systems and technologies.

Personnel and other costs

16. An MTF requires a team of skilled personnel to operate the business, with capabilities in technology (systems maintenance, development); compliance and regulation; equity trading; sales and business development; and corporate management. The technology team plays a central role in an MTF because the operation of the trading venue requires correct configuration and reliable connections with a range of customers and other parties (eg main market and other MTFs). Further, there are ongoing requirements to maintain, develop and improve systems (which may be a combination of internal developments and third party products and services).

17. Candidates may be drawn from the local labour market (eg UK financial services, or other relevant local market), and may also attract interest from a global pool of suitably qualified individuals (subject to immigration requirements). Quote MTF told us[8] that being located in Hungary enabled it to access skilled staff at lower costs than in London and other Western European financial centres.

18. Recruitment of a sufficient number of staff to perform all key functions is therefore an entry requirement. It is likely to take several months to put a team in place and to proceed to recruitment requires sufficient financial resources to fund staff costs.

19. An MTF requires a physical presence in the financial centre in which it is regulated (eg London, or a centre in another EU member state).

Sunk costs and potential exit costs

20. In the event of a commercial failure, it is likely that the majority of licence fees and development costs would be sunk costs. However, it is conceivable that aspects of internally developed systems and processes might be of interest to third parties.

21. It appeared that set-up costs included very little in the way of physical goods that could be recovered in a liquidation due to their short useful life (eg second-hand IT equipment), and therefore were largely sunk costs.

22. There may be exit costs in relation to long-term contracts for data centres and office accommodation, and to staff redundancies.

Minimum scale of operations to break even and economies of scale

23. The extent to which average costs fall with increased volumes represent economies of scale that may place small entrants at a disadvantage. For example, the ability to handle greater volumes of business with the same operating expenses (eg people, technology), to obtain more advantageous terms from suppliers (eg clearing and

[8] Summary of hearing with Quote MTF, 6 July 2011.

settlement costs) and other potential scale benefits such as the ability to charge for market data.

24. There was limited time series (historic) data for operating costs because the businesses are relatively young and are still in a growth phase, having only commenced operations around four years ago.

25. From our discussions with market participants, our understanding is that MTFs are service businesses. The assets involved in providing trading services are largely intellectual property (eg software and licences), contracts (customers, suppliers) and standard IT equipment (servers and PCs). The principal costs involved in running an MTF are staff and technology. We noted that MTFs can establish and operate anywhere in the EU, and so the labour costs may be driven by local market conditions. It appears that the main constraint on the minimum scale of operations to break even under which an MTF could operate was having in place a suitably skilled team to fulfil the key operational roles (technology, regulation and compliance, business development, and corporate functions).

26. As an MTF business grew there would be incremental costs associated with building a customer relationship and managing regulatory responsibilities (eg market supervision). However, the marginal cost of handling additional trading volumes is minimal across a wide range of trading volumes. Accordingly there may be variations in trading volumes and values (and fluctuations in market shares between the MTFs) from time to time with no impact on the operating expenses of the company. The IT investments have been made such that the matching engine and connectivity equipment have spare capacity to cope with changes in volumes and have built in resilience in case of system malfunctions. Our understanding was that software enhancements were likely to proceed based on competitive forces and customer requirements. There may be step changes in costs to add large increments in capacity to a data centre or to upgrade connectivity to handle large volumes or faster speeds, or to add office space. Staff costs contained a high proportion of fixed costs, notwithstanding the fact that MTFs operated bonus schemes linked to commercial success. For example, Chi-X generated £[✂] million (£[✂] million including interest income) net trading income in 2010, and the cost of employing its [✂] staff represented [51–75] per cent of Chi-X's direct expenses, whereas BATS generated £[✂] million of net trading income and the cost of its [✂] staff represented [76–100] per cent of BATS' direct expenses.

27. We examined the stand-alone cost structure of BATS, Chi-X and Turquoise and the anticipated synergies from the proposed merger of Chi-X and BATS.

BATS

28. In the first three years of operations, BATS' operating costs increased from £6.3 million in 2008 to £9.2 million in 2009 and [£5–£15] million in [✂]—an increase of [✂] per cent over the period. Net trading income increased from nothing to £[✂] million in the same period. Since [✂], operating costs increased by [✂] per cent and revenues by [✂] per cent. The business remained loss-making in [✂], with an operating loss of £[✂] million. Supplementary details are contained in Table 4.

29. Looking forward, BATS forecasted annualized revenue growth of [✂] per cent in the [✂] years to [✂], and expected operating expenses to increase from [£5–£10] million to [£10–£20] million, a [✂] per cent annualized rate of increase. This was expected to deliver EBIT margins of [✂] per cent by [✂]. Supplementary details are contained in Table 5.

Chi-X

30. Chi-X's budget for 2010 included a breakeven analysis indicating breakeven revenue of £[✂] million, and that this equated to a pan-European market share of approximately 16.2 per cent.

31. Chi-X's annual operating expense in 2010 was [£10–£20] million (including around £[✂] million of depreciation), an increase of [0–25] per cent from £[✂] million in 2009. In the same period, net trading income increased by [76–100] per cent (from £[✂] million to [£10–£20] million). The business generated an operating profit of £[✂] million in 2010. Supplementary details are contained in Table 2.

32. Looking forward, Chi-X forecast annual revenue growth of [26–50] per cent until 2015, whereas the BATS forecast for Chi-X is [26–50] per cent annual growth. The 2015 estimated revenue was therefore £[✂] million (depending on the growth forecast). Operating costs were expected to increase by [0–25] per cent annually over the next five years, resulting in a rapid increase in EBIT margin to around [51–75] per cent in 2015. Supplementary details are contained in Table 3.

Turquoise

33. The annual operating expenses of Turquoise increased from £8.7 million in 2007 to £17.6 million in 2008 and £25.6 million in 2009. The cumulative net losses for the three-year period were £46.9 million. The estimated cash outflow in the period was £43.2 million. Turquoise told us[9] that the historical cost structure was higher than the current and future costs. Under LSEG's majority ownership, the operating costs of Turquoise have reduced to about £[✂] million a year, and it achieved cost savings in areas such as technology support and development. For the 15-month accounting period ended 31 March 2011, Turquoise generated gross revenue of £[✂] million. It incurred £[✂] million of maker rebates, which were recorded as cost of goods sold. This resulted in gross profit of £[✂] million. Supplementary details are set out in Table 6.

BATS/Chi-X expected merger synergies

34. The potential synergies for the merger provided evidence of the existence of economies of scale. Based on the proposed merger plans, the forecasts for the combination of BATS with Chi-X indicated that substantial cost savings were available, reducing the average cost of handling each unit of trade. BATS forecast that operating cost savings from combining the two companies would result in a saving of [26–50] per cent of the stand-alone operating costs of the two companies in 2011, with total savings of [£10–£15] million from the combined costs of [£25–£40] million. [Over half] of these savings would be personnel costs. Other potential savings would be through combining the technology operations in a single data centre, and migrating to BATS technology.

Overcoming network effects

35. This section analyses a number of potential barriers to entry and expansion that a new entrant would need to overcome to counter network effects:

[9] Summary of hearing with LSE/Turquoise, 21 July 2011.

(a) 'critical mass' required before customers (makers and takers) would consider connecting to a new trading platform;

(b) cost and time for customer connection;

(c) cost of customer acquisition; and

(d) other customer costs associated with market fragmentation.

Critical mass

36. We spoke to third parties about the critical mass required for MTFs to attract client flow and the viability of small MTFs.

37. Customer C told us[10] that the MTF would need to have a 5 per cent market share in the EEA, or possibly 5 per cent in a single country, before it would merit serious consideration for it to connect to the trading platform.

38. GETCO told us[11] that a market share of 4 to 6 per cent would be sufficient for brokers to take the MTF seriously and that, in its view, best execution placed an obligation on brokers to demonstrate to their clients that they would provide access to venues with this scale of market share.

39. Customer D and UBS raised doubts about the ability of some of the current MTFs to generate commercial returns and survive. Customer D told us that part of its evaluation of whether to engage with a new entrant was the financial strength of the business model. UBS told us that it looked at the business plans of new MTFs to examine the expected performance.

40. Customer D considered a market share of 2 to 3 per cent to be significant.

41. UBS said that critical mass was equivalent to a breakeven scale of operations, with net trading income covering the cash costs of operating the platform.

Cost and time for customer connection

42. Investment banks use equity trading platforms to give their traders a consolidated view of the market, and employ SORs to direct their trades to the most appropriate venue.

43. MiFID required brokers to ensure that they offer best execution in relation to trading client orders, and removed the concentration rule which favoured the former national exchanges as the venue for trading. Closely associated with these regulations is the investment that the equity trading community has made to develop SORs.

44. We spoke to some of the larger investment banks which told us that they had developed their own SORs. We also spoke to a smaller broker, which told us that it purchased its equity trading platform and SOR from third party vendors such as Fidessa and Sungard.

45. Customer D told us that it would cost in the region of $500,000 (£312,500) to adapt its systems and integrate a new MTF into its equity trading architecture, and that the

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[10] Summary of hearing with Customer C.
[11] Summary of hearing with GETCO, 19 July 2011.

process would take around three months. Customer D said that it had a set of procedures to evaluate whether to proceed with such an investment, which included a period of monitoring of market share over 21 days and market quality to establish the credibility of the provider, but that it would not see itself as an initial provider of liquidity to a new trading venue. It undertook reviews of this kind routinely.

46. UBS told us that it would cost around $200,000 (£125,000) to integrate a new platform, and that consistent market shares would need to be demonstrated before this would be a worthwhile investment. The costs would depend on the location chosen for the MTF's data centre and whether this was in the same location as existing UBS infrastructure. Other considerations would include interoperability with the clearing partners used by UBS for its equity trading activities. UBS considered that the main consideration was whether to proceed with the expenditure relative to alternative investments, more than being a significant sum in absolute terms.

47. [✂] said that the cost of maintaining a connection to an MTF was in the region of £12,000 per year per MTF. Maintaining connection requires the support of its software vendor and draws on internal resources for implementation, testing and upgrades. [✂] noted that reliance on the software vendor could affect the time to gain access to the MTFs. [✂] believed that up to 100 brokers were customers of Fidessa, some of which used their SOR technology alongside the equity trading platform. Quote MTF told us that the software vendors were a potential barrier to entry because it was necessary to convince them to adapt market gateways and SORs to allow trades to be routed onwards to its matching engine.

48. There was an initial investment for customers to establish a connection with an MTF and costs in maintaining this link. These costs included establishing the communications infrastructure to connect the various systems; revising software code that routes trades between trading venues; and testing the trade messaging instructions and protocols to ensure that they work correctly. Connectivity costs may vary depending whether a customer chooses to co-locate its trading infrastructure in the same data centre as one or more trading venue, or chooses to connect to it via a leased line.[12]

49. Once a connection between a customer and an MTF has been established, there was no switching cost involved in choosing between the trading venues for a specific trade order because such decisions are automated by the programming of the SOR.

Cost of customer acquisition

50. In order to attract customer flow, a trading venue needed to convince potential customers that it offered a high-quality market. A hypothetical new entrant needed to demonstrate sufficient order flow to attract customers.

51. Both Customer D and UBS said that they would wait for an MTF to demonstrate market share before deciding whether it was worth making the initial investment.

52. However, once the trading venue had demonstrated a track record, and given that brokers were under an obligation to provide best execution for their clients, it would become easier for the trading venue to attract customers.

53. Two principal strategies have emerged to attract initial flow: equity incentives and pricing strategies that differentiate between customer types.

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[12] For example, connectivity charges between remote locations can cost several thousand pounds per year, whereas cross-connections between equipment in the same data centre (co-located) cost hundreds of pounds a year.

Offering equity stakes to liquidity providers

54. The majority of market entrants have been sponsored by a broker, or a proprietary trading firm, or a consortium of brokers and/or proprietary trading firms. This was the case with the largest MTFs active in the UK (Chi-X, BATS and Turquoise). Brokers are required to follow a best execution policy, and this means that equity participation in trading venues cannot directly influence the choice of trading platform for a particular trade. Conversely, the best execution obligation does not specifically require a broker to sign up to specific exchanges, though customers may expect brokers to have access to established centres of liquidity. Proprietary trading firms are not required to follow a best execution policy.

55. In order to encourage trading, an incentive could be offered in the form of an option that converts into equity once a target volume has been achieved. This has become known in the industry as a 'jump ball' incentive.[13]

56. It was also the approach adopted by Quote MTF. Quote MTF told us that it granted options over 40 per cent of its company to its founding liquidity partners, for nil consideration. These options would convert to equity if a minimum trading volume was reached in a fixed period of time. The equity had little or no value unless Quote MTF was commercially successful at growing its business.

Maker/taker pricing

57. A comparison of the trading fees that the MTFs charged relative to the LSE indicated that substantial discounts were given to achieve market entry after the implementation of MiFID. However, a comparison of trading fees between the MTFs showed that trading prices were very close, and the net of 'maker' and 'taker' fees was the same for the three largest MTFs in the UK (ie 0.1 bps at Chi-X, Turquoise and BATS).

58. Maker/taker pricing has become a well-established mechanism for MTFs to attract liquidity providers. BATS' recent trading activities demonstrated that some customers received 'maker' fees that were substantially in excess of the 'taker' fees they paid, and vice versa. Chi-X, BATS and Turquoise all offered 'maker/taker' pricing for lit order book trading, whereby a provider of liquidity was paid a rebate to place orders on a lit book whereas the taker of liquidity paid a trading fee. The MTF generated net fees from the difference.

59. For example, BATS' trading results for 2010 showed a wide range of net trading fees paid to or received from BATS Europe:

(a) the five largest net recipients of rebates were [✂]; and

(b) the five largest customers paying trading fees were [✂].

60. A number of broker-dealers carry out market-making activities. Brokers with this strategy are more likely to be a source of liquidity to new platforms to give them an initial flow of trading if there is a financial incentive for them to do so.

[13] 'Jump ball' is a term derived from basketball: at the beginning, the referee throws the ball directly upward, and competing players leap in the air to win it. The highest jumper wins the ball.

Other customer costs associated with market fragmentation

61. For some smaller customers, it is possible that spreading a fixed volume of trading among a number of venues can result in higher clearing and settlement costs, for example due to the loss of volume discounts compared with using fewer venues, and the need to post margins with multiple clearing houses. This could represent a barrier to entry for a new entrant because a customer would take into account the overall costs of trading, including clearing and settlement, and this may result in it not trading on a particular venue even if it has a connection.[14] However, there was evidence that smaller brokers could route their trading via larger brokers to benefit from volume discounts offered by the RMs and clearing houses.[15]

62. Those brokers which used multiple trading platforms tended to use technology in the SOR and equity trading platform to give their traders a comprehensive view of the market. These brokers produced their own 'European Best Bid and Offer' (EBBO) price based on the live feeds from multiple venues. This meant that there were multiple EBBOs (assembled by each broker) rather than a single one. A broker adjusted the constituents of its EBBO by adding new platforms into the underlying sources of pricing data. There appeared to be no major additional technical difficulties to this.

63. It has been suggested that the merger between BATS and Chi-X may increase their prospects of generating revenues from live market data. To the extent that they are able to do so, they will compete with the LSE and other RMs in this market. Additional scale benefits may flow from this opportunity, which may not be available to existing competitors and new entrants. In the post-trade environment there is no consolidated tape in Europe. This has led to some concerns about the quality and availability of post-trade pricing information, particularly with regard to OTC trading data, which may be omitted, double-counted or reported on a delayed basis. There were several providers of post-trade pricing information (including Thomson Reuters, Bloomberg and Markit BOAT). The EU is currently reviewing regulatory changes, such as a consolidated European tape. It appeared that the emergence of a consolidated tape could also lead to a sharing of market data revenues based on the market shares in trading thereby reducing the minimum scale of operations currently necessary to be able to access revenues from market data. At the date of this report, it is too early to determine whether regulatory or industry developments would provide opportunities for new entrants to share in market data revenues (see paragraph 76 for further details).

Commercial rationale to create an MTF

64. We assessed the commercial rationale for launching a new MTF in three subsections:

(a) size of the potential trading fee pool;

(b) additional sources of revenue in the medium to long term; and

(c) other reasons to operate an MTF.

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[14] Future developments that lead to customer choice and interoperability of clearing houses could lead to a more level playing field because clearing and settlement fees could be netted off for all executed trades regardless of the trading venue used. For example, Chi-X announced on 16 August 2011 that it intended to offer four-way clearing interoperability. EMCF, EuroCCP, LCH.Clearnet Ltd and SIX x-clear will collaborate to offer clearing interoperability for all traded equities on Chi-X, with the exception of the Spanish market, by 1 January 2012, subject to regulatory approval.

[15] For example, Panmure Gordon told us that this was its strategy.

65. The short-term commercial opportunity for an MTF was to win a share of equity trading fees paid by institutional investors. The medium- to long-term opportunity was to generate additional trading income, notably through reducing frictional costs of trading, or to generate additional sources of revenue in the securities trading arena. Customers (ie brokers and investment firms) may have further reasons to enter the trading market over and above those of independent entrants, in particular to create competition in both direct and indirect costs of trading that they incur. RMs elsewhere in Europe may also have strategic incentives to compete using a pan-European business model.

Size of the potential trading fee pool

66. The majority of revenue was from trading fees. MTFs did not charge for membership of their exchange, and income from other sources was immaterial. We therefore considered whether the current trading fee pool alone was attractive for a market entrant.

67. Prior to MiFID, there was a widely-held perception by regulators and investment firms that the incumbent national exchanges enjoyed near-monopoly status in local markets, resulting in higher trading fees and other indirect costs of trading, including a lack of innovation. One of the major motivations for the first entrants after MiFID was introduced in 2007 was to attract business away from the RMs through lower prices and better service. In the relatively short period of four years since the introduction of MiFID, there has been a significant reduction in trading fees charged by the RMs, and the differential between trading fees between RMs and MTFs has narrowed. For example, Customer D told us that prior to MiFID its trading fees averaged over 1 bps, whereas today they were in the region of 0.3 to 0.4 bps on a blended average basis, and that MTFs remained cheaper than the RM.

68. The trading fee pool is the product of the aggregate value of equity trading multiplied by the trading fee. In 2010, the estimated value of UK listed on-book equity trading was €2.1 trillion (£1.9 trillion),[16] and the estimated value of the EEA market was €9.1 trillion (£8.3 trillion).

69. We used a range for estimated trading fees that a new entrant may be able to charge its customers. The lower end of the range was based on an indicative net trading fee of 0.1 bps, being the net of the maker/taker prices currently in the market. The upper end of the range was 0.3 bps, consistent with the 'remove' fee charged by Chi-X and Turquoise. This indicated an industry-wide trading fee pool of €91–€273 million (£82.7–£248 million) at the time of our report.

70. For illustrative purposes, a 10 per cent market share of the EEA equities market (based on 2010 trading levels) would generate £8–£25 million annual revenue for a new entrant. For the UK alone, the range is around a quarter of this level (ie £2–£6 million). Revenue growth in trading fees would depend on a combination of the market share achieved and the overall value and volume of equity trading.

71. It appeared likely that (in the absence of particular strategic considerations) the market entry decisions would be predominantly based on the EEA fee pool, as opposed to the UK fee pool, because the available trading fees from EEA equities was four to five times that available from UK equities; the investment required to launch in multiple European markets would be of a similar nature and magnitude to that of launching in a single, large European market (such as the UK); and some customers take a pan-European view of the equity markets. For example, equity

[16] FX rate: €1.1 = £1.

trading desks within larger brokerages were increasingly structured on a sector basis with a pan-European focus.[17] However, we noted that there were several regional MTFs which had not taken this approach to date (eg Burgundy in the Nordic region and TOM in the Netherlands).

72. We were told that there were several reasons to consider that the fee pool for UK and EEA equity trading may be greater in future.

73. First, the parties to the proposed merger, and a number of other independent market commentators, considered that equity trading volume and values in the UK and EEA was currently subdued or at a cyclical low. Given that trading fees are a function of both market value (ie share prices) and trading volumes, the overall size of the equity trading market may grow in future. Market participants have made the following assumptions about the future growth of trading fees:

(a) BATS forecast that the European equity trading market would grow at [✂] per cent.

(b) Chi-X considered that the European equity trading market was at a cyclical low and forecast that it would grow at a rate of [✂] per cent a year between 2010 and 2015, comprising [✂] per cent from increase in market value and [✂] per cent from increased trading volumes (in particular, as the gradual reduction in frictional costs of trading lead to increased trading activity); Chi-X said that the proportion of trading relative to GDP in the EU appeared to be significantly less than that in the USA but that this differential would close over time.[18]

(c) LSEG told us[19] that the daily trading value in EEA equities was currently around €50–€60 billion a day, which was less than the level prior to the financial crisis, when it was in the range €70–€80 billion. LSEG said that the market was less likely to shrink than it was to grow, but it was not possible to make reliable estimates. In the longer term, further progress towards a single European market was likely to drive growth.

74. Second, there was evidence to suggest that a substantial proportion of equity trading in the FTSE 100 was carried out off-exchange in various venues. There is a range of opinions about the extent to which such trading is addressable by MTF and RMs. It was too early to determine the extent to which MiFID II would affect the distribution of liquidity between venues such as Broker Crossing Systems (BCSs) and other OTC venues. However, trading fees may grow if a greater proportion of OTC activity were to be served by the RM and the MTFs in future.

75. Third, the EU's vision of a single European market in cash equities has yet to be fully realized. The EU is currently examining additional measures to achieve its ambitions, such as increased transparency of post-trade information and greater competition in clearing and settlement, which could enlarge the addressable market for MTFs. The parties considered that as the frictional costs of trading (such as data and clearing and settlement costs) were reduced, the total equity trading volume in both the UK and the EEA would increase. For instance, the parties estimated that the total volume of equity trading in the USA, where total costs of trading were significantly lower on average than the EEA, was approximately eight times larger than the EEA in spite of having similar levels of GDP.

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[17] For example, this was confirmed by Customer C, Customer D and UBS. However, smaller brokerages such as Panmure Gordon are primarily focused on the UK market.
[18] Source: Chi-X business plan October 2010.
[19] Summary of hearing with LSE/Turquoise, 21 July 2011.

Additional sources of revenue

76. A potential entrant's business plan may also be based on adding additional sources of revenue to equity trading. An MTF represented a springboard for future commercial opportunities, and in particular to compete more directly with the RMs in more than one national market. We identified several potential sources of revenue that may form part of a new entrant's business plan in the medium to long term, including:

(a) Revenue from market data charges. Market data formed a significant proportion of the revenue for typical RMs. In the year ended 31 March 2011, LSEG generated £70.4 million from the sale of market data products. Income from market data is currently very low or zero for MTFs, and is only likely to be making a greater contribution to revenues at higher market shares than have been historically achieved by the existing MTFs. In 2010, Chi-X generated £0.4 million revenue from market data (approximately 2 per cent of net revenue) and BATS provided market data free. The European Commission considered that the cost of market data in Europe was too high and it was examining ways to increase competition, including the possibility of a European consolidated tape. The introduction of a consolidated tape would allow MTFs to share in the revenue from live market data.[20] Based on the BATS presentation to the FSA, the combined business plans to start charging users for market data, with revenue rising from £[✂] million in 2011 to £[✂] million by 2015, and would be [✂] per cent of total revenue by this time.

(b) Potential introduction of membership fees. The LSEG charged a membership fee of £12,500 a year (before taking account of applicable trading credits and discounts)[21] for the LSE. It generated £[✂] million of annual UK membership fees in the last financial year, whereas none of the MTFs charge membership fees, and each had fewer members.

(c) Creation of new benchmark indices to compete with the FTSE indices[22] and launching tradable instruments such as ETFs and derivatives based on these indices in order to generate trading fees.

(d) Expanding the range of equity instruments available to trade in each market to include small cap and less liquid instruments.

Other reasons to launch an MTF

77. In addition to the returns that an independent entrant may generate in its own right, there are additional reasons why users and customers (ie investment firms such as brokers) have historically, and may in future, find it commercially attractive to launch or sponsor an MTF, as they may find it a cost-effective way of exerting competitive pressure on former national exchanges (such as the LSE). These include:

(a) As was the case following MiFID, a combination of higher prices, lower innovation, declining service or quality may prompt a customer, or a group of customers, to launch a rival service to deliver the facility desired by customers in order to avoid such costs.

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[20] Source: EC Consultation Paper, Review of MiFID, 8 December 2010, p25.
[21] Source: LSEG website.
[22] The FTSE indices is a joint venture between LSEG and Pearson (owner of the *Financial Times*).

(b) Customers may consider that a consortium or mutual ownership may be attractive to maintain downward pressure on costs and reduce the required return that such owners would expect relative to that of an independent new entrant.

(c) Regulatory obligations may encourage or require some existing trading venues to become regulated exchanges or open to a wider range of market participants (eg SIs, BCSs, other matching facilities and OTC facilities that may be captured under the definition of an OTF that the EU is currently reviewing).

(d) Large RMs with presence in other European equity markets may respond to the increasing tendency for investors to view European equities as a single market, and may need to establish a material presence in the UK market because it remains the largest of all equity markets among the EU member states.

Case studies on entry and expansion

Competitive landscape

78. This section sets out supplementary information in relation to Chi-X, BATS and Turquoise, and also sets out details relating to the launch of other MTFs, in the form of case histories, detailing relevant chronologies, strategies and financial performance.

79. Table 1 summarizes the ownership and strategy of a number of MTFs and equity trading venues operating in the UK.

TABLE 1 **UK-listed on-book equities, 2010**

Platform	*Owners*	*Strategy*	*Lit/Dark*
LSE	Wholly-owned subsidiary of London Stock Exchange Group plc	RIE/RM/MTF	Lit/Hidden Order Service
Chi-X	Investment bank, proprietary trading firms and broker consortium	Pan Europe MTF	Lit/Dark
BATS	Investment bank, proprietary trading firms and broker consortium	Pan Europe MTF	Lit/Dark
Turquoise	51% LSEG; remainder owned by a number of banks	Pan Europe MTF	Lit/Dark
Neuro	Nasdaq OMX	Exited the market	Lit/Dark
NYSE Arca Europe	NYSE Euronext subsidiary	Pan Europe MTF	Lit
Liquidnet	Private equity	Regional focus MTF	Dark
Smartpool	JV NYSE Euronext and brokers (JP Morgan, HSBC, BNP Paribas)	Pan Europe, matching platform	Dark
Nomura NX	Single broker	Crossing platform	Dark
ITG Posit	Independent	Buy side liquidity pool	Dark
Equiduct	Börse Berlin, Citadel, Knight	Retail order flow	Dark
Instinet Blockmatch	Single broker (Nomura)	Block-trades	Dark
UBS MTF	Single broker	Pan Europe MTF	Dark
ICAP BlockCross	Single broker	Block trades	Dark

Source: CC analysis.

Chi-X

80. The key milestones in the development of Chi-X were:

(a) March 2007—launched; began trading in AEX25 and DAX20 shares;

(b) March 2008—first anniversary: market shares 9 per cent UK; 6 per cent Netherlands; 4 per cent France; and

(c) October 2008—granted FSA approval to offer sponsored access.

81. The annual cost of the technology licence from Instinet is $[✂] million (£[✂] million) and the current agreement lasts [✂]. By August 2010, Chi-X had a headcount of [✂] consultants.[23]

82. Table 2 contains a financial summary for the period 2007 to 2010.

TABLE 2 **Chi-X financial summary**

£ million

	2007 Actual	*Actual*	*2009 Actual (restated)*	*8 months Jan–Aug 2010 Actual*	*12 months 2010 Estimate*
Net trading income (gross profit)	[✂]	[✂]	[✂]	[✂]	[✂]
Operating expenses	[✂]	[✂]	[✂]	[✂]	[✂]
EBIT	[✂]	[✂]	[✂]	[✂]	[✂]
Net income	[✂]	[✂]	[✂]	[✂]	
Cumulative loss	[✂]	[✂]	[✂]	[✂]	
Operating cash outflow	[✂]	[✂]	[✂]	[✂]	
Cumulative cash flow	[✂]	[✂]	[✂]	[✂]	

Source: Chi-X business plan, October 2010 and Annual reports 2008 and 2009.

Note: 2010 cash flow based on depreciation of £[✂] million, capex £[✂] million. No adjustment for change in working capital.

83. Table 3 summarizes the Chi-X forecasts as presented in Chi-X's October 2010 business plan and in the BATS model produced during the due diligence phase.

[23] Management accounts, August 2010.

TABLE 3 **Summary of Chi-X forecast income statement**

	2010E *£m*	[✂]*E* *£m*	*CAGR* *%*
Revenue			
Chi-X business plan	[✂]	[✂]	[✂]
BATS model	[✂]	[✂]	[✂]
Average	[✂]	[✂]	[✂]
Operating expenses			
Chi-X business plan	[✂]	[✂]	[✂]
BATS model	[✂]	[✂]	[✂]
Average	[✂]	[✂]	[✂]
EBIT			
Chi-X business plan	[✂]	[✂]	[✂]
BATS model	[✂]	[✂]	[✂]
Average	[✂]	[✂]	[✂]
EBIT margin (%)			
Chi-X business plan	[✂]	[✂]	
BATS model	[✂]	[✂]	
Average	[✂]	[✂]	
Capex			
Chi-X business plan	[✂]	[✂]	[✂]
BATS model	[✂]	[✂]	[✂]
Average	[✂]	[✂]	[✂]
Capex/sales (%)			
Chi-X business plan	[✂]	[✂]	
BATS model	[✂]	[✂]	
Average	[✂]	[✂]	

Source: Summary of Chi-X forecasts, October 2010, and BATS forecasts for Chi-X.

BATS

84. BATS was founded in March 2008 and it went live in October 2008,[24] nine months after founding. BATS provided a copy of its European business plan, dated 6 January 2008. This indicated that, starting from January 2008, it would take one year to enter the European market with a trade-matching service, and that the core technology would be developed by adapting its existing software in the USA.

85. BATS developed matching technology for its US equities business. In order to launch in the European equities market, BATS identified a team [✂] to modify the software components. The business plan indicated that a period of nine months would be required for software development to launch with a trade-matching service at the end of 2008, and a further [✂] would be needed to extend the service to trade routing [✂].

86. The business plan indicated that a team of 32 staff would be recruited during 2008, so that the business could launch at the end of the year. [✂] In the UK, BATS' head-count in February 2011 was [✂]. According to BATS, the major set-up costs were: data centre (Savvis) technology —approximately $[✂] million/£[✂] million; and office/ market control fit-out and technology—approximately $[✂] million/£[✂] million. Normal operating costs are £[✂] million per month (£[✂] million per year). The initial business plan indicated that it would take one year to complete various preparatory stages in parallel, including regulatory approval (9 months); legal issues (12 months total); opening a London office (9 months); obtaining space in a data centre (9 months); sales, marketing and publicity (9 months). Based on its initial business plan, BATS expected to break even after [✂] months of commencing trading ([✂]), and [✂]

[24] Source: Company fact sheet.

months of the initiation of the business plan ([✂]). In subsequent business plans, the start of operations was delayed until [✂], with revenue commencing in [✂].

87. [✂]

88. Table 4 summarizes the results of BATS in the period [✂].

TABLE 4 **BATS historical results**

£ million

	[✂] *Actual*	[✂] *Actual*	[✂] *Actual*
Net trading income (gross profit)	0.04	0.7	[✂]
Operating expenses	6.3	9.2	[✂]
EBIT	–6.2	–8.5	[✂]
Net income	–6.1	–8.3	[✂]
Cumulative loss		–14.4	[✂]
Cash outflow	–5.9	–7.2	[✂]
Cumulative outflow		–13.1	[✂]

Sources: [✂] and [✂] revenue and profit: annual report and financial statements [✂]; [✂] revenue and profit: management accounts; [✂] and [✂] cash flow: management accounts.

Note: Cash flow from operating and investments, before investing activities. [✂] cash flow estimated by adjusting net loss for balance sheet changes.

89. Table 5 compares BATS forecasts in [✂] with [✂] results.

TABLE 5 **BATS forecast results**

	[✂] *Actual £m*	[✂] *Estimate £m*	*CAGR %*
Net trading income (gross profit)	[✂]	[✂]	[✂]
Operating expenses	[✂]	[✂]	[✂]
EBIT	[✂]	[✂]	
EBIT margin (%)	[✂]	[✂]	

Source: Annual report 2010 and BATS management forecast.

Note: EBIT margin based on net trading income. [✂] estimates converted at £1 = $1.6.

Turquoise

90. In 2008, intangible assets valued at £4 million were transferred to Turquoise by its parent. The value of these intangible assets was reduced by an impairment charge which reduced the net book value to £1 million at 31 December 2009. The underlying technology for the Turquoise trading platform was originally provided by Cinnober, a Swedish technology company. Cinnober remains an independent software company, and supplies products based on its TRADExpress Trading System.[25] In October 2010, LSEG migrated Turquoise and its UK cash equities markets on to the Millennium Exchange,[26] which is owned by LSEG following the acquisition of the technology company that developed it.

91. The annual results of Turquoise for the period 2007 to 2009 are summarized in Table 6.

[25] Source: Cinnober website.
[26] Source: LSEG 2011 Annual Report.

TABLE 6 **Turquoise Trading Limited**

£ million

	2007 Actual	*2008 Actual*	*2009 Actual*
Fee revenue	-	1.3	2.8
Operating expenses	8.7	17.6	25.6
Earnings/(loss) before interest & tax	–8.7	–16.3	–22.8
Profit/(loss) after tax	–7.2	–17.0	–22.7
Cumulative loss	–7.2	–24.2	–46.9
Net cash flow from operating activities	17.6	–40.3	–13.0
Capital expenditure	–0.1	–5.8	–2.4
Other cash flows	0.1	0.7	-
Net cash flow excluding financing	17.6	–45.4	–15.4
Cumulative net cash flow from operating activities excluding financing	17.6	–27.8	–43.2

Source: Companies House.

Note: Net cash flow from operating activities: net income plus depreciation, amortization and impairment of assets minus changes in trade debtors and creditors, plus changes in relation to share-based payments.

Baikal

92. In 2008, LSEG announced that it was planning to launch an electronic trading platform, Baikal (named after the world's deepest lake), with Lehman Brothers which would compete with rival MTFs. The intention was that Baikal would allow traders to use complex algorithms to trade anonymously large batches of shares across 22 European venues. As well as being a non-displayed or dark pool of liquidity, LSEG intended Baikal to be an aggregator of liquidity from a variety of sources, including brokers, buy-side firms and other trading platforms, such as MTFs. Baikal was formed as a joint venture between LSEG and Lehman Brothers, under which Lehman Brothers would provide the algorithms and anti-gaming technology to the pool, although the companies had invited other market participants to take stakes.

93. The original launch was expected to be in the first quarter of the year, but this was initially delayed until September 2008. Following the collapse of Lehman Brothers in mid-2008, LSEG was forced to re-evaluate its strategic plans. Nomura acquired the European operations of Lehman Brothers, and LSEG found it necessary to seek alternative partners. Throughout 2009, LSEG remained committed to launching Baikal, and examined a range of alternative options for the technology and incentives to attract liquidity to the platform. Baikal launched as a wholly-owned subsidiary of LSEG in July 2009, initially providing multi-market access and smart order routing solutions to mid-tier regional niche brokers, with the intention of launching a dark pool later that year. Subsequently, with the acquisition of Turquoise, Baikal was wrapped into that business at the beginning of 2010. Many of the features and functionality developed for Baikal have since been adopted by the Turquoise dark pool.

Nasdaq OMX Europe—'Neuro'

94. Nasdaq OMX Europe launched its European MTF, Neuro, in September 2008. In May 2009 Neuro added a dark trading pool to its offering. In April 2010, Nasdaq OMX Europe announced that it was closing down Neuro for commercial reasons. Neuro ceased operations in July 2010.

95. Nasdaq OMX Europe told us that it took about nine months to launch Neuro operationally. The cost was about £[✂] million, of which professional advisory fees (including legal fees) were around £[✂] million and the other high-cost items were

technology (£[✂] million) and staff compensation (£[✂] million). [✂] Nasdaq OMX Europe said that despite its best efforts, it was unable to attract enough order flow to reach a break-even point. It considered that with the extremely competitive fee structure put in place by Chi-X, BATS and others, the order flow required to reach this point was around [✂] per cent market share on a pan-European basis.

96. At its peak, Neuro reached 1.5 per cent pan-European market share. Nasdaq OMX Europe told us that without an increase in fees, or partnership commitments from trading firms which were also members of the platform, it could not see a way of reaching the necessary target. It believed that both Chi-X and BATS benefited significantly from the co-investment by member firms as well as from resultant directed order flow. Nasdaq OMX Europe told us that its internal forecasting analysis conducted in March 2010 suggested the need for [5–10] per cent lit market share and [0–5] per cent dark market share to reach breakeven. This assumed an operating cost base of US[$15–$25] million per year. In September 2010, it updated the analysis assuming an operating cost base of £[✂] million, and that in turn suggested the need for [10–15] per cent lit market share and [0–5] per cent dark market share to reach breakeven. Both sets of analysis were based on a snapshot at that particular time, which would have included assumptions on overall market volumes, the fees that could be charged for different services, and ancillary revenue streams for services such as datacentre hosting etc. Nasdaq OMX Europe said that it should be noted that market data revenues (which could be significant) were not available at that time.

NYSE Arca Europe

97. NYSE Arca Europe is a pan-European MTF that offers trading of blue-chip stocks in 14 European countries (Austria, Czech Republic, Denmark, Finland, Germany, Hungary, the Republic of Ireland, Italy, Norway, Spain, Sweden, Switzerland, the UK and the USA). There are currently 21 members, comprising investment banks and brokers.[27] NYSE Arca Europe is regulated by the Dutch regulator Autoriteit Financiële Markten (AFM). Clearing and settlement is managed by EuroCCP. Trades are published in real time via NYSE Euronext market data feeds and systems. The underlying technology is Universal Trading Platform. At launch, the system offered low latency of 150 to 400 microseconds and capacity to handle 100,000 orders per second. NYSE Euronext also operates the Smartpool, a dark pool benefiting from the reference price waiver under MiFID.

98. Key events in the development and launch of NYSE Arca Europe are:

(a) 8 September 2008—announced intention to launch in November 2008;

(b) 9 March 2009—announced a successful launch of trading in an initial 337 stocks;

(c) 23 September 2009—a further 334 stocks were added to the instrument list, resulting in 794 instruments;

(d) 14 April 2010—announced ability to trade US stocks on NYSE Arca Europe; and

(e) 16 June 2010—announced trading in Budapest and Prague.

[27] Source: NYSE Euronext website.

99. NYSE Arca Europe's fees[28] for trading in Finland, Spain, Sweden and the UK are a maker rebate of 0.30 bps and taker rebate of 0.15 bps (maximum €20,000 per month[29]). NYSE Arca Europe's fees for trading in Austria, Czech Republic, Denmark, Germany, Hungary, the Republic of Ireland, Italy, Norway, Switzerland and the USA are: for monthly activity above €100 million, a maker rebate 0.25 bps and a taker charge of 0.15 bps; for monthly activity of €50–€100 million, a maker rebate of 0.18 bps and taker charge of 0.15 bps; and for monthly activity up to €50 million, a maker rebate of 0.15 bps and taker charge of 0.15 bps.

Quote MTF

100. Quote MTF was founded by BRMS Holdings and Abovethirty kft. Quote MTF is a lit-only equities trading venue operating across multiple European markets. Quote MTF is licensed by the Hungarian Financial Supervisory Authority as an investment firm operating an authorized MTF. Being located in Hungary means that Quote MTF can keep its costs lower relative to Western European competitors. Quote MTF could be breakeven at around €[✂] million daily trading value. Quote MTF told us that it did not expect to increase costs substantially to hit its target trading value of €1,000 million daily trading.

101. Quote MTF subscribers can trade securities and ETFs from 14 European markets in their respective home market currency. As at 27 June 2011, there were 1,837 tradable securities available on the platform. Quote MTF has announced a trading fee of 0.14 bps, with no rebates and a cap of €14,000 until 2012. Quote MTF does not offer a rebate for liquidity providers. It considers that not incentivizing passive flow allows it to reduce fees for taking liquidity, passing savings on to liquidity takers and end-investors directly through cost-plus or broker services arrangements.

102. 60 per cent of the share capital is owned by BRMS Holding (a Canadian company) and 40 per cent of the share capital is owned by management, staff and partners (ie customers). It offered 40 per cent equity participation model for liquidity providers to enhance the success of the platform. The equity was granted in the form of equity options that were issued for nil consideration. The options will convert into common equity once the platform reaches critical mass. Quote MTF went live in April 2011, following the completion of connections with its passive liquidity providers that committed to the MTF via its equity participation programme.

103. The technology underlying the Quote MTF was supplied by Orbixa.[30] ThymeX provides under 200 microsecond execution and the ability to process hundreds of thousands of orders per second. The CCP is EMCF. Quote MTF told us that it invested €2–€3 million to develop the platform and that its principal founding shareholder provided the matching engine. Quote MTF considered that the overall investment would be in the region of €3–€10 million on a stand-alone basis including the technology. Quote MTF is currently targeting around €250 million of daily trade value by the end of 2011, rising to around €1 billion by the end of 2013. This would represent a market share in the region of 2 per cent.

[28] Source: NYSE Euronext website.
[29] Once the cap has been reached, subsequent trades are charged at 0.15 bps.
[30] Orbixa is a privately-held company located in Toronto with corporate campuses in Asia and South America.

Customer profile

1. This appendix:

   (a) provides data for the top 10 and top 20 customers of BATS, Chi-X, Turquoise and LSE;

   (b) outlines how Chi-X and BATS categorize their customers; and

   (c) sets out the prevalence of SOR usage by trading participants.

Top 10 and top 20 customers

2. Tables 1 and 2 identify the top 10 and top 20 (by value traded and volume) customers in 2010 and 2011 on each lit on-book exchange for UK equities. Tables 3 and 4 set out the top 10 UK customers (by value traded) for BATS, Chi-X, Turquoise and LSE in 2011.

TABLE 1 **Top 10 customers—percentage of total UK value traded and volume by trading exchange in 2010 and 2011**

	per cent	
	2010	*2011*
BATS volume	[✂]	[✂]
Chi-X volume	[✂]	[✂]
LSE volume	[✂]	[✂]
Turquoise volume	[✂]	[✂]
BATS value	[✂]	[✂]
Chi-X value	[✂]	[✂]
LSE value	[✂]	[✂]
Turquoise value	[✂]	[✂]

Source: Chi-X, BATS, Turquoise and the LSE.

TABLE 2 **Top 20 customers—percentage of UK total value traded and volume by trading exchange in 2010 and 2011**

	per cent	
	2010	*2011*
BATS volume	[✂]	[✂]
Chi-X volume	[✂]	[✂]
LSE volume	[✂]	[✂]
Turquoise volume	[✂]	[✂]
BATS value	[✂]	[✂]
Chi-X value	[✂]	[✂]
LSE value	[✂]	[✂]
Turquoise value	[✂]	[✂]

Source: Chi-X, BATS, Turquoise and the LSE.

TABLE 3 **Top 10 UK customers for BATS and Chi-X in 2011 data**

Chi-X	*Value traded £*	*% total value traded*	*BATS*	*Value traded £*	*% total value traded*
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]		[✂]			[✂]

Source: Chi-X and BATS.

TABLE 4 **Top 10 UK customers for LSE and Turquoise in 2011 data**

LSE	*Value traded £m*	*% total value traded*	*Turquoise*	*Value traded £m*	*% total value traded*
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Turquoise and the LSE.

Categorization of customers

3. Chi-X broke down the average daily consideration traded on its exchanges by customer type. It segmented customers into *(a)* global investment bank and sponsored access, accounting for [✂] per cent of notional value; *(b)* high-frequency and proprietary trading representing [✂] per cent; and *(c)* broker, accounting for [✂] per cent.[1] However, Chi-X considered that users of trading platforms were more appropriately categorized by reference to types of trade rather than types of customer since, as noted above, a single customer was often made up of various types of trader.

4. BATS had a customer relationship management tool which categorizes its customers as: *(a)* institutional brokers accounting for [✂] per cent; *(b)* investment bank representing [✂] per cent; *(c)* proprietary trading firms accounting for [✂] per cent; and *(d)* retail brokers, representing [✂] per cent of total value traded in 2011.[2] Since 2008, the proportion of share allocated to proprietary firms has fallen, while investment bank trade has increased. In terms of absolute numbers in 2011, [✂] customers were classified as institutional brokers, [✂] as investment banks, [✂] as proprietary trading firms and only [✂] as retail brokers.

[1] Period—calendar year 2011 to July year to date.
[2] The main caveats of this classification are that many customers can be categorized in more than one way, especially investment banks that have multiple desks, a number of which may connect to BATS. Even though these customers fall into more than one category, they are classified as one type of customer which does not reflect then the reality of the customer base.

Prevalence of smart order routers

5. BATS submitted that the vast majority of its customers, if not all of them, used an internal SOR and/or an external SOR such as the one it provided.[3] Chi-X estimated that approximately [✂] per cent of traders operated SORs.[4] The LSE estimated that a significant proportion of its customers used SORs, while Turquoise submitted that all agency businesses used SORs, which accounted for [✂] per cent of its trades. It told us that the remainder of business was proprietary in nature. These proprietary trading entities would not use the same form of SOR as the agency entities but would also have some sort of algorithm technology, which would manage their proprietary flow across multiple trading venues, thus performing the same function as an SOR.

6. In the customer questionnaire, we asked customers whether they used an SOR. We received 30 responses to our questionnaire. Twenty respondents said that they used an SOR either always or sometimes (they represent [✂] per cent of BATS' and [✂] per cent of Chi-X's 2011 customer base by value). The remaining ten customers said that they did not use an SOR. Four of these customers (representing around [✂] per cent of Chi-X's and [✂] per cent of BATS' 2011 customer base by value traded) used the MTFs. The remaining six respondents did not use MTFs, with four accessing only the LSE.

[3] BATS noted that the SORs were not mutually exclusive and some customers would use, or have access to, both types of SOR capability.
[4] Chi-X does not specify between volume and value.

Exchange fees and rebates

1. Trading in cash equities involves several costs. Trading venues levy various direct charges for services including all or some of the following: direct trading fees payable on the execution of transactions, order management fees payable on the posting of certain types of trading instructions, exchange membership fees to belong to a trading venue, market data fees to access live market data and order book details and connectivity charges to send and receive trading messages.

2. This appendix describes the direct exchange fees and rebates, and exchange membership fees at MTFs and the LSE.

Exchange fees

3. Each of the trading venues publishes a tariff of trading fees, and these are amended from time to time.

Note regarding basis points

4. Trading fees were generally expressed in terms of bps, and are applied to the value traded. 1 bps is equivalent to 1/100th of 1 per cent, which is 0.0001 in decimals; and 0.1 bps is equivalent to 1/1000th of 1 per cent, which is 0.00001 in decimals. In other words, under an assumption that trading fees are 0.3 bps, £10,000 of value traded would incur 30p in trading fees, and £1,000,000 of value traded would incur trading fees of £30.

Lit book

5. There were two principal approaches to direct trading fees. These approaches are relevant for price comparisons between the various trading venues. The direct trading fees charged by the three largest MTFs (BATS, Chi-X and Turquoise) were 'flat fees' which did not attract volume discounts. The LSE charged 'scaled fees' under its SVTS, which reduced as the value traded increased. The three largest MTFs differentiated between customers by using a maker-taker fee structure. The LSE also differentiated between passive (ie maker) and aggressive (ie taker) flow in many cases under the terms of its current price list.

6. Table 1 summarizes the prevailing direct trading fees for the principal pricing schemes operated by the LSE and the three largest MTFs active in the UK. It is important to note that the LSE's SVTS tariff is applied by reference to the total value traded in whatever combination of passive and aggressive trading activity is under-taken, whereas the MTF tariffs are calculated separately for each of passive and aggressive activity. For this reason, any like-for-like comparison between tariffs in Tables 1 and 2, and Figures 1 and 2, below should take the mix of trading activity undertaken by an individual trading participant.[1]

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[1] In relation to Figures 1 and 2 below, the cost curves have been produced to show the respective tariffs for passive and aggressive trading separately. In the circumstances that a trader was exclusively engaged in one type of trading only (ie only passive or only aggressive trading), a like-for-like comparison could be made with reference to the tariff (vertical axis) for a range of values traded (horizontal axis). In the circumstances that a trader engaged in both passive and aggressive trading, as is likely to be the norm, a like-for-like comparison of the trading fees payable would need to take into account the different ways in which value traded affects the tariff paid. LSE tariffs are determined by the value traded of all types, whereas MTF tariffs

TABLE 1 **Summary of direct trading fees comparison for lit books**

	*BATS**	*Chi-X*†	*LSE*‡	*Turquoise*§
Structure	Flat	Flat	Scaled by value traded	Flat
Taker (aggressive)	0.28 bps fee	0.30 bps fee	*SVTS:* Fee: 0.45 bps (first £2.5 billion) 0.40 bps (next £2.5 billion) 0.30 bps (next £5 billion) 0.20 bps (all subsequent) *Liquidity Taker Scheme Packages:* Package 1. Monthly fee £50,000. Value of orders executed: 0.15 bps Package 2. Monthly fee £5,000. Value of orders executed: 0.28 bps	0.30 bps fee
Maker (passive)	–0.18 bps rebate	–0.20 bps rebate	*SVTS:* Fee: 0.45 bps (first £2.5 billion) 0.40 bps (next £2.5 billion) 0.30 bps (next £5 billion) 0.20 bps (all subsequent) *Liquidity Provider Scheme:*¶ Free	–0.20 bps rebate

Source: BATS, Chi-X, LSE and Turquoise.

*Fee for all securities on integrated book. Price list January 2011.
†Trading fee for visible executions. 2011 tariff schedule.
‡Price list at 1 October 2011. Volumes are determined on a calendar month basis. All trading is available for the SVTS, such that a member is eligible for discounts once total value traded (whether passive or aggressive) exceeds the appropriate thresholds. Package 1 and 2 replaced the High Volume Liquidity Taker Scheme (HVLTS), described in the 1 July 2011 price list, which applied a trading fee of 0.29 bps for order values of £3 billion for trading in qualified securities in the current or preceding month.
§Effective May 2011.
¶Conditions: to qualify for the scheme for a calendar month, passive continuous trading by value must exceed 75 per cent of all continuous trading by value in FTSE 350 securities sent through a trader group or group of user IDs. Passive trading means flow solely generated from the firm's own capital with no related client orders. Applications must be made by 29 February 2012 and the scheme will apply until 31 March 2012. Nominated client flow may also qualify under certain conditions.

LSE tariffs

7. Until 1 October 2011, when LSE introduced a new pricing scheme, LSE members that qualified for the HVLTS benefited from a reduced trading fee of 0.29 bps for aggressive trades, a discount to all but one tranche of the SVTS. The principal condition for members to qualify for this discount was monthly trading volumes above £3 billion (equivalent to £36 billion a year, on a pro rata basis). From 1 October 2011, the LSE offered a choice of packages for liquidity takers, which differed in the monthly fee and the fee per value traded. Package 1 had a monthly fee of £50,000 and a fee of 0.15 bps of value traded, whereas Package 2 had a lower monthly fee of £5,000 and a higher trading fee of 0.28 bps of traded value.

8. LSE members that qualified for the LPS for FTSE 350 securities benefited from free execution of passive orders, while still contributing to the SVTS. The principal condition for members to qualify for this scheme was to demonstrate that 75 per cent of their flow by value is proprietary passive continuous trading. Nominated client flow may also qualify under certain conditions.

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differ by type of trade. When considering relative costs of aggressive trading (Figure 1) and passive trading (Figure 2), it is therefore important to note that an individual trader could be positioned further along the LSE cost curve (along the horizontal axis) than it may be along the cost curve of an MTF because the measure of trading value is not the same.

9. The LSE levied its fees according to activities each calendar month. LSE member firms could have activities that were charged under several tariff schemes, and the overall fee would depend on the volume and nature of trading that the member had carried out in the billing period. Given the range of tariffs and schemes, it was possible that the blended average trading fees paid by a given member or trading participant could be different from averages across the order book activity (eg total trading fees/value traded) because costs would depend on the trading activity carried out, and was subject to change between monthly billing periods. The tariffs indicated that the LSE's standard tariff was higher for aggressive trades (liquidity takers) than those of the three largest MTFs, but that this difference narrowed for traders that qualified for discounts related to higher trading activity (in value traded) and/or other schemes. For example:

(a) For liquidity takers, the LSE standard fee was 0.45 bps at most, which was 0.15 bps higher than Chi-X and Turquoise, and 0.17 bps higher than that of BATS. This was for monthly trading of £2.5 billion or below (equivalent to £30 billion a year).

(b) The difference in fees narrowed as trading activity increased on the LSE. For example, based on a blended average of trading fees, the gap narrowed to nil for Chi-X and Turquoise, and 0.02 bps for BATS at monthly trading of £10 billion or more.

(c) Until 1 October 2011, for LSE customers that qualified for the HVLTS, the LSE fee was 0.29 bps for qualifying trading of £3 billion or more (equivalent to £36 billion a year). This was 0.01 bps less than Chi-X and Turquoise and 0.01 bps more than BATS. Since 1 October 2011, the LSE has offered a choice of packages, which can in some cases enable traders to achieve lower blended fees than the headline fees of BATS, Chi-X and Turquoise.

10. The tariffs also showed that the MTFs provided a rebate to liquidity providers (makers) of between 0.18 bps at BATS and 0.20 bps at Chi-X and Turquoise. By contrast, the LSE did not provide a rebate: liquidity providers paid trading fees, albeit on a volume-related reducing scale, according to the SVTS unless a different trading scheme applies:

(a) For liquidity makers, the LSE standard fee was 0.45 bps, which was at most 0.63 bps higher than Chi-X and Turquoise, and 0.65 bps higher than that of BATS, because the MTFs provide a rebate. This was for monthly trading of £2.5 billion or below (equivalent to £30 billion a year, and regardless of whether the trade was aggressive or passive).

(b) The difference in fees narrowed as trading activity increased on the LSE. For example, based on a blended average of trading fees, the gap narrowed to 0.38 bps for Chi-X and Turquoise, and 0.40 bps for BATS at monthly trading of £10 billion or more.

(c) For LSE customers that qualified for the LPS for FTSE 350 securities, the LSE did not charge for passive flow (ie it was free). Other firms may also have qualified through nominated client flow. This meant that the relevant comparison between the maker rebates on the MTFs narrowed to 0.20 difference compared with Chi-X and Turquoise and 0.18 bps compared with BATS.

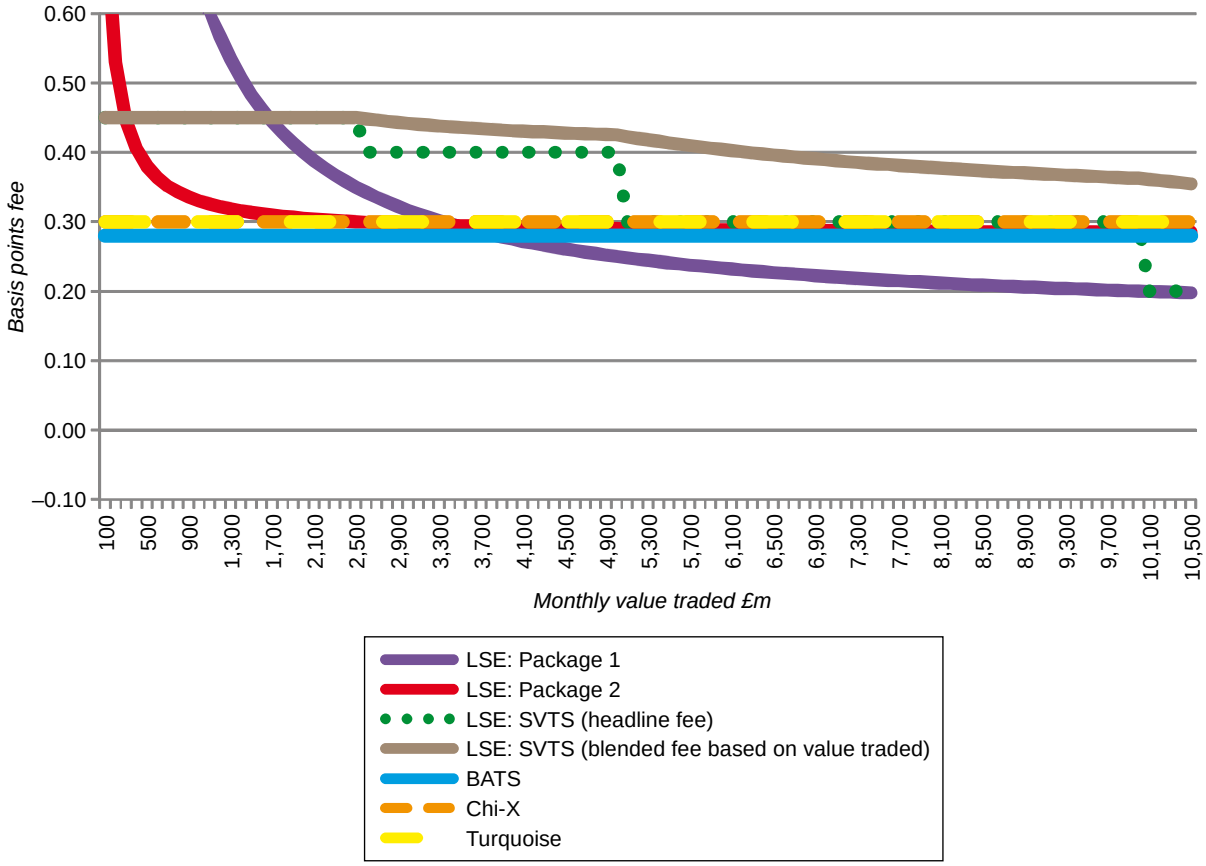
(d) Private client broker order book trading scheme: 0.10 bps.[2]

(e) Smaller Company Registered Market Maker: 0.20 bps.

11. Figure 1 shows the fees across a range of trade values (the y axis is expressed in £ billion, assuming a standard 12 months' annualization) for liquidity takers.

FIGURE 1

Chart of liquidity taker fees



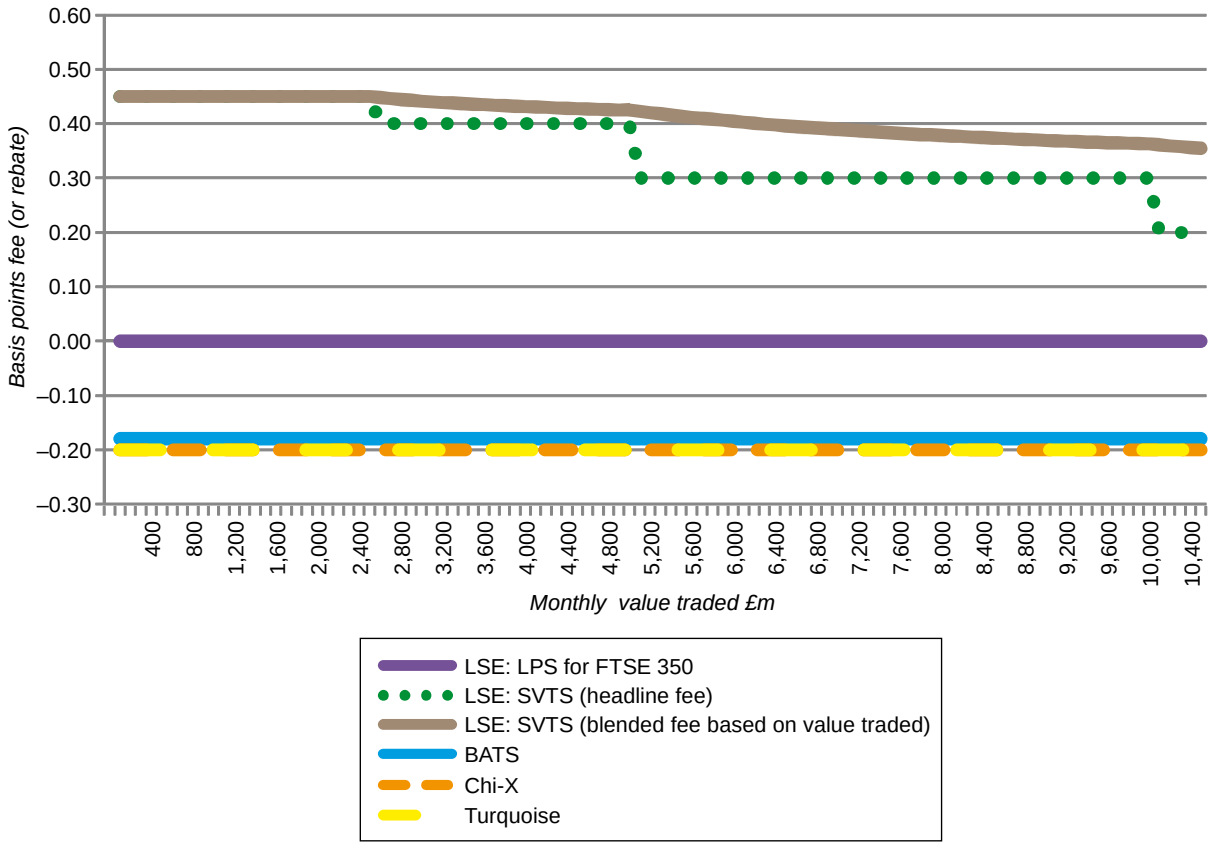
Source: CC analysis.

12. Figure 2 shows the fees and rebates for liquidity providers.

[2] Free for orders executed in the first six months from joining scheme.

FIGURE 2

Chart of liquidity provider (maker) fees and rebates



Source: CC analysis.
Note: Negative figures represent a rebate paid by the exchange to the trader

Non-displayed/dark book

13. Table 2 sets out the direct trading fees for execution on dark books.

TABLE 2 **Direct trading fees comparison for dark books**

	*BATS**	*Chi-X*	*LSE*†	*Turquoise*‡
Structure	Flat	Flat	Not applicable	Flat
Fee	0.15 bps per side. 0.05 bps for dark self cross trades	0.15 bps for executions resulting from non IOK/FOK orders§ 0.30 bps for all other	Not applicable	0.30 bps

Source: Party submissions.

*Price list January 2011.
†LSE does not operate a dark book.
‡Effective May 2011.
§IOK = immediate or kill, FOK = fill or kill.

Onward routing

14. BATS also provided an onward routing service. For UK equities it charged 0.28 bps for onward routing to lit venues and 0.30 bps for onward routing to liquidity providers.

Neither LSE, Chi-X nor Turquoise offered a comparable service although Turquoise offered onward routing for non-displayed orders.

Order management fee

15. The LSE charged an order entry fee of £0.01 for non-persistent orders (equivalent to 0.01 bps for a single order £10,000). However, it told us that the majority of orders did not attract this order management charge. These fees related to orders that had certain technical characteristics to execute aggressively only and these fees could be avoided by entering limit orders.

Exchange membership fees

16. The LSE charged an annual membership fee of £12,500, against which an annual credit of £2,500 was available for trading and reporting activities. None of three largest MTFs charged membership fees.

Other costs of equity trading

1. This appendix describes the following costs of trading, other than those charged directly by exchanges, including:

   (a) pre-trade costs, ie cost of liquidity (spread) and market data; and

   (b) post-trade costs, ie clearing and settlement.

Pre-trade costs

The cost of liquidity: spread

2. Price discovery takes place on public markets through the interaction of buyers and sellers, including the order book of unmatched trades. Each equity trade involves two sides. If an investor wants to trade immediately, the price that is paid for liquidity is typically measured through the spread. The spread is the difference between the price quoted for immediate sale ('ask' or 'offer' price) and purchase ('bid') of a security. The cost of liquidity measures the cost that a taker of liquidity (ie aggressor) needs to pay to the provider of liquidity (ie passive) for the sale or purchase of a share. Some academic studies have also sought to derive measures of liquidity that incorporate other factors, such as order book depth.[1]

3. Exchanges cannot control spreads directly, but a transaction is more likely to be executed on the platform offering the best liquidity for a given trade. Both Chi-X and BATS published summary statistics that sought to quantify the extent to which execution on their trading platforms took place inside the spread on other available venues. This is termed 'price improvement'.

4. The price improvement statistics provided anecdotal evidence that the cost of liquidity is several times larger in magnitude than the direct trading fee. For example:

   (a) Chi-X reported[2] that overall savings for participants through price improvements over the first six months of 2011 amounted to more than €86 million, representing an average basis point price improvement of 1.20 bps.[3]

   (b) BATS provides live price improvement data for indices and individual stocks.[4] For example, on 18 August 2011, the price improvement on the FTSE 100 was calculated at 1.45 bps.

5. Liquidmetrix provides comparisons of spreads between a number of trading venues and individual securities. Summary information is published on a historical basis—

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[1] See, for example, Michael Chlistalla and Marco Lutat, 'Competition in securities markets: the impact on liquidity', 9 April 2011, *Swiss Society for Financial Market Research 2011*.
[2] Chi-X press release, 19 July 2011.
[3] Definition: overall bps price improvement is calculated by comparing the execution price against the market of listing best bid for each sell or best offer for each buy at the point of execution for all aggressive trades executed on Chi-X, and is calculated from the perspective of the aggressive party only.
[4] BATS monitors market data feeds from major European stock exchanges and maintains a record of the best bid and offer for each stock on the relevant primary exchange (PBBO). For each trade that occurs on BATS, the price achieved by the aggressor is compared to this PBBO and the improvement (or dis-improvement) of notional value achieved is recorded. If the BATS trade represents a buy, it is compared to the price of the primary best offer, and for sells, the primary best bid. PBBO information is collected as close to the market data entry point to the BATS system as is possible.

see Figure 1 below for an example. This equally provided anecdotal evidence that the spread is several times larger in magnitude than the direct trading fee.

FIGURE 1

Indicative spreads on UK exchanges, week of 15 August 2011

Source: Liquidmetrix.

6. The market impact of a particular trade is characterized by the effect on the market price of an order being displayed to other trading participants. The presence of large orders on lit books has a price-signalling effect because the order books are actively monitored by professional investors. Large orders have the potential to influence the market price due to the balance of supply and demand for a particular equity.

Market data services and connectivity

7. Market data has a value to a trading venue if it is able to charge for this data. A commercial decision has to be taken to charge for data based on how valuable data generated by an equities trading venue may be. In general terms, the greater the level of trading activity on an exchange, the greater the value of its market data.

8. The LSE charged for live market data. Of the MTFs, only Chi-X charged fees for its market data. While it has chosen not to levy end-user terminal fees, it has since 1 January 2010 charged redistribution licence fees to those vendors who package Chi-X Europe data in services to end-user consumers.

9. Market data was available from a wide range of sources. It may be obtained directly from trading venues or via market data vendors (such as Bloomberg or Thomson Reuters). Providers of data offer different options as to how the data is received,

including how much data is provided and at what rate so as to meet varying customer needs.

Post-trade costs

Clearing and settlement

10. This section describes the cost of clearing and settlement.

11. In contrast to exchange charges, which are typically ad valorem, clearing and settlement charges are levied on a *volume* basis (ie an amount per transaction, expressed in a particular currency). Settlement may also be subject to volume discounts. The volume discounts are triggered at a variety of different volume thresholds, which makes it difficult to produce a direct comparison between CCPs. This approach to tariffs also means that producing a consolidated stack of direct trading costs is not particularly meaningful at an aggregate industry level because the costs that a particular trader pays will be a function of its specific trading pattern.

Central counterparty services

12. CCPs act as the legal counterparty to trading, sitting in between the buyer and seller, providing guarantees that both sides will receive delivery of payment or securities at the agreed price, even if one side becomes insolvent before settlement. In order to take this risk, CCPs make a risk assessment of their members' positions and require collateral to be posted, and they may require additional margin depending on market conditions. CCPs undertake a process of netting-off the positions of trading parties to reduce the amount of collateral that each has to post. This section describes the current tariffs for the four CCPs currently providing services to exchanges relevant to this transaction: European Multilateral Clearing Facility NV (EMCF), EuroCCP, LCH.Clearnet and SIX x-clear.

EMCF

13. EMCF is regulated as a CCP in the Netherlands. EMCF provides CCP services in 19 European markets through nine MTFs and exchanges, including BATS and Chi-X. Today it serves over 50 European financial service providers with an offering that includes: novation, gross trade netting, risk management, settlements, and fails and buy-in management.[5]

14. EMCF levies a clearing fee on the volume of gross trades executed by participants.

15. The EMCF fees are:

    (a) first 100,000 trades per day: €0.03; and

    (b) volumes in excess of 100,000 trades per day: €0.01.[6]

16. EMCF provides settlement via the local Central Securities Depositary (CSD).

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[5] www.euromcf.nl/about_us.php.
[6] www.chi-xeurope.com/home/clearing-and-settlement.asp.

EuroCCP

17. EuroCCP is a central counterparty and the European clearing subsidiary of DTCC.[7] EuroCCP provides clearing services for a number of MTFs, including BATS and Turquoise.

18. The EuroCCP fee schedule details the cost of membership, clearance and risk management, settlement and other miscellaneous charges.

19. EuroCCP charges an annual fee of €15,000 to general clearing participants, €12,000 to individual clearing participants. The combined clearing and risk processing fees are charged in three volume-related tiers:[8]

    (a) Tier I: 0–100,000 sides per day: €0.03.

    (b) Tier II: 100,001–230,000 sides per day: €0.01.

    (c) Tier III: 230,001+ sides per day: €0.

20. The settlement schedule shows the settlement fees for securities in EEA territories. The fees for settlement of UK and Republic of Ireland securities is as follows:

    (a) Settlement: £0.54.

    (b) CSD fee: £0.34.

    (c) Income payments: £10.

    (d) Corporate actions: £13.

LCH.Clearnet

21. LCH.Clearnet Group Ltd is owned 83 per cent by its clients and 17 per cent by exchanges.[9] The EquityClear service clears equity-based trades for LCH.Clearnet Ltd that are executed, inter alia, on the LSE and BATS.

22. The cost associated with using the EquityClear service depends on monthly volumes. All cleared volumes across all the trade sources cleared through the EquityClear service are cumulative. The average daily volume (ADV) of the clearing member is determined by the number of trades cleared throughout the month, then divided by the number of business days in the month. When the ADV has stepped through each band, the cost of clearing and an average unit cost per trade can be derived as shown in Table 1.

TABLE 1 **LCH.Clearnet clearing prices**

Average daily volume: from	0	10,001	20,001	40,001	50,001	75,001	150,001
Price (pence)	10	7	5	4	1	0.5	0

Source: LCH.Clearnet.

23. LCH.Clearnet passes through all settlement-related fees at cost.

[7] DTCC is the Depository Trust & Clearing Corporation, the US CCP.
[8] EuroCCP fee schedule effective 29 July 2011.
[9] www.lchclearnet.com.

SIX x-clear

24. SIX x-clear Ltd is part of SIX Group, the integrated Swiss financial market infrastructure provider. As a CCP, SIX x-clear offers clearing and risk management services in the cash-equity and bond markets. SIX x-clear currently services SIX Swiss Exchange and the LSE.[10]

25. The annual General Clearing Membership fee for SIX x-clear is CHF10,000. A volume-based tariff structure applies to clearing, with charges in Swiss francs, as set out in Table 2.[11]

TABLE 2 **Clearing price in CHF for x-clear**

Volume	0	50,000	250,000	1,000,000	3,000,000
Rating AAA to BBB+	0.200	0.100	0.050	0.025	0.010

Source: x-Clear price list, 1 June 2011.

26. The fees for domestic market settlement of UK and Republic of Ireland stocks via SIX x-clear is CHF 2.40 (£1.80).

Comparison of CCP prices

27. Table 3 sets out a side-by-side comparison of clearing costs, expressed in bps, based on the highest and lowest volume-related charges. The volume thresholds are different for each CCP[12] and the table excludes settlement costs.

TABLE 3 **Comparison of CCP charges (bps)**

	ECMF		*EuroCCP*		*LCH.Clearnet*		*x-Clear*	
Fee level	Highest	Lowest	Highest	Lowest	Highest	Lowest	Highest	Lowest
Fee	€0.03	€0.01	€0.03	€0.01	£0.10	£0.005	CHF0.20	CHF0.01
Threshold volume	100,000	100,001	100,000	230,001	10,000	75,001	50,000	3,000,000
Individual trade								
£10,000	0.03	0.01	0.03	0.01	0.10	0.01	0.15	0.01
£5,000	0.05	0.02	0.05	0.02	0.20	0.01	0.31	0.02
£1,000	0.27	0.09	0.27	0.09	1.00	0.05	1.54	0.08

Source: CC analysis of tariff schedules.

Notes:
1. An individual trade value of £1,000 multiplied by a trading volume of 100,000 trades per day is equivalent to an annual traded value of £25 billion (assuming 250 trading days a year).
2. Clearing fee expressed in bps.
3. Exchange rate: €1.10:£1.00; CHF1.30:£1.00.
4. LCH.Clearnet incremental fees are nil for incremental daily volumes in excess of 150,001.
5. EuroCCP incremental fees are nil for incremental daily volumes above 230,001.

Interoperability of CCPs

28. Clearing has evolved from the structure of the European securities landscape, which was historically structured on national lines. There are in the region of nine CCPs operating in the EEA. The MTFs are in favour of interoperability of CCPs in order to reduce the cost of clearing. For example:

[10] www.six-x-clear.com/ccp/about.htm.
[11] x-clear price list 1 June 2011.
[12] The specific volume thresholds are detailed in separate tables. Note that both LCH.Clearnet and EuroCCP do not charge for incremental volumes above the maximum volume in the tariff schedule. Table 4 shows the charge at the highest volume with a net fee that is not nil.

(a) Chi-X plans[13] to offer full four-way clearing interoperability to all its trading participants, under which EMCF, EuroCCP, LCH.Clearnet and SIX x-clear will collaborate to offer a full clearing choice by 1 January 2012, subject to regulatory approval. Full interoperability will be available for all traded equities on Chi-X, with the exception of the Spanish market.

(b) BATS provides users with a choice of clearing partner.[14] EMCF continues to be the default clearer but traders are able to inform BATS if they have a preference between EMCF, EuroCCP, LCH.Clearnet and SIX x-clear for trading in particular geographic markets. BATS offers three-way interoperability and plans to offer full four-way interoperable clearing by 1 January 2012.

Settlement

29. Settlement is the final stage of trading, which involves the exchange of securities against payment. Securities are settled in a CSD.

30. Euroclear UK & Ireland is the CSD of the UK, Republic of Ireland, Jersey, Guernsey and the Isle of Man. It provides settlement facilities for a wide range of UK equities, corporate bonds and government securities, including those traded on the LSE, Chi-X, BATS and Turquoise. Securities are settled in the CREST system. Euroclear has direct links to US and European settlement systems, to facilitate settlement in 21 international markets.[15]

31. From July 2011 the standard annual user fee was £10,000.[16]

32. The headline rate for domestic delivery is £0.45, which applies to average daily volumes of 0–1,500. There is a sliding scale for charges, which reduces to £0.075 for daily volumes greater than 20,001.[17] This is summarized, in bps, in Table 4.

TABLE 4 **CREST domestic delivery charge, in bps**

Daily volume	1,500	20,001
Price (£)	0.45	0.075
Trade value (individual trade):		
£10,000	0.45	0.01
£5,000	0.90	0.15
£1,000	4.50	0.75

Source: CREST tariff.

Stamp Duty Reserve Tax

33. Stamp Duty Reserve Tax (SDRT) is levied on electronic 'paperless' share transactions. Most shares are bought and sold this way. When shares are purchased using a paper stock transfer, stamp duty is levied.[18] CREST automatically deducts the SDRT and sends it to HM Revenue & Customs. The broker settles up with CREST and bills the customer for the SDRT and its own fees. Stamp duty is normally charged at 0.5 per cent of the price paid (ie 50 bps).

[13] Chi-X press release, 16 August 2011.
[14] BATS website.
[15] www.euroclear.com.
[16] Euroclear Tariff, June 2011, p6. The standard annual user fee before July 2011 was £7,500.
[17] Euroclear Tariff, June 2011, p8.
[18] www.hmrc.gov.uk/sdrt/intro/basics.htm.

34. Because stamp duty is, in principle, payable on each movement of shares in the course of effecting a sale, the Government provides intermediary relief to facilitate the provision of liquidity and remove the possibility of a single sale and purchase becoming subject to multiple charges of stamp duty as shares pass through market intermediaries (eg market makers) on their way from investor A to investor B. The relief applies to all purchases made by a recognized intermediary on the exchange (or designated MTF) on which it is recognized. The relief is not, however, applicable where the purchases are made elsewhere. The arrangements aim to ensure that the relief does not become available to end-investors and is confined to market intermediaries that carry on a bona fide business of dealing in stock or securities. To obtain relief, an intermediary must be a 'recognized intermediary'.[19]

[19] FSA, *Trading of MTF shares: impact of proposed stamp duty changes*, July 2007. Prior to MiFID, the Treasury announced proposals to modernize the framework of the stamp duty relief available to market intermediaries when trading (as principal) in UK shares admitted to trading on a regulated market. The Government said that the changes, which were due to come into force in November 2007, would remove obstacles to competition and expand choice in the trading of financial instruments in the UK. The changes were designed to ensure that firms could benefit from the liberalization of trading introduced by the Markets in Financial Instruments. This was extended to MTFs in 2007.

Shareholders

This appendix details the shareholders of BATS and Chi-X pre-merger, and the pro forma ownership if the merger completes.

Shareholders of BATS and Chi-X

per cent

	BATS (pre-merger)	*Chi-X (pre-merger)*	*Proposed ownership of merged entity*
ABN AMRO			
BNP Paribas			
Citadel Derivatives Trading			
Citigroup			
Credit Suisse			
Tradebot Systems			
Deutsche Bank			
GETCO			
Goldman Sachs			
Jane Street			
Instinet Holdings Inc.			
International Algorithmic Trading GmbH		✂	
JP Morgan			
Lehman Brothers (in Administration)			
Lime Affiliates			
Merrill Lynch			
Morgan Stanley			
Nomura			
Optiver Holding			
Ogier			
Societe Generale			
UBS			
WEDBUSH			
Individuals			

Source: Party submissions.

Competitive constraints

Introduction

1. In this appendix we summarize some of the elements of the analysis that we conducted to assess the constraint imposed by *(a)* EEA equities, *(b)* dark on-book trading, and *(c)* off-book trading on the pricing and service quality offered in respect of lit on-book trading. For each, we undertook a qualitative review, reviewed the parties' internal documents, evidence from the hearings, and the questionnaire evidence.

2. With regard to EEA equities, the parties maintained that they each offered a uniform fee throughout Europe with the exception of special offers.[1] Thus, BATS offered three discount schemes: in June and July 2009 for equities in the main French, Belgian and Dutch indices; in September 2009 for FTSE 100 securities; and June to December 2009 for ETFs and ETCs. Chi-X is planning a temporary pricing promotion in Spain, which it views as unique. These initiatives indicate that there may be some scope for MTFs to differentiate prices between stocks that are listed on different national exchanges. We therefore needed to consider whether, if the merged party attempted to increase the trading fees of UK-listed equities relative to the fees for trading other EEA-listed equities, the other EEA-listed equities would be a sufficiently close substitute to make action of this kind unprofitable.

3. With regard to dark on-book and off-book trading, we needed to consider whether either dark on-book trading or off-book trading are sufficiently close substitutes for lit on-book trading as to constrain the pricing and service quality offered to investors engaged in lit on-book trading.

EEA-listed equities

Qualitative review

4. An investor has the option to trade UK equities on the LSE or pan-European MTFs. If an investor wants to trade equities in other jurisdictions, it may execute on pan-European MTFs or other former national exchanges. Some equities may have a dual listing on more than one former national stock exchange. In most cases, dual-listed shares have different voting rights, dividends etc, so, while they represent the same portion of ownership in the company, they are not necessarily fungible.

Review of parties' internal documents

5. BATS and Chi-X internal documents consider a pan-European market although they separate out individual indices. BATS offers trades in more than 1,300 of the most liquid securities (primarily equities) across 24 indices and 15 major European states. Chi-X facilitates trading in 1,386 of the most liquid stocks across 23 indices in 15 European states

[1] Parties joint initial submission.

Evidence from the hearings

6. Evidence from the hearings in relation to UK versus EEA equity trading was mixed. Some parties noted that transactions should be considered on a European basis given that some trading desks operated in this manner. Competitor B told us that most people trading UK-listed equities wanted to trade UK-listed equities and would not necessarily regard other listed equities or equities listed on other exchanges as substitutes. Nasdaq said that the location of the exchange was important in deciding which equities to trade. LSEG told us that while big banks undertook institutional trading at a pan-European level, some small UK brokers specialized in UK equities only. Nonetheless, they used the same wide range of trading venues to execute trades. In each case, customers trading only UK equities accounted for just a small fraction of overall volumes and value for the LSE and Turquoise.

7. Customer C told us that trading firms were interested in the stock rather than the geographic location. It acknowledged that a domestic bias may still exist but could not quantify it. It also noted that there was variation between countries. Other customers agreed that there was a domestic bias in the UK, and did not consider EEA equities easily substitutable for UK equities.

Questionnaire evidence

8. We asked customers whether, when planning to make a UK equity trade, they considered trading a non-UK equity as an alternative. Most customers considered non-UK equities only in specific circumstances, ie when there is dual listing and they are fully fungible. Three customers representing less than [✂] per cent of each of Chi-X's and BATS' customer base said that they always considered non-UK equities as an alternative. Eleven customers (representing [✂] and [✂] per cent of Chi-X's and BATS' customer base respectively) said 'sometimes'. Focusing on 'sometimes' customers accounting for in excess of [✂] per cent of BATS' or Chi-X's customer base, one customer said that it only considered trading a non-UK equity in place of a UK equity under the circumstance that the non-UK equity was a fully fungible instrument. Any such trade would only occur with a dual or multiple-listed security. Another customer said that to the extent that a non-UK equity was regarded as fully fungible with a UK equity, then it would regard the non-UK equity as a viable alternative instrument to trade. Typical factors that would need to be taken into account when deciding on which equity to trade would include price and currency rate, as well as local taxes and levies. A third customer told us that it was an exception rather than a norm to substitute with a non-UK equity. Essentially the stock it wanted to trade was the stock it traded. A fourth customer said that it would substitute if the stock were sufficiently correlated and/or fungible. Finally, a fifth customer told us that for the vast majority of instruments, a non-UK equity could not be substituted for a UK equity. Sixteen customers (representing [✂] and [✂] per cent of Chi-X's and BATS' customer base respectively) said they never considered non-UK equities.

Dark on-book trading

Qualitative review

9. In terms of types of trades executed, the evidence suggests that the nature of the trade differs between lit and dark books. BATS noted that, historically, the lit and dark books played different roles, in as much as dark books may offer lower prices. Dark books execute at the midpoint, so buyers pay lower prices and sellers achieve higher prices compared with a bid/offer model on a lit book, but they generally have less liquidity and, therefore, generally slower execution times.

10. BATS said that it created its own dark book to meet customer demand. It submitted that customers might prefer to execute in a dark rather than lit pool for large blocks of shares which may affect the price. LSEG submitted that flow requiring immediacy and certainty of execution would most likely take place on the lit book, although customers would also consider the dark pools.

Review of parties' internal documents

11. Chi-X submitted that a presentation to the CESR on dark pools indicated substitutability between lit and dark trading methods. BATS had no internal documentation specifically demonstrating the substitutability between lit and dark trading. No relevant documentation was provided by LSEG. It noted that its experience showed that customers used either, or a combination of, lit and dark trading depending on their trading objectives.

Evidence from hearings

12. Most third parties told us that the decision to trade dark was customer-driven. Some (Panmure Gordon, IG Group and Customer D) told us that they would trade the less liquid stocks such as FTSE 250 on the dark books because they would tend to have higher spreads and therefore offer the biggest improvements when trading at the midpoint. For the most liquid equities such as FTSE 100 (where spreads are much tighter and so the price advantage of dark books more limited), they may program the SOR to look first in the dark books, but if the order is not met immediately to move to lit. Other third parties explained that order values (per transaction) were much larger in dark pools while volumes were far smaller than in lit. Competitor B told us that lit and dark on-book trading was not comparable.

Questionnaire evidence

13. We asked customers whether they considered dark trading as an alternative to lit trading. Respondents covering approximately [✂] per cent of BATS' and Chi-X's customer base said that they 'always' or 'sometimes' considered dark trading. Fifteen respondents, representing only [✂] and [✂] per cent of Chi-X's and BATS' customer base in value traded in 2011 respectively, said that they did not consider dark trading.

14. Customers who said 'sometimes' described the nature of the trade leading to the direction of flow. The following reasons for looking in the dark book were: large trades where liquidity cannot be found in the market; when timescale of implementation allows; client instruction; and reducing market impact/signalling risks.

Off-book trading

Qualitative review

15. With respect to trading fees, Chi-X submitted that off-book trading could in some circumstances be less expensive, given that it avoided the execution and clearing costs of on-book trading.

16. In terms of the nature of the trades that take place within either venue, there is no industry consensus. MiFID characterizes[2] off-book OTC transactions as transactions that fulfil the requirements of being ad hoc and irregular, carried out with wholesale counterparties, above standard market size, and conducted outside systems used for systematic internalization. One academic paper, however, considered that a significant share of OTC transactions were neither above standard market size nor would such transactions affect the market if concluded on open, public order books.[3]

Review of internal documents

17. BATS and Chi-X did not have any internal documentation specifically demonstrating the substitutability between on-book and off-book trading. LSEG also did not provide any documentation, although it made oral submissions on this point too—see below.

Evidence from hearings

18. There seems to be a consensus among the various third parties that the decision of trading on-book versus off-book is often a customer decision, and usually both are considered as trading options.

19. LSEG submitted that various off-book and on-book mechanisms were considered simultaneously. It said that it considered off-book trading when developing its on-book offering, for example it had introduced a private client broker order book trading scheme to encourage private clients who carried out off-book trading to consider trading on the order book. It did not continuously track OTC trading volumes but said that they were taken into account in formulating its commercial strategy. It said that traders would consider trading both on and off book, depending on their trading objectives, and a particular order may be split between the two. Accordingly, it said, a distinction between 'on-book' and 'off-book' trading did not provide any meaningful characterization of trading patterns or customer groups.

Questionnaire evidence

20. We asked customers whether they considered trading off-book as an alternative to trading on-book. The responses were mixed. Eleven respondents, among which six represent slightly more than [✂] per cent of Chi-X's and BATS' customer base,[4] said that they did not consider off-book as an alternative to on-book when executing a trade. In contrast, four customers, representing [✂] per cent of each of the parties' customer base by value, said that they always considered off-book trades. The majority, 15 respondents representing [✂] and [✂] per cent of Chi-X's and BATS' customer base in 2011 respectively, said that they 'sometimes' considered off-book. The 'sometimes' respondents described the nature of the trade as directing the direction of flow. Characteristics for looking off-book tended to be for large block trades that may otherwise have a market impact. Where liquidity may be lacking, off-book may be favoured. Client instruction was also mentioned.

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[2] Peter Gomber and Axel Pierron, *MiFID Spirit and Reality of a European Financial Markets Directive*, September 2010. Recital 53.
[3] ibid, p3.
[4] Of 2011 total notional value.

Customer overlap analysis

1. This appendix sets out tables analysing the extent of customer overlap between BATS, Chi-X, Turquoise and the LSE.

2. Table 1 shows a breakdown of UK customer overlap between the trading exchanges. Tables 2 to 5 show the proportion of total UK notional value and volume the overlap customers represent for each exchange in 2011.

TABLE 1 **Summary of UK customer overlap between trading exchanges**

	BATS	*Chi-X*	*LSE*	*Turquoise*
BATS	[✂]	[✂]	[✂]	[✂]
Chi-X		[✂]	[✂]	[✂]
LSE			[✂]	[✂]
Turquoise				[✂]

Source: Chi-X, BATS, Turquoise and the LSE.

Note: We have not merged potential duplicate entries, for example different divisions of Deutsche Bank.

TABLE 2 **Chi-X UK customers: overlap with other exchanges—proportion of total value and volume 2011**

Overlap	*Volume*	*Notional value*
BATS	[✂]	[✂]
LSE	[✂]	[✂]
Turquoise	[✂]	[✂]

Source: Chi-X, BATS, Turquoise and the LSE.

Note: We have not merged potential duplicate entries, for example different divisions of Deutsche Bank.

TABLE 3 **BATS UK customers: overlap with other exchanges—proportion of total value and volume 2011**

Overlap	*Volume*	*Notional value*
Chi-X	[✂]	[✂]
LSE	[✂]	[✂]
Turquoise	[✂]	[✂]

Source: Chi-X, BATS, Turquoise and the LSE.

Note: We have not merged potential duplicate entries, for example different divisions of Deutsche Bank.

TABLE 4 **Turquoise UK customers: overlap with other exchanges—proportion of total value and volume 2011**

per cent

Overlap	*Volume*	*Value*
Chi-X	[✂]	[✂]
BATS	[✂]	[✂]
LSE	[✂]	[✂]

Source: Chi-X, BATS, Turquoise and the LSE.

Note: We have not merged potential duplicate entries, for example different divisions of Deutsche Bank.

TABLE 5 **LSE UK customers: overlap with other exchanges—proportion of total value and volume 2011**

		per cent
Overlap	*Volume*	*Value*
Chi-X	[✂]	[✂]
BATS	[✂]	[✂]
Turquoise	[✂]	[✂]

Source: Chi-X, BATS, Turquoise and the LSE.

Note: We have not merged potential duplicate entries, for example different divisions of Deutsche Bank.

Glossary

Admission	Admission of **securities** to trading on a regulated market or **RIE**.
Aggressive orders	Orders that, by contrast with **passive orders**, subtract **liquidity** from the **order book** during continuous trading, when each trade has one aggressive party (the party that hits an order) and one passive party (the party whose order is hit).
Arbitrage	The (simultaneous) buying and selling of a **security** on two markets in order to benefit from different prices on those markets.
Best execution rule	A rule specifying that firms executing transactions on behalf of their clients must take all reasonable steps to obtain the best possible result for their client, taking into account price, costs, speed, likelihood of **execution** and **settlement**, size, nature or any other consideration relevant to the **execution** of the order.
Bid-ask (or bid-offer) spread	The difference between the **bid** and **offer price**s of a **security**.
Bid price	The price at which a market participant offers to buy a **security**.
Bilateral trades	Direct broker-to-broker trades, organized by two **broker**s between themselves, away from the **exchange**'s **order book**.
Broker	Any person when dealing as agent.
Buy side	The end-investor, generally institutional or retail. Examples include mutual funds and pension funds.
Capital market	A market where debt **securities** or **equity** securities are traded.
CC	Competition Commission.
CCP	Central counterparty. An entity that takes on the contractual obligations and **counterparty risk** of contracts traded within one or more financial markets, becoming the buyer to every seller, and the seller to every buyer.
CESR	Committee of European Securities Regulators.
Clearing	The process of transmitting, reconciling and, in some cases, confirming payment orders or **security**-transfer instructions prior to **settlement**, including the **netting** of instructions and the establishment of final positions for **settlement**.
Counterparty	The market participant with whom a **trade** is being transacted.
Counterparty risk	Risk of default on fulfilment of an obligation by a **counterparty** prior to final settlement.
Dark pool	A private securities **exchange** or **trading platform**, where the prices of transactions are not published.

Dark trades	Another name for non-displayed **liquidity** trades. Trades in a venue on which **liquidity** is not openly advertised. Primarily, this means trading within pools set up by investment banks, which allow even a large volume of trading to occur without affecting the market.
Derivative	A financial instrument, the price of which depends on the value of one or more underlying **securities**. The most common underlying assets include stocks, bonds, commodities, currencies, interest rates and market indexes. Futures contracts, forward contracts, options and swaps are the most common types of derivatives. Derivatives are contracts and can themselves be used as an underlying asset.
EBBO	European Best Bid and Offer. The current best prices—the lowest price for a buy or the highest price for a sell—available for selling or buying a trading instrument such as a stock on any **exchange** within the euro zone.
Electronic trading	Fully automated trading of **securities** or commodities.
Equity	A share or stock signifying an ownership position in a company, and representing a claim on its proportional share in the company's assets and profits.
Euronext	A pan- European **exchange** created from the merger of the **equity** and **derivatives** exchanges of Amsterdam, Brussels, Lisbon, London and Paris.
Euronext.liffe	The London International Financial Futures and Options Exchange owned by Euronext.
Exchange	A centralized marketplace where participants buy and sell **securities** etc, either directly or through **intermediaries**.
Execution	The completion of a buy or sell order for a **security** etc.
FSA	Financial Services Authority. An independent, non-governmental body with statutory powers which regulates the financial services industry in the UK.
FSMA	Financial Services and Markets Act 2000. Provides, among other things, a framework for operation of stock **exchange**s and their regulation by the **FSA**.
Fungible	A good, **security** or instrument which is capable of interchange or exchange with others of the same type.
Iceberg order	A single, large trading order that is divided into smaller lots. A 'peak' order size is set which, trade by trade, gradually trades parts of the large order, with only the 'peak' at any one time being visible to the public.
Index	A statistical measure—such as the FTSE 100—of the changes in value of a portfolio of stocks.

Intermediary	A third party facilitating business between two other parties.
Internalization	The act of a broker filling a client's order with stock from its own inventory.
Interoperability	The ability of IT systems to work together and/or the accessing and sharing of multiple data structures across multiple hardware platforms, operating systems and application software.
IPO	Initial public offer. The first offering of stock by a company to the public.
Issuer	Any company or other legal person or undertaking, any class of whose **securities** has been admitted or is, or is proposed to be, the subject of an application for admission to trading.
Latency	The time it takes to accept, process and execute an available order.
Liquidity	The ease with which a **security** can be traded on the market without affecting its price.
Liquidity provider	An underwriter or **market maker** who makes it possible for **securities** to be traded by providing **equity** financing and facilitating debt transactions.
Listed company	A company whose **securities** have been admitted to the **UKLA**'s (ie **FSA**'s) official list.
Listing services	**Exchange** services provided in respect of a flotation, whether an **IPO** or a secondary public offer.
Lit pool	A **securities exchange** or **trading platform**, where there is pre-trade transparency, ie the open advertising of **liquidity**.
Lit trades	Another name for displayed **liquidity** trades. Trades in a venue on which **liquidity** is openly advertised, in order to attract additional **liquidity**.
LSE	London Stock Exchange plc.
Main market	**LSE**'s principal market for listed companies from the UK and overseas.
Market capitalization	A measure of the value of a company derived by multiplying the number of shares in issue by the current share price.
Market impact	Actual or potential effect of trades on share prices.
Market maker	A person who (otherwise than in his capacity as the operator of a regulated collective investment scheme) holds himself out as willing and able to enter into transactions of sale and purchase in investments of that description at prices determined by him generally and continuously rather than in respect of each particular transaction. This is done in order to facilitate trading in those investments.

Market price	The last reported sale price of a **security**.
Member firm	A broker or dealer which is a member of an **exchange** and may deal in **securities** on an **exchange**'s markets.
MiFID	Markets in Financial Instruments Directive 2004/39/EC.
MTF	Multilateral Trading Facility. A multilateral system, operated by an investment firm or a market operator, which brings together multiple third-party buying and selling interests in financial instruments —in the system and in accordance with non-discretionary rules—in a way that results in a contract in accordance with the provisions of Title II of **MiFID**.
NASDAQ	The largest electronic stock market in the USA.
Netting	A process by which the claims and obligations between two **counterparties** are offset against each other to leave a single net sum.
NSC	Electronic trading platform developed by Euronext.
NYSE	New York Stock Exchange.
Off-book trade	All trades carried out away from an **exchange**'s or **MTF**'s order book, whether reported to the exchange or **MTF** or not. Off-order-book trading includes **OTC** trades. **Exchange**s generally charge trading firms for trade reporting of off-book trades.
Offer price	The selling price for **securities** in the market.
OFT	Office of Fair Trading.
On-book trade	All trades carried out on an **exchange**'s or **MTF**'s order book.
Order book	A list of orders available to be matched, maintained for each **security** trading through an order-driven (matched bargain) system, or a hybrid system that has order-driven features.
OTC	Over the counter. A trade affected other than through a recognized investment **exchange** or **MTF** where the trading parties negotiate directly with one another.
Passive orders	Orders that, by contrast with **aggressive orders**, provide **liquidity** to the **order book** during continuous trading, when each trade has one aggressive party (the party that hits an order) and one passive party (the party whose order is hit).
Post-trade services	Clearing and settlement and related services, used for all **on-book** and some **off-book trade**s.
Primary market	The market for new **securities** issues, where the **securities** are purchased directly from the issuer, as opposed to subsequent purchases from other investors.
RCH	Recognized clearing house. A provider of clearing and/or **settlement** services, granted such status and regulated by the **FSA**.

RIE	Recognized Investment Exchange. An investment **exchange** granted such status and regulated by the **FSA**.
RM	Regulated market.
Security	A type of investment as defined in article 3 of The Financial Services and Markets Act 2000 (Regulated Activities) Order 2001.
Sell side	Institutions acting as agents for other institutions or investors when they buy and sell **securities**. The sell side includes retail brokers, institutional brokers and traders, and research departments.
Settlement	Transfer of a **security** from seller to purchaser and the transfer of the respective consideration.
Settlement netting	An agreed offsetting of positions or obligations by trading partners or participants, reducing the number of **settlement** instructions.
SLC	Substantial lessening of competition.
SOR	Smart order router. A system for ensuring that orders are directed to the **exchange** or automated trading system which provides the best price or execution for the client. This can result in a single order being executed in more than one part, in different venues.
Systematic internalizer	An investment firm which, on an organized, frequent and systematic basis, deals on its own account by executing client orders outside a regulated market or an **MTF**.
Trade	A transaction of a **security** or commodity.
Trade reporting	Reporting to the **exchange** of the basic details of **on-book** and **off-book trade**s so as to enable the **exchange** to ensure that trading remains transparent and orderly.
Trading fee	Fee charged by an **exchange** for any **on-book trade**.
Trading firm	A broker member of the **exchange**.
Trading platform	The technology infrastructure that an **exchange** uses to support its **trading service**s.
Trading service	A configuration of system and market rules that support the trading activity of a market.
UKLA	The United Kingdom Listing Authority, that is the **FSA**.
VWAP	Volume weighted average price. A measure of the price at which the majority of a given day's trading in a given **security** took place, calculated by dividing the value of trades in a **security** over a given period by the number of those **securities** traded.