



# The Competitive Impact of London's Financial Market Infrastructure





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The authors of this report are Peter Cox and Lynton Jones of Bourse Consult  
with a statistical analysis by Stephen Wells.



April 2007

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# Foreword

**Michael Snyder**  
**Chairman, Policy and Resources Committee**  
**City of London**

The City has changed profoundly in the two decades since Big Bang. The most obvious transformation has been in the organisation of City firms themselves, a long series of mergers and takeovers producing the integrated, and largely internationally-owned investment banks which dominate today's wholesale markets. Equally important, however, have been the changes in market infrastructure, the institutions and mechanisms that support the trading function by disseminating prices, bringing buyers and sellers together, ensuring that financial obligations are efficiently discharged, and providing the regulatory environment within which all participants operate.

This market infrastructure is as important to maintaining the City's competitiveness as the financial institutions that operate within it. The evolution of electronic trading has changed most of the processes beyond recognition (even to the point of human concentration at trading venues being replaced by computer server concentration), and the opening up of markets, not just through the creation of the EU single market, but also as a result of the globalisation of financial services in general, has had an equally profound impact on the organisation and ownership of the infrastructure providers themselves.

With the debate on just how the City's competitiveness should be enhanced having been brought into particularly sharp focus by the Chancellor's High Level Group, we decided to commission Bourse Consult to confer with senior City practitioners to produce a report which analyses London's market infrastructure, assesses its impact on the City's performance, and identifies the policy imperatives that should be addressed to support it in the future.

The report makes compelling reading, particularly against the background of recent institutional consolidation, the possibilities for change arising from the implementation of MiFID, and a series of potential new initiatives such as the ECB's T2S proposal. The clearest conclusion to emerge is that a financial centre must maintain a full set of infrastructure capabilities in order to maintain its competitive credibility, and that London could not afford to lose any one of the constituent institutions. There was little concern if the institutions themselves were non-UK owned, as long as any overseas ownership did not produce a related intrusion of foreign regulation, and project participants were particularly insistent that the highly regarded FSA's regulatory control must be maintained intact.

The past performance of the UK's infrastructure providers has at times been sub-optimal, but most if not all are in a fairly robust state today as a result of greatly improved management and governance. The report, however, makes the critical point that monopolies are always in danger of becoming

uncompetitive, regardless of their ownership structure. Incumbent bodies must be exposed to real competition to ensure that they remain effective. Continuing innovation and market responses to it will produce just such competition, and it is important that the policy of openness, which has always been one of the City's greatest strengths, remains in place to allow new ventures the chance to make the UK market even stronger and more efficient than it is today.

The report's initial brief was to look only at infrastructure, but respondents were so vehement on certain other competitive issues that the authors felt compelled to report on them. There is continued frustration on the London transport front, and a belief that the situation is actually getting worse from a business travel point of view. Even more ominously, those consulted felt that the UK was being threatened with real loss of business due to a deteriorating tax environment. Compared to many other centres, the City has generally benefited from national government policy – if the benefits of years of support are not to be lost, it is now very important that real attention is devoted to improving tax competitiveness.

*Michael Snyder  
London  
April 2007*

## Executive Summary

This report examines the financial infrastructure within which the international equities, derivatives (both on and off exchange), foreign exchange and fixed income markets operate. This infrastructure directly supports the market by disseminating prices, bringing buyers and sellers together, and ensuring that their obligations to each other are properly discharged, and also provides the regulatory structure that underpins the process.

The report goes on to assess the importance of such issues as the location and ownership of infrastructure providers, their efficiency and their regulation, based on a series of interviews with a cross section of senior representatives from investment banks, infrastructure providers and other bodies. It concludes by looking at the implications of the performance of the infrastructure providers for the future competitiveness of London as an international financial centre.

### **E-trading and the evolution of market infrastructure**

Electronic trading has had an important impact on all of the main markets covered. The evolution from electronic bulletin boards to full scale electronic execution has made trading much faster and more efficient, and allowed investors to access market information and then trade in real time. Subsequently, manual order entry has been replaced by machine trading employing algorithmic strategies. The financial community is now on the threshold of a further evolutionary change involving aggregation, internalisation and "Smart Order" routing.

Technological advance has impacted the markets by lowering the price of computing power, introducing high speed networks, and reducing transaction latency. The last of these developments has created an unusual trend. Where markets used to depend upon physical places where individuals could concentrate in order to trade efficiently, technology now means that traders wish to locate their servers as close to those of the relevant exchange as possible in order to reduce latency (the time taken to process a transaction) to a minimum. Thus human concentration is being replaced by computer server concentration.

### **Policy imperatives**

In terms of location, the majority view was that for a financial centre to be truly credible, it needed to possess a full set of capabilities – if one piece of iconic infrastructure was missing, the perception of the power of the centre would be diminished. Nobody felt that the attractiveness of London as a financial centre would be diminished if a major infrastructure provider was non UK owned: indeed, some felt that such ownership demonstrated the openness of the London marketplace. The quality and "business friendliness" of FSA regulation was also seen as a significant advantage.

Questions were raised about how the interests of the City within the Eurozone (where London accounted for almost 50% of international financial services



business) could be protected now that the Bank of England has given up that role. Concerns were also raised about the impact of taxation issues and London's transport infrastructure, notwithstanding the fact that these were outside the scope of the study interviews.

### **The performance of infrastructure providers**

Three of London's main infrastructure providers, the London Stock Exchange, LIFFE and LCH.Clearnet, have all performed sub-optimally at various times in the past. The LSE is no longer Europe's largest exchange, largely because its competitors, Euronext and Deutsche Börse have built up substantial derivatives businesses alongside their equities operations. LIFFE had to be rescued by new management after the loss of the German Bund to Eurex. LCH.Clearnet also underwent a management restructure after the failure of an IT project that was supposed to deliver major economies. Notwithstanding these failures, the market as a whole in London has prospered, and all three are now back on track and doing well.

For infrastructure providers to survive, they will need to continue to provide an ongoing service that is solid, reliable, well-regulated and cost effective. They will also need to respond rapidly to innovation elsewhere in the marketplace. As new regulations come out of Brussels, in particular MiFID, new providers (such as Project Turquoise) will emerge on the trading side and in clearing and settlement.

### **Conclusions**

The success of the London market is due ultimately not to its infrastructure providers but to its dynamic participants and its openness to innovation. The FSA has added significantly to this success by developing a regulatory system that is both intelligible and appreciated by the market community.

Consolidation can exercise either a positive or a negative influence on competitiveness. LIFFE could well benefit from its effective takeover by the New York Stock Exchange, but the LSE would probably have been damaged had the Nasdaq bid succeeded.

UK government oversight compares positively with many other national regimes, and has been broadly beneficial for the City in the long term, although there are now warning bells sounding on the taxation front.

Incumbent infrastructure providers need to be exposed continually to real competition to maintain their own effectiveness. Monopolies run as much danger of becoming uncompetitive whether mutually or publicly owned.

The current preoccupation with London having become a "bigger and better" international financial centre than New York needs to be treated with some caution – the two centres are more interdependent than is realised, and much of the financial innovation, exploited to such effect in the City, comes originally from the US.

# Introduction

## *1.1 Purpose of the Research*

All markets require infrastructure if they are to function efficiently. They require access to basic services, such as power and telecommunications, and to skilled people. They require a legal and regulatory framework to give participants confidence in dealing with each other. And they require mechanisms that directly support the functioning of the market by disseminating prices, bringing buyers and sellers together and ensuring that their obligations to each other are properly discharged. It is this last class of infrastructure and the regulatory structure underpinning it that we describe as “financial infrastructure”.

This financial infrastructure is most visible in the longest-established markets, such as equity trading, where it takes the form of established institutions – the stock exchange, the clearing house, the depository. But other markets, such as trading in foreign exchange, bonds and over-the-counter derivatives, also require similar functions to be fulfilled.

These are all markets in which institutions based in London play a leading role. Their ability to do so depends on the effectiveness of the financial infrastructure and its availability to London-based institutions. Our intention here is to analyse the financial infrastructure supporting the full range of markets trading financial instruments in which London-based institutions play a leading role, and to assess its impact on the future competitiveness of financial market activity in London.

The background against which this study has taken place has been somewhat challenging. During the period in which we have interviewed a cross section of users and providers of infrastructure, the ownership and in some cases the management of these infrastructure providers has been under major challenge. The London Stock Exchange (LSE) has been successfully fighting off a bid from Nasdaq, Euronext.liffe’s owners have agreed a merger with the New York Stock Exchange, and LCH.Clearnet has been going through major changes.

While all this has been going on there has been a veritable deluge of media coverage about the way in which London has now overtaken Wall Street as the world’s most important international financial centre. In this study, we have been concerned to avoid simplistic comparisons with what, by any count, remains the world’s largest financial market (thanks to the size of the domestic US market). Instead we have tried to assess how the infrastructure in London has helped (or hindered) the growth of London as an international centre.

## 1.2 *Areas covered in interviews*

The interviews we conducted were not based on a formal question and answer session. Instead we found it more constructive to allow those we interviewed to concentrate on those areas that they felt were of most concern to them. As a basis for the discussion, however, we informed all those we met of our intention to look at those markets in traded assets where London institutions have a significant international role, specifically:

- Foreign exchange
- Over the Counter (OTC) derivatives
- Exchange-traded derivatives
- Secondary market trading in bonds and repos
- Equities.

We further informed them that the purpose of the research was to analyse the role of the financial infrastructure – the exchanges and other market infrastructure providers, clearing houses, settlement organisations and regulators - in maintaining London’s competitiveness as an international financial centre.

We defined infrastructure providers very broadly to include organisations such as Reuters, ICAP, EBS and BrokerTec as well as the more obvious infrastructure organisations.

In the discussions we had we concentrated on the following issues:

The general trend towards the adoption of **electronic trading mechanisms**, examining particularly how different markets have evolved different trading structures and what the implications of these developments have been for post-trade services. We asked them:

- Why they thought a central order book structure is appropriate for some markets but not for others?
- Whether there were fundamental reasons why some markets have very limited (or no) electronic trading mechanisms, and whether this was due simply to their state of evolution, or to the level of sophistication of the technical solutions available?

We pointed out that defining the location of a market was getting increasingly difficult. Traders sitting in country A may execute trades on a platform with computers in country B operated by a company headquartered in country C and regulated in country D, whose shareholders are completely international. We asked them:

- What defines the location of such a market?
- Is it a problem for London-based firms that they depend on infrastructures “located” elsewhere?
- Should the UK authorities be concerned about the impact on the UK financial services industry of infrastructure being owned and controlled abroad?

Did they think the move to electronic trading had affected the location of trading activity and had it increased or decreased London activity?

We further asked them whether they were satisfied with the ability of infrastructure providers to keep pace with the needs of the London markets:

- Did they have any good and bad examples?
- Were there particular features of ownership, governance or regulation that made infrastructure providers more or less responsive?
- There seemed to be a pattern where market participants establish a co-operatively-owned vehicle to constrain the market power of an incumbent, but later sell it to a commercial organisation (examples include Cedel, EBS and BrokerTec). Was this because it had achieved its purpose or because the co-operative model was too hard to manage?

For many of those we met this agenda fitted their own concerns quite well. Others tended to broaden the debate into other areas we had not expected, and we have reflected those views in the report, even when they were not strictly in line with the approach we were taking.

### ***1.3 Methodology***

We interviewed 31 people from 25 organisations. A full list of organisations is contained in the Annex. The study is based on our own internal research and on the results of those interviews. The conclusions, however, are entirely our own.

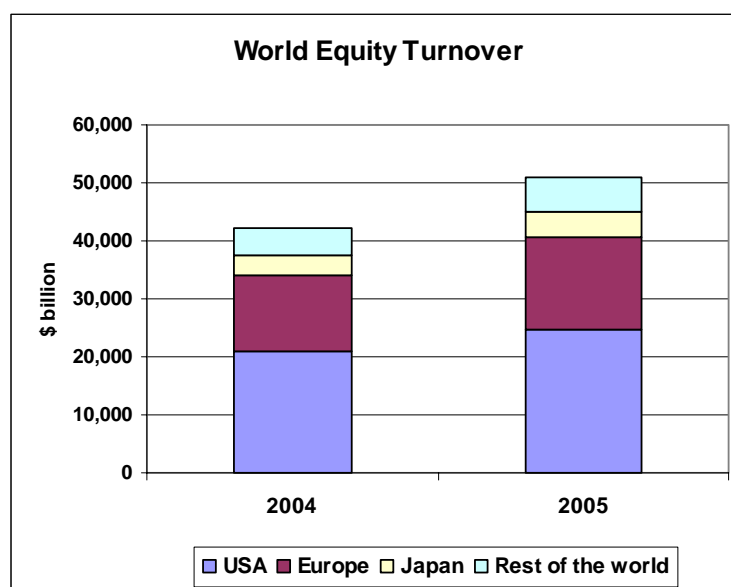
We would like to thank all those who gave most generously of their time in meeting us. As we agreed at the outset that their views would be confidential we cannot mention them by name here. It is a mark, however, of the seriousness with which they took this research that we were frequently received at a very senior level in the companies which we visited.

## 2 Description of the markets

### 2.1 International Equities

#### Size of the market

The average daily value of trading in equities worldwide was \$200 billion in 2005, up from \$170 billion in 2004.



Source: Bourse Consult

Although the greatest volume of trading is in the USA, London is the leading centre for international trading of equities. Indeed, turnover in foreign equities in London is greater than in domestic equities.

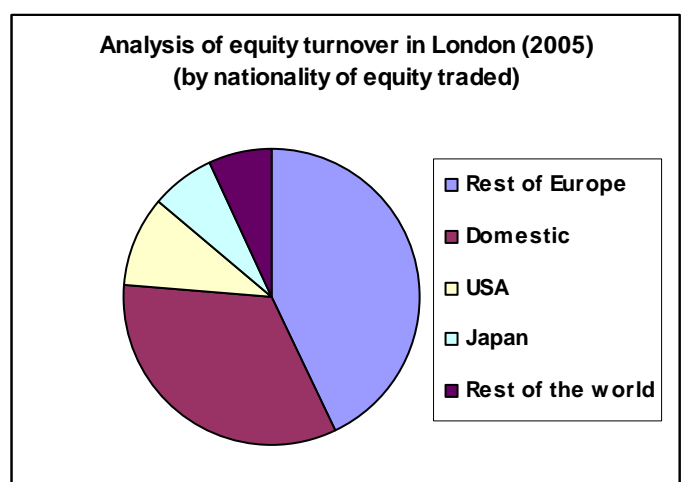
The involvement of London firms in international equity trading takes two forms:

- over-the-counter trading of non-domestic equities, either between two firms in London or between a firm in London and one in another centre; and
- remote membership of a stock exchange elsewhere, with the trading decisions made in London.

The first type of trade is generally reported to one of the two exchanges in London, the London Stock Exchange or virt-x; the second is sometimes reported in London, although it does not need to be, as the trade is executed on another stock exchange. As a result, it is hard to arrive at precise figures.

It is reliably estimated, however, that the proportion of turnover on the Euronext markets generated by firms in London is around 50%, up from 30% two years earlier. It can be assumed that the proportion of trading in other continental markets generated by firms in London is at least 40% on average.

Consequently, the value of international equity trading in London is estimated to be roughly double the value of trading in domestic equities, with trading of European equities alone exceeding that of domestic equities.



Source: Bourse Consult

## Market structure

### *Trading*

There is no international equity market as such. Although both virt-x and the LSE offer electronic trading facilities for non-domestic equities, in practice the great majority of trading in foreign equities in London takes place through remote membership of exchanges elsewhere. There is also some trading between firms in London, mainly over the counter (i.e., directly between banks). This is supplemented by specialist electronic trading facilities, such as Posit (which facilitates trading of shares through scheduled matches).

The introduction of the EU's Market in Financial Instruments Directive (MiFID) in November 2007 will increase the possibilities for offering pan-European trading venues. Proposals that have already been announced at the time of writing include Instinet Chi X, Project Turquoise, and Equiduct. In addition, firms will have the option of becoming Systematic Internalisers and executing client orders against their own book.

### *Trade reporting and confirmation*

After trades are executed, they must be reported to an exchange. Historically, trades were reported to the LSE, but in recent years virt-x has provided a competing service for trade reporting. The introduction of MiFID in 2007 will change trade reporting obligations by requiring all trades across Europe to be published, whether or not they are traded on an exchange, over the counter or internally. This places a new emphasis on the potential value of trade publication data and is providing a stimulus to the creation of new reporting mechanisms such as Project BOAT.

<sup>1</sup> This chart uses the authors' estimates, based on assumptions about London's share of trading in continental European markets and LSE data on trading of domestic shares and trades reported to the LSE in non-European shares. It should be treated as illustrative of the broad orders of magnitude involved.

Where an investment bank is dealing on behalf of a client, it will generally confirm the details of the trade, both to ensure that everything is in order and to receive instructions on where it is to settle. The main trade confirmation service is Omgeo, a joint venture between the US Depository Trust and Clearing Corporation (DTCC) and Thomson.

### *Clearing*

Because most of the trading in European equities takes place through remote membership of domestic exchanges, trades are generally cleared and settled through the central counterparties (CCPs) and settlement systems in the home countries of the stocks. An exception is virt-x, which uses two CCPs (LCH.Clearnet in London and x-clear in Switzerland) for all securities traded, regardless of the nationality of the issuer. LCH.Clearnet provides CCP services for LSE, virt-x and the four Euronext markets. Instinet Chi X has appointed Fortis Bank as its clearing agent.

### *Settlement*

Regardless of where trading and clearing take place, transactions in equities are almost invariably settled in the Central Securities Depository (CSD) of the issuer's home country. Traditionally, dealers outside the home country have used an agent bank to manage their clearing and settlement locally. In recent years, however, as volumes have risen and as there has been increasing adoption of international message standards, large investment banks have moved to open their own accounts in other CCPs and CSDs, where this was justified by volume of business.

## ***2.2 On/off-exchange derivatives - financial and commodities***

### ***2.2.1 Financial Derivatives***

London is one of three major international centres for trading financial derivatives, the others being New York and Chicago. London derivatives trading is characterised by its breadth as well as its depth. Trading activity in London is focussed on:

- Euronext.liffe – the third largest derivatives exchange in the world.<sup>2</sup>
- Very extensive participation by London firms in the main European electronic derivatives exchanges – particularly Eurex.
- The largest OTC derivatives market in the world with 43% of the global market.

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<sup>2</sup>By contract volume, counting the CME/CBOT merger, which is in process, as one exchange.

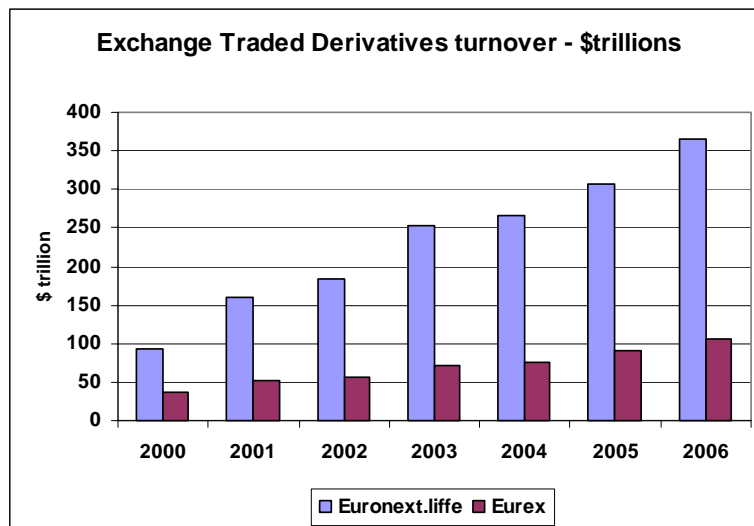
## Exchange Traded Financial Derivatives

### Size of the market

The largest derivatives exchange in Europe by contract volume is Eurex with a turnover in 2006 of 1,526 million contracts. Over 50% of trade on Eurex originates in London.

The derivatives markets of the Paris, Amsterdam, Brussels and Lisbon stock exchanges were merged with Liffe when it was taken over by Euronext, to create Euronext.liffe, which accounted for approximately a third of all European exchange traded derivatives business in 2005. Liffe the largest of the five by some margin and the volume of business done on Euronext.liffe continues to be dominated by that done by London-based members.

Euronext.liffe is by far the largest exchange in Europe when comparing the underlying value of the contracts traded.



Source: Euronext.liffe & Eurex

London also accounts for a significant percentage of trades done on the other European exchanges.

### Market Structure

#### Trading

Trading on Eurex is done on the Eurex automated execution system. Eurex was a pioneer of electronically trading derivatives and offered access from London as a strategic weapon in their competition with Liffe when both exchanges were vying to be the lead market for trading the German bund contract, the benchmark European bond future. The lower costs of trading electronically and the speed and convenience of direct access won the battle for Eurex and drove Liffe to develop LIFFE CONNECT and migrate away from floor trading in 1997 (see Section 4.4 below).



Trading on Euronext.liffe is done on the LIFFE CONNECT electronic trading system which can be used from virtually anywhere in the world. There are currently 830 user sites in 31 countries equipped with LIFFE CONNECT.

### *Trade reporting and confirmation*

Trade reporting is an automatic by-product of an execution on the Eurex system or LIFFE CONNECT.

Euronext.liffe has recently introduced facilities to allow trades executed on the OTC market to be confirmed and/or routed to clearing using its facilities.

### *Clearing & Settlement*

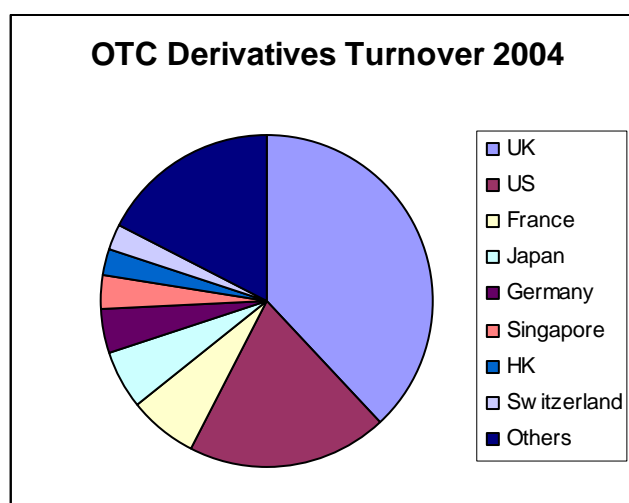
Business executed on Eurex is cleared and settled by Eurex Clearing, a part of Deutsche Börse.

Business executed on Euronext.liffe is cleared and settled by LCH.Clearnet.

### **OTC Financial Derivatives**

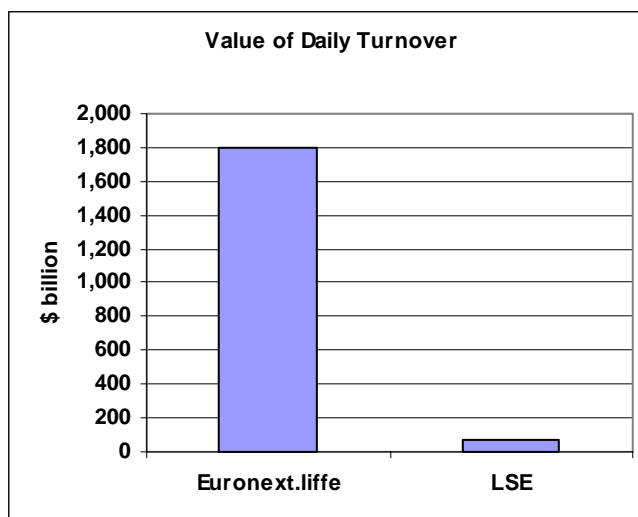
#### **Size of the market**

OTC financial derivatives – a group of products not traded on organised exchanges and consisting predominantly of interest rate and credit default swaps, and derivatives on Equities and FX – have become a very important part of the financial services landscape over the past 20 years. At the end of 2005, the total value of contracts outstanding was \$266 trillion according to the Bank for International Settlements (BIS). We estimate that the annual trading turnover in interest rate contracts (FRAs, swaps and options), the largest product group, to have been \$277 trillion per annum. London is the pre-eminent international centre for trade in OTC derivatives, with by far the largest market share compared to any other financial centre as shown in the chart below.



Source: Bank for International Settlements - 2004

Accurate comparisons between the OTC derivatives markets and exchange traded markets are difficult, but it is instructive to reflect on the relative size of the major financial markets. As will be seen from the chart below, the value of daily turnover in exchange traded derivatives in London is some 25 times greater than the value of daily turnover in exchange traded equities. The value of OTC derivatives trading is between 3 and 6 times the size of exchange traded derivatives depending on definitions.



Source: Euronext.liffe, LSE

## Market Structure

### *Trading*

Trades are executed bilaterally, mainly by telephone, between the principals to each contract, often via the services of inter-dealer brokers. There is a growing number of electronic services – from directed price routing systems through to full automated execution – to assist the trading process, but they are not yet being used extensively.

### *Trade reporting and confirmation*

Once agreed verbally, trades have to be confirmed formally in a separate process. Since the traded contract may well be bespoke and complex in detail, this can involve the agreement between the trading parties of extensive contractual documentation – a labour-intensive process. The rapid growth of the OTC market has meant that the industry has struggled to confirm trades in a timely fashion – particularly in London and New York where volumes have been the greatest. This has led to a very large effort to automate some of the confirmation processing, and to close scrutiny from the regulators, who are concerned that a significant backlog of unconfirmed trades could pose a serious systemic risk.

Swapswire and DTCC both operate automated confirmation services for interest rate and credit default swaps.

## *Clearing*

LCH.Clearnet operates a clearing service for “plain vanilla” interest rate swaps – SwapClear – which is said to handle more than 80% of the contracts eligible for the service. Euronext.liffe – with Bclear - and EDX London operate services which allow equity OTC derivatives to be cleared by LCH.Clearnet. Other OTC derivatives are not cleared through a central counterparty.

## *Settlement*

OTC derivatives which are not cleared are settled bilaterally between the trading parties. Usually this will involve a series of payments passing between the parties during the life of the contract. It may also involve the exchange of collateral to cover the outstanding counterparty risk.

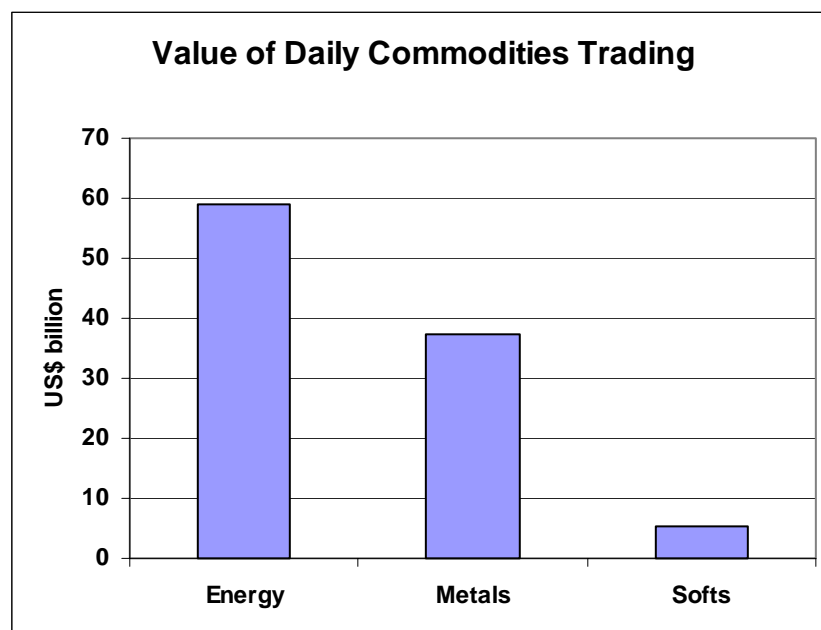
DTCC are developing a portfolio reconciliation and payment service to handle both the agreement of payments due between two parties and the payments themselves.

## **2.2.2 Commodities**

### ***Exchange Traded Commodities***

#### **Size of the market**

The major commodities exchanges – CBOT, NYMEX, LME and ICE - account for about 90% of global volume. The total value of trading on these exchanges in 2006 was \$26 trillion, broken down between the main commodity types as shown below.



Source: Bourse Consult

## Market Structure

### *Trading*

Some of the earliest traded markets, in some cases dating back several hundred years, were in commodity agricultural products and raw materials. It was in these markets that futures contracts were devised to hedge the risks of buyers and sellers during the time taken to ship a raw material from its source or to bring a crop to harvest. Now the trade on the major commodities exchanges is almost all in forwards and futures, and they set price benchmarks which are used for the bilateral buying and selling of the underlying commodities.

Perhaps because of their long history, the commodities exchanges have been the slowest to embrace electronic trading. The London Metal Exchange, the world's largest base metals exchange, retains an open outcry trading floor but introduced an electronic trading system – LME Select - alongside it in 2001. We believe that LME Select now accounts for about half the trading on the LME.

After prolonged resistance from some members, the ICE Futures exchange (previously the International Petroleum Exchange) switched to fully electronic trading early in 2005, having operated an after-hours electronic system for some years. This move produced a dramatic increase in liquidity.

Euronext.liffe's commodities division, which incorporates markets dating back to the nineteenth century, transferred trading from the floor to the LIFFE CONNECT electronic trading system in 2000.

In mid 2006 the largest commodities exchange in the world, the New York Mercantile Exchange (NYMEX), significantly tightened its previous limited embrace of electronic trading, collaborating with the Chicago Mercantile Exchange (CME) to allow its energy products to be traded on the CME's Globex system during NYMEX floor trading hours.

In general, the rapid recent adoption of electronic trading by mainstream commodities exchanges has increased the level of international access to these markets and increased competition between the exchanges themselves.

### *Trade reporting and confirmation*

Trade reporting is an automatic by-product of an execution on the LIFFE CONNECT, LME Select, ICE platform and Globex systems for electronically executed trades.

Trades done on the LME or NYMEX trading floors are recorded for trade reporting by exchange officials and confirmed prior to clearing on systems operated by LCH.Clearnet and NYMEX respectively.

## *Clearing & Settlement*

Business executed on the Euronext.liffe, LME and ICE Futures exchanges is cleared and settled by LCH.Clearnet. The InterContinental Exchange (ICE) has, however, recently acquired the New York Board of Trade (NYBOT) which operates its own clearing house. It will be interesting to see whether ICE opens up a choice of clearing venues for members of ICE Futures.

Metal traded through forward contracts on the LME is settled by the exchange of warrants – records of physical metal ownership in LME-approved warehouses around the world.

## *OTC Traded Commodities*

Derivatives on a wide variety of commodities and commodities-related products including base and precious metals, energy products, pulp and paper, emissions, agricultural products, weather and freight are traded over the counter.

### **Size of the market**

At the end of 2005 the total value of OTC commodity contracts outstanding was \$3.6 trillion.<sup>3</sup> This was a 25% increase on the previous year – in part related to a general increase in commodities prices.

### **Market Structure**

#### *Trading*

Trades are executed bilaterally, mainly by telephone, between the principals to each contract often via the services of inter-dealer brokers. Many of the brokers operate price display and execution systems alongside their voice broking services. In addition, some central infrastructure providers – such as ICE with their OTC system and NYMEX with ClearPort - provide trading systems specifically designed for the OTC markets.

#### *Trade reporting and confirmation*

ICE OTC trades destined for clearing are confirmed automatically if they were traded on the ICE OTC platform or confirmed through the ICEBlock system if they were traded by telephone.

NYMEX ClearPort acts as both a trade execution system – which effectively confirms the trade automatically – and a trade comparison system for trades executed by telephone.

LME trades done off-floor by telephone are reported and confirmed prior to clearing through the LCH.Clearnet LME Matching System.

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<sup>3</sup> Bank for International Settlements – May 2006.

## Clearing & Settlement

LCH.Clearnet offer the EnClear service for clearing US and UK power and gas contracts traded through ICE, and for continental European power contracts traded through the European Energy Derivatives Exchange (EINDEX) in Amsterdam. LCH.Clearnet has regulatory clearance to offer the service in the USA.

LME telephone trades are cleared by LCH.Clearnet along with trades done on the floor and electronically.

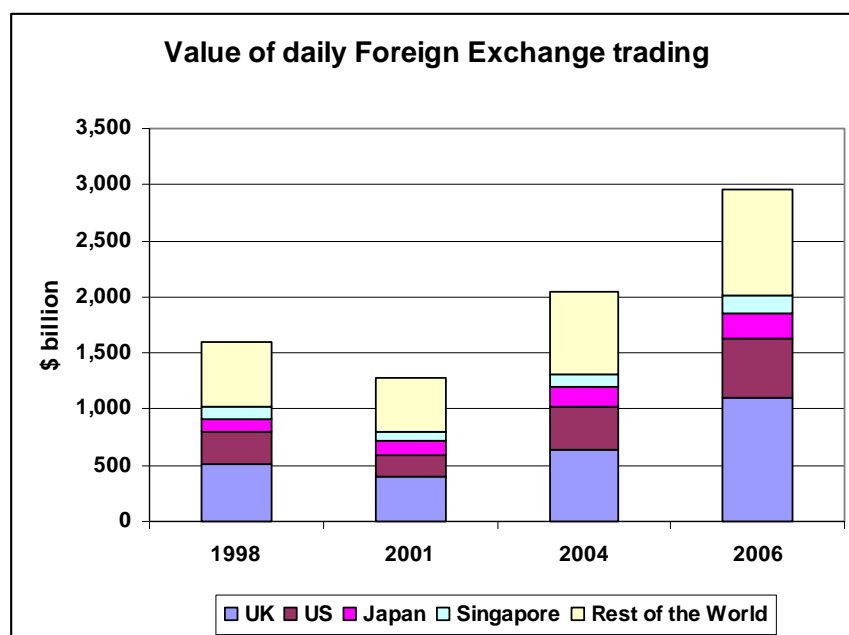
## 2.3 Foreign Exchange

### Size of market

Average daily global turnover in traditional foreign exchange market transactions totalled \$2.9 trillion in April 2006<sup>4</sup>. Turnover has grown rapidly, increasing by 37% over 2005, and more than doubling since 2001.

The bulk of the market is accounted for by traditional foreign exchange trading (spot transactions, outright forwards and foreign exchange swaps), which make up \$2.7 trillion of the total. Non-traditional foreign exchange derivatives and products traded on exchanges have, however, been growing rapidly.

London is by far the leading centre for FX trading and has consistently maintained a share of 31-32%. Average daily turnover in April 2006 was \$1,109 billion, with a further \$102 billion traded in currency derivatives.



Source: Bourse Consult

<sup>4</sup> Source: IFSL, *Foreign Exchange*.

## Market structure

### *Trading*

Foreign exchange trading is an entirely over-the-counter market. There is no central market place. Despite this, it is a very concentrated market, with the ten largest banks estimated to account for some 75% of turnover. They, in effect, act as market-makers for the other smaller banks, which generally trade with one of the major banks rather than with each other.

The market has evolved from being conducted entirely by voice over telephone towards an increasing use of electronic trading mechanisms. The two leading electronic dealing systems at present are Reuters Dealing and EBS. Both services post firm quotes, which can be accepted electronically. The quotes are anonymous, but the system holds information on the credit limits that participants give each other, and only shows each institution those quotes where it and the counterparty are able to trade with each other. Counterparty details are exchanged after the deal has been struck electronically.

There is also a variety of electronic systems that enable banks to trade with their corporate customers, some public and some proprietary to banks.

Estimates of the proportion of trading conducted electronically vary. Research by Aite Consulting<sup>5</sup> shows the proportion of electronic trading in FX rising from 22% in 2001 to 56% in 2006. Research by TowerGroup puts the figure at 40%.<sup>6</sup>

An important factor behind the growth in electronic trading has been the increasing adoption of foreign exchange by hedge funds as an additional asset class. Their use of algorithmic trading models requires rapid execution, which can only be achieved through electronic platforms.

The existing model will be challenged in 2007 with the launch of FXMarketSpace, a joint venture between Reuters and CME. It will differ from the current market structure in that it will provide anonymity before and after trade execution with clearing through a central counterparty, which will eliminate the need for credit restrictions on counterparties.

### *Post-trade*

After trades are executed, the two banks confirm the terms of the trade, either direct with each other or through an electronic confirmation service. In the past, banks settled by making two payments, one for each currency being traded. The fact, however, that these payments were not necessarily simultaneous (and in some case, because of time zone differences, could not

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<sup>5</sup> Quoted at <http://www.ebs.com/pdf/Volume%20in%20the%20FX%20market%20eForex%20Oct%2006.pdf>.

<sup>6</sup> [http://www.towergroup.com/research/content/news\\_view.jsp?newsId=1520](http://www.towergroup.com/research/content/news_view.jsp?newsId=1520).

be simultaneous) gave rise to what was known as “Herstatt Risk”, after the failure of Bankhaus Herstatt.<sup>7</sup>

This risk was addressed by the development of CLS Bank, which commenced operations in 2002. The CLS system is an ongoing process of instruction submission, authentication and matching, with related funding and settlement. The system receives payment instructions from members, on average within 38 minutes of the trade. These instructions are authenticated and matched, and eligible instructions are maintained by the system until value date. In the event that instructions do not match, both submitting members are notified.

On each value date during the settlement cycle CLS simultaneously settles each pair of matched instructions by making the corresponding debit and credit entries across the Settlement Member’s account at CLS Bank. This all takes place during a five-hour window when the opening times of the eligible currencies RTGS systems overlap. Working in real-time enables simultaneous settlement of both legs of an FX trade.

CLS Bank can settle payment instructions related to trades executed in four main instruments: spot, forward, option exercises and FX swaps. Daily funding requirements are determined by multilaterally netting all payment instructions. This process is achieving netting efficiencies in excess of 90% per day. Thus for every \$1trillion of value settled, the CLS community has to fund less than \$10 billion in cash. It is now estimated that 60% of trades in eligible currencies are settled through CLS.

There is no clearing in the conventional sense, with the result that there is no post-trade anonymity. It is postulated that this will change with the introduction of FXMarketSpace in 2007, which will use the CME clearing house as central counterparty, thus eliminating counterparty credit exposures and maintaining post-trade anonymity.

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<sup>7</sup> On 26th June 1974 the Bundesaufsichtsamt für das Kreditwesen withdrew the banking licence of Bankhaus Herstatt, a small bank in Cologne active in the FX market, and ordered it into liquidation during the banking day but after the close of the interbank payments system in Germany.

Prior to the announcement of Herstatt's closure, several of its counterparties had, through their branches or correspondents, irrevocably paid Deutsche Mark to Herstatt on that day through the German payments system against anticipated receipts of US dollars later the same day in New York in respect of maturing spot and forward transactions.

Upon the termination of Herstatt's business at 10.30 a.m. New York time on 26th June (3.30 p.m. in Frankfurt), Herstatt's New York correspondent bank suspended outgoing US dollar payments from Herstatt's account. This action left Herstatt's counterparty banks exposed for the full value of the Deutsche Mark deliveries made (credit risk and liquidity risk). Moreover, banks which had entered into forward trades with Herstatt not yet due for settlement lost money in replacing the contracts in the market (replacement risk), and others had deposits with Herstatt (traditional counterparty credit risk).

(Bank For International Settlements, Settlement Risk In Foreign Exchange Transactions, March 1996) <http://www.bis.org/publ/cpss17.pdf>.



## 2.4 Fixed income trading

### Size of the market

Fixed income trading is made up of three main components:

- secondary market trading of government and quasi-government debt;
- secondary market trading of non-governmental debt; and
- repo trading.

Unfortunately, there are very few definitive statistics on trading in these markets; those that do exist tend to be partial.<sup>8</sup> The international securities clearing houses Euroclear and Clearstream used to be good sources of statistics on secondary market size, but since Clearstream no longer makes this information available, we have to rely on estimates.

Our best estimate is that European trading in bonds amounts to around €200 billion per day (by contrast, trading in the US bond markets amounts to \$900 billion per day). The major part of the European total is accounted for by trading in government bonds. It appears that the value of trading of corporate bonds is considerably smaller than the value of trading of equities.<sup>9</sup> A significant share of European bond trading activity takes place in London, with estimates ranging from close to 50% of trading in government bonds, to 70% of trading in corporate bonds<sup>10</sup> to at least 80% of inter-professional trading in corporate bonds.<sup>11</sup>

The bond market differs from the equity market in that the number of bond issues outstanding is far larger than the number of equity issuers. Some 200,000 bond issues are listed on TRAX (the trade reporting system operated by the International Capital Markets Association (ICMA) – see below).

Trading activity, however, is normally concentrated in the largest and most liquid issues, which are usually the current government bond issues. Other bonds tend to experience a short period of active post-issue trading, after which they become illiquid. Analysis by ICMA in 2005 found that only six non-governmental issues had more than 200 trades per day.

The value of repo activity is considerably higher than outright trading of bonds and appears to amount to some €500 billion per day.

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<sup>8</sup> Estimates in this section are mainly based on estimates made by the Committee of European Securities Regulators (CESR) and the Centre for European Policy Studies and on statistics published by ICMA.

<sup>9</sup> CESR response to MiFID consultation.

<sup>10</sup> Bloomberg response to MiFID consultation.

<sup>11</sup> FSADP p.12.

## Market structure

### *Trading*

The trading structures of the bond markets reflect the nature of the market described above, with a large number of illiquid issues and a small number of liquid issues (usually government bonds). As a result, trading structures differ between the liquid, government issues and the less liquid corporate issues. There is a further distinction between inter-dealer trading (also known as the B2B market) and dealer-to-investor trading (also known as the B2C market).

“In broad terms, the bond markets are heavily dealer-centric. They rely substantially on the commitment of dealer capital to support the trading process and trading in some parts of the market, especially in the less liquid corporate bonds, relies almost exclusively on dealers operating on a bilateral basis. Although a significant proportion of trading in larger, more liquid issues, has in recent years gravitated to multilateral electronic trading systems, the more significant of these systems remain dealer dependent and operate on the basis of competing dealer liquidity provision. In that sense, they differ significantly from the open, order-matching systems commonly found in equity markets that provide for more broadly based interaction of buying and selling interest.”<sup>12</sup>

The leading platform for outright trading of government bonds is the network of MTS platforms. There is a national MTS platform for each of 13 European countries, together with EuroMTS which is a platform for Europe-wide benchmark bonds. It is estimated that the MTS platforms have a market share of around 70% in the electronic trading of European government bonds.<sup>13</sup> Only the most liquid issues, however, are traded electronically<sup>14</sup>.

A survey conducted by The Bond Market Association in the first quarter of 2006<sup>15</sup> suggested that some 40% of trading in government bonds was conducted electronically in Europe. Analysis of individual markets by Bearing Point suggests that the percentage of electronic trading in major markets ranges from 20% in French government bonds to over 80% in Italian government bonds. There is a view that the electronic proportion of the bond market will grow by 10-15% in 2007.

The MTS market structure is built around the Liquidity Pact, under which dealers commit liquidity across the range of issues in that market. In exchange for committing liquidity, banks are recognised as primary dealers and gain the right to participate in auctions and receive a steady supply of new issues. There has been criticism that the link between the share of primary issuance and market share in secondary market trading on specific platforms distorts competition between trading venues.<sup>16</sup>

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<sup>12</sup> CESR response to MiFID consultation.

<sup>13</sup> Persaud, p.6.

<sup>14</sup> ICAP response on MiFID.

<sup>15</sup> [http://www.ehya.com/ads/tbma/etrade07/e-trade\\_revamp/eTradingSurvey.pdf](http://www.ehya.com/ads/tbma/etrade07/e-trade_revamp/eTradingSurvey.pdf).

<sup>16</sup> Persaud *op cit.*,

Other electronic trading platforms are more specialised, either by market (such as Eurex Bonds, which specialises in German government bonds) or by type of activity (such as BrokerTec, which is particularly strong in basis and repo trading).

The inter-dealer platforms are supplemented by bank-to-client (B2C) platforms, which enable investors to request quotes from a panel of dealers. TradeWeb (operated by Thomson) is generally believed to be the largest of these, with a turnover of around \$200 bn per day, 20% of which is done in Europe. In addition, some banks operate their own proprietary systems (e.g. Deutsche Bank's Autobahn).

The market structure for secondary trading of corporate bonds is different. Given the large number of issues with limited liquidity in each issue, trading is mostly carried out directly between banks.

In the European repo market, the use of electronic trading platforms has grown rapidly. According to the most recent ICMA survey, the share of automated repo trades is just over 20%, compared with 59% direct and 20% through voice brokers. Among the top firms, some 70% of repo trading is carried out electronically, compared with 30-40% at second and third-tier banks.<sup>17</sup> BrokerTec appears to be the main trading platform with some €275 billion outstanding, compared with under €100 billion on Eurex and daily turnover on MTS of €50 billion.<sup>18</sup> Not surprisingly, Eurex Repo and MTS have particular strengths in German and Italian government bond repos respectively.

### *Clearing*

While secondary market trading of government and corporate bonds is generally not cleared, the growth in electronic repo trading has been accompanied by the use of central counterparty clearing, both to eliminate counterparty risk exposure and to preserve post-trade anonymity.

Unlike equity clearing, there are more cross-relationships between trading platforms and central counterparties:

- BrokerTec offers clearing through RepoClear (operated by LCH.Clearnet) as well as through Cassa di Compensazione e Garanzia (CC&G) (the Italian domestic CCP);
- Eurex Repo clears through Eurex Clearing, following the Deutsche Börse vertically integrated structure;
- MTS offers choice of clearing through RepoClear or CC&G, through an interoperable model.

As a result, RepoClear is the main repo clearing venue, clearing some €250 billion daily, or about 50% of the total market, as it accepts OTC repos for clearing, as well as those from trading platforms. Although the RepoClear model is popular in the market, firms interviewed by BearingPoint for their

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<sup>17</sup> BearingPoint, Electronic repo market.

<sup>18</sup> *Idem*.

report, criticised LCH.Clearnet for delays in introducing an integrated clearing model.

### *Settlement*

Settlement of European bond and repo trading takes place through a combination of ICSDs and local CSDs. Access to settlement venues is an important requirement for trading platforms to be able to compete. Thus BrokerTec, for example, thought it necessary to obtain direct access to feed trades to Monte Titoli, the Italian CSD, in order to be able to compete effectively with MTS in the Italian government bond and repo markets.

The EU's Economic and Financial Committee has found that restrictions on the settlement of secondary market trading of government bonds exist in nine European countries, including Spain and Greece.<sup>19</sup>

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<sup>19</sup>Restrictions on the location of clearing and settlement in the EU government bond markets.

## 2.5 Summary of infrastructure organisations

Name of provider	Reuters	Bloomberg	TradeWeb	EuroMTS
Relevant services provided in London and elsewhere	FX and money market etc trading	Equity, FX and energy trading	Fixed income and derivatives	(Quasi-)government euro benchmark bonds
Ownership – if part of a group, including ultimate ownership of group	Quoted company	Partnership	Owned by Thomson	Owned by MTS Spa, owned by MBE Holding (60%) and 27 banking groups; MBE Holding owned by Euronext (51%) and Borsa Italiana (49%)
Location of head office and management – if part of a group, including location of ultimate group head office and management	London	New York	Thomson HO in Stamford CT, USA	EuroMTS in London, MTS Spa in Italy
Form of London presence, if not a UK institution	Head Office	European office	TradeWeb Europe Ltd, European HO in London	EuroMTS HO in London
Business and governance model (e.g. for profit/not for profit; user-governed, consultative committees etc)	Quoted company	For profit	Quoted company	For profit
Regulatory status	Regulated as ATS by FSA	Regulated by FSA	Regulated as ATS by FSA	Regulated by FSA
Location of Participants	Worldwide	Worldwide	35% of dealers in London; 28% of customers in Europe, rest in US	Principally Europe

Name of provider	CLS Bank International	Omgeo	FXMarketSpace	ICAP
Relevant services provided in London and elsewhere	"Settlement" of FX	Equities trade confirmation	FX spot trading (forwards and options later) with central clearing, starting early 2007	BrokerTec: fixed income trading EBS: FX and precious metals trading Also i-Swap, i-Forwards, ETC, FRA-Cross
Ownership – if part of a group, including ultimate ownership of group	CLS Group AG is ultimately owned by 71 financial groups. It is parent company of CLS Bank and CLS Services	DTCC and Thomson (50% each)	Reuters and CME (50% each)	Quoted company
Location of head office and management – if part of a group, including location of ultimate group head office and management	New York	US	New York	London
Form of London presence, if not a UK institution	CLS Services in London	London office	London office	Group HQ
Business and governance model (e.g. for profit/not for profit; user-governed, consultative committees etc)	User ownership, not for profit		For profit	Quoted company
Regulatory status	Regulated by FRBNY	Authorised by FSA		Various entities authorised by FSA

Name of provider	TRAX2	Instinet Chi X	Posit	Virt-x
Relevant services provided in London and elsewhere	Trade matching and reporting for bonds and repos	Chi X trading system for equities	Equities crossing	Exchange for pan-European blue chip equities
Ownership – if part of a group, including ultimate ownership of group	International Capital Market Association	Chi X owned by Instinet Europe, owned by Instinet Inc, majority owned by Silver Lake Partners – now with agreement to sell to Nomura Instinet LLC is US agency broker	Investment Technology Group Inc, quoted in US	Association SWX is ultimate holding co
Location of head office and management – if part of a group, including location of ultimate group head office and management	Zurich	New York	New York	Head office in London, group head office in Zurich
Form of London presence, if not a UK institution	Office	Instinet Europe Ltd	London office (ITG Ltd and ITG Europe Ltd, both based in Ireland)	UK company
Business and governance model (eg for profit/not for profit; user-governed, consultative committees etc)	Association	Commercial	Quoted company	Owned by Swiss Exchange
Regulatory status	Recognised by FSA as international securities self-regulating organisation	Authorised by FSA as ATS	Authorised in Ireland, passported to UK	RIE under FSA
Legal regime – e.g., law governing contracts	English law for Global Master Repo Agreement			English or Swiss law

## 3 Evolution of e-trading

The story of the evolution of the financial markets over the last twenty years and of the infrastructure which has been developed to support them is almost entirely one of the introduction of computerisation and particularly electronic trading. In this section we outline the history of the introduction of electronic trading and the impact it has had on the markets – both the established markets and those in new instruments.

### 3.1 History

Electronic trading has evolved dramatically over a twenty year period in a number of clear steps. Each step has opened up new horizons and triggered new stages of development in the industry at large.

#### *Step one: Electronic Bulletin Boards*

NASDAQ and the LSE's SEAO system in equities, and Reuters Monitor in FX, pioneered the introduction of screens showing the prices at which competing market makers would trade. Trades were executed over the telephone. The combination of distributed screens and telephone trading allowed a "centralised" market to be created without the trading community having to assemble on a trading floor.

In the case of NASDAQ, which was founded in 1971, it allowed the shares of small companies, which had traditionally been traded by brokers and investors local to the company, to be offered nationally across the USA on a consolidated market. The market rapidly became more competitive and liquid, and started to challenge the supremacy of the two major traditional stock exchanges – the American Stock Exchange (AMEX) and the New York Stock Exchange (NYSE).

When the SEAO system was launched at Big Bang in 1987 it led to an almost immediate abandonment of the trading floor, allowing trading firms to operate from their own offices. From there, they could reduce their trading overhead costs, and take advantage of the growing array of information, communication and analysis tools they had available.

Reuters Monitor brought together onto a single screen an FX market which had never been anything other than geographically dispersed. The benefit was that, for the first time, competing FX prices could be compared without having to phone around. The ensuing competition sharpened market prices and increased market activity.

#### *Step two: Electronic Execution*

The Toronto Stock Exchange's CATS system, launched in 1977, was the first to reproduce electronically the order matching mechanism used on many stock exchange floors. The CATS system was used by other exchanges – notably



the Paris Bourse – and its concepts form the basis for most of the order matching electronic trading systems in use around the world today.

The introduction of electronic execution had some key effects on the trading of liquid investments:

- Order handling, particularly of small orders, became much more efficient. “At market” and limit orders did not require any skilled broker intervention to insert them directly into the trading market.
- Information on current tradable market prices and reports of trades done could be disseminated automatically and immediately to investors and other market participants.
- For the first time Straight Through Processing became possible. Orders could be routed from brokers’ desks and branch offices directly to the exchange execution system. Confirmations, positions and regulatory reports could be produced automatically from trade information returned from the execution system.
- Stock market indexes could be calculated in real time directly from trade execution data.

### *Step three: Investor Access*

Institutional investors had availed themselves of electronic market information from Reuters, Telerate and Bloomberg etc. since those services began. These services, however, required users to install special and costly equipment. The advent of the PC and the internet created institutional demand for price information to be available through these cheaper media, and parallel interest from retail investors for market prices to be available electronically at home.

Banks and brokers began to offer institutional investors the opportunity to enter orders electronically rather than by telephone. Initially these systems were proprietary to the banks and brokers, and were seen as a way of capturing the order flow of the investors. Subsequently there was a requirement from investors to be able to route orders to multiple intermediaries in a standard way and this led to the creation in 1992 of the FIX protocol – a standard specification for the communication of trade-related messages.

Once on-line prices were available to retail investors, brokers such as E\*TRADE<sup>20</sup> and Charles Schwab rapidly built order-taking services which allowed their customers to trade on, as well as see, market information. Initially the brokers handled these orders manually but subsequently they were automatically routed to exchanges for execution, the brokers building systems which allowed them to control the risk exposure of their customers.

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<sup>20</sup> E\*TRADE was founded by Bill Porter as Trade Plus in 1982, a year after the IBM PC was launched.

#### *Step four: Machine Trading*

From the early days of electronic trading exchanges have had to accommodate the attachment of third party trading terminals:

- To allow for additional and innovative functionality to be provided to traders.
- To allow third party vendors to consolidate trading on many exchanges onto one traders screen.

This has meant exchanges have offered a standard Applications Programming Interface (API) into which their customers and third party Independent Software Vendors (ISVs) have been able to plug their end user systems.

The availability of an API has allowed a great deal of sophistication to be built into those end user systems. Initially these developments took the form of more advanced facilities to aid traders' decision-making. Subsequently, starting in the exchange-traded derivatives field, systems were developed which traded automatically, without trader involvement.

Now automated trading is widespread in all the most liquid markets. The machines incorporate trading algorithms which pursue particular trading strategies, commonly referred to as Algorithmic Trading.

These systems are developed by proprietary traders for their own use, by specialist firms or by some of the big banks for offer to their institutional clients – usually hedge funds. This introduction of these systems has given rise to:

- A significant increase in the volume of trades done on the major exchanges since most of the algorithms aim to make a relatively small margin on a large number of trades.
- A search to reduce the time taken to process a transaction (called, in the jargon, "latency") in both the central exchange system and the participant's algorithmic trading computer.
- A sort of "arms race" between the owners of the algorithmic trading systems to produce ever more successful algorithms than their competitors.

#### *Step five: Aggregation and Internalisation and Smart Order Routing – the "Virtual Market"*

We believe that we are now on the threshold of a further step in the evolution of electronic trading. This step is expected to come about through the convergence of a number of factors:

- The larger market participants are members of multiple exchanges – including all the major exchanges in Europe.
- The European markets – particularly those in the Eurozone – are being traded to a much greater extent on a sectorised basis. So, for example, a person trading European utilities needs access to multiple

exchanges and the ability to easily switch positions between national markets.

- In the course of gaining access to those exchanges, the major players have invested heavily in IT to automate the full transaction chain from investing client to clearing, settlement and custody. Where possible, trading access for all the exchanges is presented to their traders in a common fashion making it easier to trade a group of instruments which are traded on disparate exchanges.
- There is increasing competition between exchanges trading the same instruments, and against exchanges by new trading venues. In the US the competition has been strong for a number of years, and seems destined to become even fiercer with the introduction by the SEC of regNMS.<sup>21</sup> In Europe, so far, there have been minor competitive skirmishes and few new trading venues challenging the exchanges, but this is likely to change with the introduction of the EU's MiFID regulations which are designed to encourage competition for exchanges.
- Access to exchanges (and other execution venues) is becoming standardised with the growing adoption of the FIX messaging protocol.

In combination these factors provide the motive and the means for the major players to restructure their trading facilities so as:

- To aggregate market information from a number of exchanges and other trading venues to provide a "virtual market" view of where the best price for a particular instrument is.
- To route orders dynamically to the exchange giving the best execution for that particular order at that time.
- Where their proprietary trading function can execute the order at a better price than the exchanges, to "internalise" the trade i.e. to execute the order against their proprietary book.

This capability to switch orders dynamically between trading venues (known as "smart order routing") effectively pools the liquidity of all the trading venues and reduces the network effect of any one of them. Thus a new trading venue can more easily compete with existing, liquid markets without having to create its own initial liquidity.

### **3.2 *Why only some markets go electronic***

The full evolutionary process laid out in section 3.1 applies principally to the equity and exchange traded financial derivatives markets. In other markets electronic trading has been slower to develop or may, as yet, have had little impact.

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<sup>21</sup> A set of rules called the Regulation National Market System intends to modernize and strengthen the markets for equity securities. One of its more controversial provisions, which will have a significant IT effect on U.S. exchanges, is the trade-through rule. This is intended to guarantee that investors will get the best price for their trade executions.

A number of factors have constrained the evolution of markets to the fully electronic form seen in the large stock and derivatives exchanges. The main factor is liquidity. Some markets just do not have the order flow which would warrant a transparent order matching system. In OTC derivatives such as Credit Default Swaps, for instance, whilst the number of contracts traded against a particular underlying asset may be high, the contract terms tend to be customised for particular trades. Although the overall market is large and appears liquid, the liquidity in an individual contract may be very limited or at best sporadic.

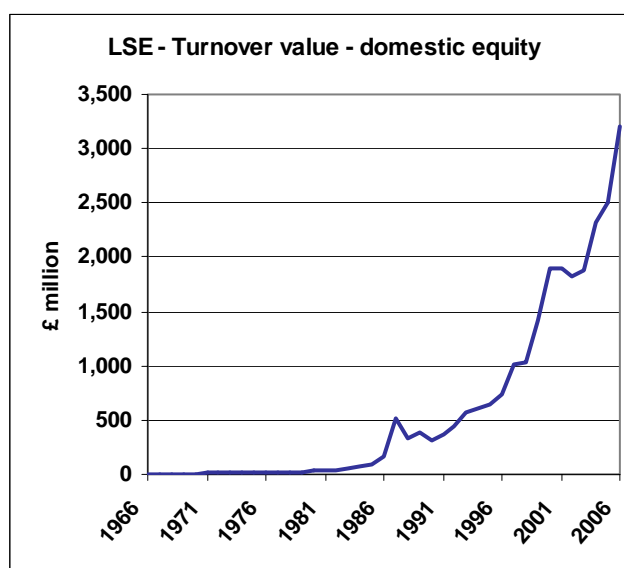
A second factor is the impact of transparency on the market. Some markets, e.g. bonds, tend to trade in very large size. Whilst overall market turnover may be very significant, any one order, if exposed on a transparent order book could have an undesirable impact on the market price.

Third is the lack of appropriate technology to meet the specific needs of a particular market. The evolution of technology for financial markets is still in its relative infancy. There is increasing evidence of the development of innovative mechanisms which are designed to meet the needs of specific markets in which the conventional exchange order matching systems are inappropriate, but in most cases there is still a great deal of ground to be covered.

### 3.3 Effect on growth of markets

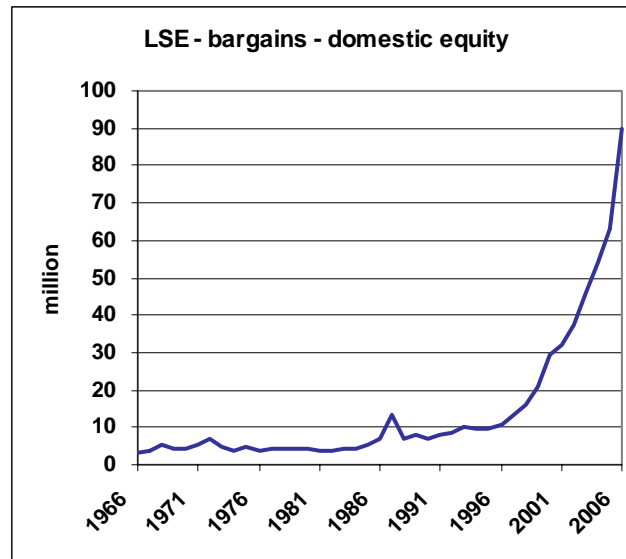
In almost all cases the effect of introducing electronic trading has been to improve efficiency, increase trading volume and, as a result of economies of scale and the reduced market impact in a more liquid market, reduce trading cost.

An interesting example is the London Stock Exchange. The following chart shows how the value of domestic equity trading increased rapidly following Big Bang in 1986.



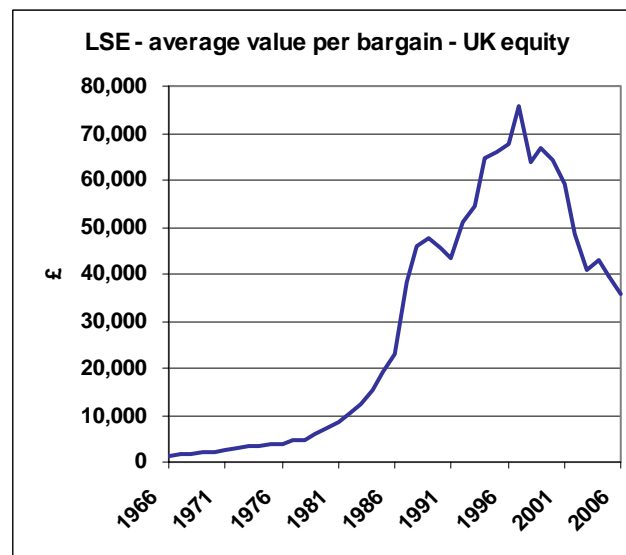
Source: London Stock Exchange

Growth in trading activity stepped up a gear in 1997 as the SETS trading system began to come into its own, and algorithmic trading and patient trading techniques began to be used by traders. This sparked a rapid increase in the number of trades, as can be seen in the chart below.



Source: London Stock Exchange

The change in trading strategies had another significant effect. The average trade size began to decline steadily as the proportion of algorithmic trading grew. The following chart shows that this trend is continuing.



Source: London Stock Exchange

Similar trends have occurred in the oil markets. After NYMEX listed its major oil contracts on the CME's Globex system alongside floor trading in the middle of 2006, there was a dramatic increase in trading volume and a shift away from the floor. Volume in January 2007 was 56% up on January 2006 and the proportion of trading done electronically rather than on the floor was 61% compared with 15% in 2006.

Similarly, six months after its transition to fully electronic trading in April 2005, volumes on ICE Futures (the former International Petroleum Exchange) had increased by 40% year-on-year. Annual volume in 2006 was 161% higher than in 2004.

NYBOT, now owned by ICE, introduced electronic trading alongside the floor at the beginning of February 2007. Since then it has announced a string of all time trading records and the proportion of trade done electronically has reached the order of 25%.

## 4 Evolution of market infrastructures

This section describes how infrastructure has evolved to support markets, how the organisations which provide that infrastructure have developed, consolidated and confronted new competitors.

### 4.1 *Development of market infrastructure providers*

Most infrastructure services have grown out of a clear (and in some cases desperate) market need:

- The original London Stock Exchange (LSE) trading floor came from the need for the broking community to meet somewhere more efficient than the coffee houses of London.
- Euroclear grew out of a banking and custody service offered by JP Morgan to the putative Eurobond market when there was no obvious international organisation which could do the job.
- CREST grew out of the failure of the LSE to improve its settlement systems.
- LCH.Clearnet grew initially from the need for commodities futures traders to reduce their counterparty risk.
- New providers – such as SwapClear, Swapswire, and DTCC DerivServ – have sprung up to service the OTC derivatives market, where the huge growth in transaction volume has created a significant administrative headache for the banks.

The availability of technology has also driven development. The appearance in the 1980s of efficient real-time computing and data networks created the opportunity to reduce cost and to widen market participation.

### 4.2 *Growth of infrastructure provision*

Nowadays most of the infrastructure services supporting the financial markets – trading, clearing, settlement (but notably not regulation) – benefit significantly from economies of scale. A large proportion of their costs are fixed irrespective of the transaction volume being handled.

This was not always so. For example, when Liffe operated a trading floor, the volume of trading was physically dependent on the number of traders on the floor, and, in turn, on the size of the floor itself. The number of staff employed by the exchange also rose with the number of traders since a team of exchange officials were needed to service each trading pit. Shortly before Liffe lost the majority of trading in Bund futures to the all-electronic DTB it was planning a very expensive move to a massive new trading floor just to keep up with the growth in trading volume. With modern systems, however, electronic exchanges can increase the capacity of their market at relatively low cost. Similarly, with the right IT tools, the number of staff employed can grow at a much lower rate than the increase in trading. The application of IT

and the resulting automation have had a similar effect on clearing and settlement infrastructure.

As a result, a virtuous circle has been at work over the past 20 years or so. As infrastructure services have reduced the cost of trading, so market activity has risen, bringing economies of scale to the infrastructure providers and allowing them further scope for reducing cost to the market. Thus the business of the infrastructure providers has grown very significantly with the markets they serve. The reduction in trading cost, however, has also been driven by other factors. The main market users – the banks, brokers and fund managers – have also invested heavily in IT, and this has produced further growth in trading volumes. The extent to which reductions in the cost of providing trading services have been passed on to investors has become a bone of contention. Intermediaries would argue that competition has been fierce and has forced them to drop their commissions in line with or further than their reduction in costs. They would also argue that the same competitive forces have not been felt by the major European stock exchanges, and that, in a situation in which the exchanges are profit maximising entities acting as virtual monopolies, it is not surprising that they choose to increase shareholder returns rather than drop their prices in line with the reduction in their per-transaction costs.

A second avenue of growth for the infrastructure providers has been the introduction of new products and services. Derivative markets have been a rich source of product innovation. Rapidly growing experience in financial engineering and risk management, together with the availability of low cost IT, have provided the foundations on which a stream of new tradable products has been created. Initially the cost of trading these new products tends to be relatively high. Back office administration for them is relatively people intensive and must be handled bilaterally between the trading parties, but profit margins are also high. As the market matures, however, competition drives margins down and higher volumes demand more automation. This provides an opportunity for market infrastructure services to be developed and offered to a broad group of market participants. The more entrepreneurial infrastructure providers – both incumbents and new entrants – have identified these situations as growth opportunities. Good examples in recent years are the trade confirmation services created for the OTC derivatives market by Swapswire and DTCC, the SwapClear clearing service for interest rate swaps offered by LCH.Clearnet and the covered warrant market run by the Stuttgart stock exchange.

#### ***4.3 Technology trends which have impacted the markets***

Information technology has affected financial markets so fundamentally over the past 30 years that it can sometimes be taken for granted. A number of trends in information technology have been important enablers of change in the financial markets:



- The price of computing power has dropped significantly and continues to do so. This has:
  - reduced the cost of processing transactions, helping to fuel the virtuous development circle discussed above.
  - enabled service providers to add capacity at much lower cost than previously thus increasing the economy of scale available to infrastructure businesses.
  - lowered the entry cost of new infrastructure providers, increasing the opportunity for incumbent infrastructure providers to be challenged.<sup>22</sup>
  - allowed richer services to be offered, opening up more opportunity for infrastructure providers to compete on service content and not just price.
  
- High speed, reliable networking and connection standards have enabled services to be offered on a global scale with remote participants enjoying virtually the same level of service as participants local to the provider.
- More effective IT development tools have allowed new services to be brought to market quicker. In a world in which markets and products are developing at an ever increasing rate, and infrastructure providers are coming under competitive pressure, time to market is becoming a crucial issue.
- The increased speed of computers and networks has allowed transaction latency<sup>23</sup> to be reduced, which in turn has encouraged an increase in trading frequency. Low latency is now becoming a competitive weapon – recently the Chief Executive of the London Stock Exchange even mentioned it in the presentation of its financial results.
- The evolution of IT and communications standards have made it easier for users and third parties to integrate the services of infrastructure providers and their own internal systems. The ability to “plug and play” which comes with the adoption of standard access and messaging protocols offers a number of important business benefits:
  - It allows market participants to use systems developed for one market for other markets, which have adopted the same standards, at relatively low incremental cost.
  - It makes it easier and cheaper for a participant to switch between two providers offering a similar service and therefore stimulates competition.
  - It facilitates the creation of new services by integrating components from existing services.

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<sup>22</sup> An example is BATS (a Better Alternative Trading System) founded in the USA in 2005 which created their trading system for about \$2 m and are now taking significant amounts of market share from Nasdaq.

<sup>23</sup> Latency can be described as the amount of time in milliseconds that it takes for a trade to be executed by an exchange's servers. This figure can be reduced the closer a bank is able to locate its servers to those of an exchange.

#### **4.4 *The influence of technology on market structures***

Information technology has had widespread effects on the structure of the financial markets, the infrastructure which supports them and the market participants. Below we give some examples of important structural changes in which technology has had a significant influence.

Market participation has become widely dispersed. Floor-based markets have traditionally restricted participation to those geographically close to the floor. Many have even restricted the number of participants because of physical space limitations. Electronic markets and reliable, high speed international telecommunications have lifted these restrictions to allow unlimited numbers of participants with little or no geographical restrictions. This has increased trading volume and improved efficiency, with market users able to access the market directly rather than going through intermediaries.

As a result, competition amongst exchanges has intensified. When exchanges were geographically constrained – in Europe usually within a national boundary – there was little competition between them. Now their user bases overlap and it is natural to expect them to try to compete. Distribution has become an important strategic issue for exchanges. A good example was the “battle for the Bund”.

In the early 90s German government bond (Bund) futures were traded by both floor-based Liffe and the electronic DTB (the forerunner of Eurex) with Liffe having the lion’s share of the market. To compete, DTB decided to invest in broadening its distribution network. It opened up access points all over Europe and subsequently the US and attracted international participation. The move was so successful that within three years DTB had become the market leader, and it has continued to grow at pace to the very strong position it occupies today. Liffe was forced to adopt electronic trading rapidly and to develop an international network. Euronext.liffe’s network today is more geographically dispersed than that of Eurex.

The establishment of standard computerised market infrastructure has reduced barriers to new entrants, who are able to piggy-back on existing infrastructure. An example of a new entrant in a new market space taking advantage of such a situation was the International Petroleum Exchange (now ICE Futures). The IPE was established in 1981 and used the clearing services of the London Clearing House (LCH) which needed relatively little modification to be able to handle an additional commodity – Oil.

An interesting example of a new entrant in an existing market was the International Securities Exchange (ISE) which entered the rather mature US stock options market in 2000. The ISE brought in a significant innovation – electronic trading – but used the existing clearing infrastructure, provided by the Options Clearing Corporation (OCC), used by other exchanges in the field. Not only was the ISE able to use the same clearing service as its competitors, but its products were fully fungible with those traded on the floor-based options exchanges. This meant that a position bought, say, on

the Chicago Board Options Exchange (CBOE) could be sold on the ISE. This arrangement made it very much easier for participants to switch their trading between exchanges, and for ISE to compete aggressively with what at the time was a cheaper and more efficient service.

By the end of 2003 ISE was the largest equity options exchange in the world. The rest of the US options market had also changed dramatically. There had been a tidal wave of innovation and development. All the other exchanges had embraced electronic trading in one form or another, innovative market models had been introduced, trading fees had dropped steeply across the board, and market volumes had increased dramatically.

The issue of transaction latency has also had a significant effect upon the market. This has created an unusual trend. Where markets used to depend upon physical places where individuals could concentrate in order to trade efficiently, technology now means that the most competitive traders wish to locate their servers as close to those of the relevant exchange as possible in order to reduce latency to a minimum. Thus human physical concentration is being replaced by computer server concentration.

The impact of technology has not only affected the infrastructure providers themselves. Participation in electronic markets and clearing and settlement infrastructure now requires a significant investment in IT from market participants. This has been one of the influences behind consolidation in the banking and broking communities. At the same time, the very large investments the international investment banks have made in IT have increased their market power. In many cases these big banks are now providing "wholesale" execution, clearing and settlement services to smaller intermediaries.

#### ***4.5 Regulatory developments***

There has been a shift over three decades from self-regulation of markets to a more statutory framework with dedicated quasi-governmental bodies performing the regulatory function. Exchanges have retained a duty to maintain clean markets and regulate participants' behaviour, but under regulatory obligations imposed on them by their licence. This has been an important shift. The separation of duties has freed up the exchanges and other infrastructure providers to focus more clearly on their role as service companies. It has also opened up the opportunity to turn themselves into commercial entities.

In recent years, the transformation of many of the infrastructure providers, particularly exchanges, into commercial, for-profit entities has raised some concerns. The strong network effects which apply to financial markets infrastructure can give the bigger players near-monopoly pricing power. There is concern that this power, combined with a profit maximising objective, could lead to service fees being held at too high a level for the good of market users. Thus there has been pressure in Europe to find ways to encourage more competition between exchanges and clearing and

settlement providers, and it is clear that competition regulation as well as conventional financial markets regulation is now beginning to play a part in shaping the industry.

Two important regulatory initiatives are likely to have far reaching consequences; the first for exchanges and the second for clearing houses and settlement organisations:

The European Union's (EU) Markets in Financial Instruments Directive (MiFID), which is due to come into force in November 2007 aims to complete the EU single market for investment services; respond to changes/innovations in the securities markets; protect investors;

It hopes to achieve these objectives by means of a number of specific steps, including a ban on monopolistic exchange concentration rules<sup>24</sup> and making it easier for users to operate new trading venues, which would effectively compete with the established exchanges, on a more equal footing.

In October 2006 the EU Internal Market & Services Directorate and the Competition Directorate encouraged the European clearing and settlement industry to sign up to a Code of Conduct which commits it to achieve: transparency of prices and services; improved access and interoperability; unbundling of services and accounting separation.

Whilst we have yet to see the effect of the Code of Conduct (its most important aspects do not bite until later in 2007) MiFID is already beginning to have an interesting impact on trading services. A consortium of nine major international banks have set up a venture codenamed BOAT to provide data collection, dissemination and commercialisation of pre and post trade information related to the business the banks will do off-exchange. A technology provider and commercial manager<sup>25</sup> have been selected for the venture and the intention is to have the system in place for the introduction of the MiFID regulations.

The Turquoise electronic market venture has been initiated by seven of the BOAT consortium banks. It aims to provide an alternative trading venue for leading European equities, and would appear to be a direct challenge to the major exchanges.

The LSE, Euronext and Deutsche Börse have all recently cut their fees, seemingly partly in response to the potential competitive threats MiFID will bring.

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<sup>24</sup> Rules imposed by some exchanges on their members which require all orders in stocks listed on the exchange to be executed on that exchange.

<sup>25</sup> Cinnober Financial Technology have been engaged as technology provider and Markit Group as commercial manager of BOAT.

## 4.6 Consolidation

The headline news in the exchange industry for the past few years has been mainly about actual and potential consolidation. Consolidation has become a major strategic issue, particularly for the newly for-profit exchanges. The strategic objectives for exchanges seeking to merge are broadly:

- To drive down cost and improve the bottom line. They seek economies of scale from consolidation by spreading the largely fixed overhead cost of IT over larger transaction volumes.
- To increase their market share and achieve more market power.
- To increase distribution of their markets and drive up volume.

In particular cases there may also be attractive functional synergies. Where for instance:

- The product ranges of the two exchanges are complementary. One such example was the attempt by the LSE to buy Liffe. The Liffe derivatives market would have complemented the cash equity and bond markets of the LSE and would have diversified the business. In the event Liffe was bought by Euronext which already had an established derivatives business. The addition of Liffe gave it a leading position in the European derivatives market.
- Where one party has a strong functional capability which would allow the other party to expand its business. A recent example was the acquisition of the NYBOT by ICE. NYBOT operates a clearing house which may provide ICE with some important development opportunities in its energy business and ICE could provide NYBOT with the electronic trading system it was seeking for its soft commodities market.

Below we comment on the characteristics of some recent consolidation activity in the European exchange industry.

### *Euronext/NYSE*

NYSE's relatively recent transformation into a for-profit entity seems to have provided the impetus for a flurry of strategic initiatives. CEO John Thain appears to have a truly global ambition for NYSE to own or influence the major exchange players in the key financial centres. Any ambition NYSE had to buy the LSE was thwarted by NASDAQ effectively taking a blocking stake before NYSE could make an offer. A bid for Euronext was a viable alternative and the deal is, at the time of writing, agreed but not yet completed. Subsequently NYSE has taken a small stake in the National Stock Exchange of India and signed a cooperation agreement with the Tokyo Stock Exchange.

The NYSE/Euronext deal is interesting because it demonstrates the constraints on any transatlantic exchange merger. The new group will operate as essentially two separate exchange operating companies –

one in the US and one in Europe – in order to avoid what has come to be known as “regulatory pollution”. The concern is that duties imposed by US regulators (particularly by the SEC on the equities market) on the NYSE and other US operating entities should not bite on the group’s European operations. The Sarbanes-Oxley Act, which imposes significant administrative burdens on listed companies, makes this a particularly topical concern. One way to reduce this risk is to ensure there are separate corporate entities for the exchange operations on the two continents. In addition, the merger brought into existence a complex regulatory structure, involving a US Trust and a Dutch Foundation which have the theoretical ability to protect the regulatory independence of the five stock markets it intends to combine at any stage in the future in the event that it perceives there to be a spread of US regulation to the European element of the merged entity.

One difficulty with this arrangement is that it reduces the potential for cost synergies. Even so, the merger proposal forecasts quite significant cost savings of roughly \$275 million per annum. The NYSE would probably have expected to make at least some of these savings, even without the merger, through the rationalisation of its technology supplier SIAC. NYSE recently bought out the stake of the co-owner of SIAC, the AMEX, and there is a common view that SIAC’s efficiency is ripe for improvement.

The major benefits of the merger would appear to be:

- Increased brand power for the group’s listing business.
- Taking advantage of NYSE’s position in the US to give Euronext.liffe the opportunity to make a bigger impact in the American derivatives market than has so far been the case.
- The opportunity to consolidate their operations in future if the US and European law makers and regulators can agree to cooperate in such a way as the risk of regulatory pollution is minimised.

### *LSE/NASDAQ*

The bid by NASDAQ for the LSE failed but, at the time of writing NASDAQ still owns a 28.75% holding in the LSE and it is unclear whether it will sell it, or retain it and seek to influence the management of the organisation. In the course of the bid, however, it intimated that, if it failed, it would seek to join forces with project Turquoise or a similar vehicle to compete with the LSE. It would be hard to do so whilst continuing to own a large stake in the LSE.

It was always difficult to see what the real benefits of a NASDAQ/LSE combination would have been. In addition to the difficulties which the NYSE/Euronext group will face, which will constrain the level of corporate integration it can achieve, a NASDAQ/LSE merger would still have been weak in derivatives, the NASDAQ brand would not have enhanced the LSE business and any expectation of significant

technology synergies were probably over optimistic. The market models in the US and UK are very different and it would probably not be straightforward to use one system for both markets.

One of the motives of NASDAQ in making the bid may have been to block the NYSE from doing so. NASDAQ and the NYSE are fierce competitors and if the NYSE had acquired the LSE it could have put NASDAQ in the shade. But, whilst NASDAQ has succeeded in shutting out the NYSE from London, it is difficult to see what other benefits it can derive from the failed bid.

### *OMX/Norex*

The OMX group – as OM – was the first for-profit exchange in the world and one of the first fully electronic exchanges. It has built on those foundations of business enterprise and respected trading technology to create a major technology-driven business and bring about exchange consolidation across the Nordic region. The initial steps towards consolidation were taken in the 1990s. It created a technology alliance between its own Stockholm Stock Exchange and the Oslo, Copenhagen and Reykjavik exchanges in the equity markets, and between Stockholm, Oslo and Copenhagen in the derivatives markets. In each alliance one system, operated by OMX was shared by all the national markets.

In 2003 OMX set out on an impressive corporate consolidation strategy which has resulted in the group owning the exchanges in Sweden, Finland, Denmark, Iceland, Estonia, Latvia and Lithuania. Whilst neither any one of these exchanges, nor the resulting group, is in the major league in terms of market volume, the process of steady rationalisation has been impressive and OMX itself will have gained experience which could be very valuable for the next stage of its consolidation strategy which it has indicated will be in Eastern Europe.

There has also been important consolidation in the clearing and settlement industry.

### *LCH.Clearent*

After a long courtship, LCH and Clearent, the French clearing house owned by Euronext, agreed to merge in 2003. From the outset, the merged group was to have two separate operational entities, one in Paris and one in London, principally to satisfy political and regulatory concerns which had impinged on the merger discussions. One of the major objectives of the merger, however, was to make considerable savings by rationalising technology – a one off saving of €23 million followed by annual savings of €35 million.<sup>26</sup> In the event, this proved more difficult than originally envisaged, and the common IT platform project was abandoned in 2006 with a €68 million write off.

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<sup>26</sup> Clearent and LCH merger announcement 25 June 2003.

Subsequently there was a change of senior management and the new chief executive appears to be concentrating more on improving LCH.Clearnet's responsiveness to new developments in the markets – a capability which had been subordinated to systems rationalisation under the previous regime. Similarly, the ambition talked about in 2005 of LCH.Clearnet further consolidating with Eurex Clearing appears to have been dropped. At the time of writing, LCH.Clearnet has announced it is to buy back shares held by Euronext, reducing the latter's holding from 41.5% (of which only 24.9% is voting) to 5%. This will have several effects: firstly, it will undermine the perception of Euronext being part of a similar "vertical silo" to the Deutsche Börse (with Clearstream); secondly, it will respond to the UK's Competition Commission ruling that, if at any stage Euronext wished to purchase the LSE, it would have to divest itself of its shareholding in LCH.Clearnet, and thirdly, and above all, it should free LCH.Clearnet to respond to market pressures to bring down the costs of clearing in Europe.

### *Euroclear*

In 2001 Euroclear bought Sicovam the French national CSD in return for a holding in the Euroclear group. This was the start of a string of acquisitions – Necigef, the Dutch CSD, in 2002, Crest, the UK CSD, in 2003 and CIK, the Belgian CSD, in 2004 – which has resulted in the Euroclear group acting as national CSD in 5 countries as well as an international CSD.

After the acquisition of Crest, Euroclear embarked on an ambitious harmonisation programme, the objective of which was to operate a common business model across the group. The programme has involved the harmonising of processes in the national CSDs where possible, and the development of a new common settlement platform – the Single Settlement Engine (SSE) – to serve all its CSDs. Rolling out of the SSE began in the middle of 2006.

As Euroclear gains experience of integrating acquisitions and harmonising business practice, we expect it to look for more acquisitions to gain some economy of scale from the very considerable investment it has made.

### **4.7 Growth of new providers**

While the major European infrastructure players have been engaged in the ritual dance of mergers and acquisitions in an effort to consolidate, the number of infrastructure providers has actually been increasing. Some of the reasons for this apparent paradox are:

- Infrastructure for new markets seems usually to be developed by new providers. Incumbents appear less inclined to take the early risk.
- More sophisticated infrastructure is being provided in market segments which previously had more basic support. For example, some of the



facilities developed in the inter-dealer broking sector – such as EuroMTS – look rather like conventional exchange trading systems.

- Regulations such as MiFID allow new infrastructure to be offered on a more even playing field alongside the incumbent exchanges. As discussed earlier, a number of new entrants have already declared themselves, and we expect more to emerge in the coming months ahead of the 1<sup>st</sup> November 2007 MiFID introduction date. If MiFID proves to be a success we would expect the number of infrastructure providers in Europe to continue to rise.

Europe is not alone in this regard. The phenomenon has been under way for a longer period of time in the US, where there are now 40 non-exchange trading venues, most of which have been established within the last 10 years, challenging the incumbent exchanges. We see no reason to believe that a similar phenomenon will not happen on this side of the Atlantic.

ICAP is an interesting example of the emergence of a new breed of infrastructure provider. In the late 1990's most of the inter-dealer brokers began to invest in technology to support their broking activity. ICAP appears to have taken the trend towards electronic trading more seriously than others, and decided that it needed to own the new channel of communication for the broking world. In 2000 ICAP set out to expand its business in electronic trading, particularly in the wholesale – i.e. inter-dealer – markets. At one time it held a substantial stake in Liffe, prior to it being bought by Euronext.

In 2003 ICAP bought BrokerTec from the consortium of banks which had founded it. BrokerTec had been successful, but its success had a downside. Questions were beginning to be asked as to whether the bank owners, who were also major players in the bond markets, had a conflict of interest. In addition the development of the venture was slowed by the need to obtain consensus for strategic decisions. Since ICAP took control, the business has expanded rapidly both in the breadth of products it offers and market penetration. Before ICAP bought it, BrokerTec's share of the US government bond market was running at 20%. It is now 60%. It has a much smaller share of the European government bond market. It would claim that this is due to the preferential treatment MTS enjoys in those markets.<sup>27</sup>

In 2006 ICAP bought EBS, a long established FX inter-bank platform which was similarly owned by a consortium of banks. This is a very interesting acquisition for ICAP, coming at a time when the FX market is going through a period of rapid growth, in part due to the introduction of algorithmic trading, and is broadening its participant base. Through these acquisitions and other smaller investments ICAP has turned itself into a full-scale infrastructure provider and differentiated itself from its traditional rivals.

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<sup>27</sup> See Persaud, A. D., *Improving efficiency in the European government bond market*, (November 2006), Distributed by ICAP.

## 5 Policy Imperatives

### 5.1 *Introduction*

Capital market infrastructure providers in London are clearly important. They supply the basic foundation upon which the City depends in order to carry out the business of financial services. What is less clear is what might be termed the policy imperatives underlying these infrastructure providers. Does it matter where they are located? With the growing sophistication of technology does it really matter whether they are located in London or could they just as easily serve the City's financial services if they were located elsewhere? And does it matter who owns them? Nasdaq's bid for ownership of the London Stock Exchange could have led to the latter being owned by a United States exchange, just as Euronext has recently become. Does this matter? Or is it just another symptom of the Wimbledonisation effect that is spoken about so often?

What about regulation? Does this act as an incentive or a disincentive for infrastructure providers to locate in the City of London? There are other issues to be considered also, not least taxation, both personal and corporate, and British non-membership of the Eurozone.

### 5.2 *Location*

Several of those we interviewed were of the opinion that the location of the major infrastructure providers was not that important. They thought that with the level of technology as it is today it would be perfectly feasible to locate, for example, an exchange, anywhere. This in turn led to an examination of what "location" actually meant. In the technological environment within which everyone now operates, it is not so easy to describe the location of the London Stock Exchange as being the place where trading is done. Trading of course used to take place on one central floor where liquidity could be concentrated. With a physical floor, this led to exchanges being located within the "square mile" for ease of access to the floor. Today trading is concentrated on computer servers which could be located anywhere (although issues of latency often lead market participants to demand that their servers be located as close as possible to those of the exchange). Nowadays market participants can theoretically access the market from virtually anywhere in the world (regulatory approvals permitting). Large amounts of business conducted on the London Stock Exchange come from outside the UK. More than 50% of the business conducted on the Deutsche Börse's derivatives market, Eurex, comes from the UK. What does that tell us about the "location" of Eurex?

The implications of these trends would seem to suggest that, when the location of an infrastructure provider is discussed, what is actually being referred to is the location of its senior management. If that deduction is correct, does it matter where they are located? On delving deeper, it seemed to our interlocutors that this might indeed matter. Some of those we interviewed felt that, as an example, it was more important to locate the

clearing and settlement mechanisms in the City than elsewhere. The logic underlying this reasoning was that if there were a crisis involving the failure of a large player in London then that would need to be solved rapidly by the clearing house, the settlement agency and above all by the Bank of England. If either the clearing house or the settlement agency were located remotely this could make the task of resolving such a crisis rapidly significantly more complicated and time consuming. If the location became sufficiently obscure, the issue of lender of last resort would arise: which central bank would be expected to come up with liquidity or to rally around the other banks in a crisis?

When we spoke about the location of a body such as the London Stock Exchange similar concerns began to be expressed. Clearly the original reasons for the concentration of infrastructure providers in one location have long gone. Others of a more “strategic” nature have, however, taken their place. The major City investment banks indicated to us that they needed to be physically close to other intermediaries and support services such as lawyers, but that they could cope with being a little more distant from the managers of infrastructure providers (especially the regulators). They accepted, however, that issues could arise on a daily basis with, for example, the regulators, which needed to be resolved in a way which required face-to-face meetings rather than telephone calls.

We came to the conclusion that in order to have a fully credible financial centre it was necessary to have a fairly complete set of capabilities. Such a complete set within a financial centre’s community is an enabler of innovation. If one piece of iconic infrastructure were missing, the perception of the power of the centre would be significantly diminished. If, therefore, London were to lose several of its major infrastructure providers (say the LSE and LCH.Clearnet), this would undoubtedly have a damaging effect not only upon the credibility of London as Europe’s main financial centre, but also on its overall capacity to support that position.

### **5.3 Ownership**

Ownership, on the other hand, was a rather different matter. We found no-one who felt that if a major UK infrastructure provider were owned by a non-UK entity, this would be detrimental to the significance of London as a financial centre. Indeed, there are already many examples of foreign ownership of UK infrastructure providers. Leaving aside the question of the London Stock Exchange, the following infrastructure providers are all owned by non-UK entities: LIFFE (now part of the NYSE/Euronext entity), CREST (owned by the Brussels-based Euroclear) and ICE Futures (formerly the International Petroleum Exchange and now owned by the InterContinental Exchange, an Atlanta-based company). The fact that they are owned by non-UK entities has had no impact whatsoever on their success. Indeed, one could argue that they have grown considerably since they have become part of multinational groups.

Those we interviewed did draw attention to the potential indirect impact ownership might have on other more important issues such as regulation (to which we turn in the following section). This is principally a US issue, rather than a European one. There is little concern with regulatory difficulty arising from European ownership of UK infrastructure providers, as London entities are subject to the same rules emanating from Brussels as are their competitors in Europe. The potential indirect regulatory impact which could arise from US ownership is, however, of considerable concern.

This said, one or two of those we spoke to again made reference to the ownership of the Clearing House, for the same reasons outlined in the section on location. They felt that it could be more difficult to resolve a Barings-type crisis if the clearing house were owned remotely by a non-British entity with a different cultural background. Objectively though, the structure that Euroclear seems to have developed through its ownership of Crest seems to work pretty efficiently. This has involved leaving an essentially UK management in place in London, with very senior UK board representation on the Euroclear main board. Euroclear could claim with some legitimacy to have developed a truly "European" culture. None of those we spoke to described it as typically "Belgian" or "French" or indeed "British".

Our conclusion is that European ownership of the UK's main infrastructure providers has no appreciable influence on the importance of London as Europe's financial centre. US ownership, on the other hand, has a potential indirect impact on the regulatory attractiveness of London.

#### **5.4 Regulation**

It was striking that a significant number of those we interviewed held the very strong view that the quality, efficiency and "business friendliness" of financial services regulation in the UK was an extremely important issue. Several said that while they did not wish to suggest that they actually enjoyed being regulated, if this was a necessary part of doing business, then they would much rather be regulated by the FSA than by any other regulator in Europe. One or two of our interlocutors were critical of what they saw as the limited level of understanding in the FSA of their particular part of the market (and urged more interchange with industry professionals), but at the same time they felt that the overall approach taken by the FSA and its pragmatic treatment of specific issues made it without doubt the best regulator in Europe.

One of the main attributes of the FSA that seems to be particularly appreciated by the financial services community is its concentration on a principles-based approach. Those with long memories hark back to the days of Bank of England supervision before the creation of the first UK regulator, the Securities and Investment Board, and recall with fondness the way in which the Governor of the Bank used to address issues via his eyebrows. The higher they went the more potential wrongdoers realised they had to respond vigorously to his "suggestions" for action. Others also referred to the pragmatic way in which the Takeover Panel responds to changing market circumstances. Such is the pace of innovation in the financial services

markets that a principles-based approach would seem to be the only one capable of responding rapidly and flexibly to the changing scenery.

The relationship between the regulator and the government is also very important. In the debate over the future ownership of the London Stock Exchange the chairman of the FSA, Sir Callum McCarthy, was not afraid to draw public attention to the potential for regulatory creep (referred to as “regulatory pollution” by the investment banks) from the US in the event of the LSE being owned by a US exchange. This in turn led to the government introducing a short act of Parliament (the “Balls” Act) designed to give the FSA the ability to veto any rule changes by the LSE (or indeed any other recognised exchange) which a potential US owner might seek to impose on it at the behest of Congress or the SEC. At the same time the government made it absolutely clear that it was completely neutral on the subject of ownership of the LSE (a fact that at least one of our US interlocutors found quite astonishing – he thought that it would be “inconceivable” for any US administration to remain neutral about the ownership of, say, the New York Stock Exchange).

There is, of course, always a danger that legislation introduced at speed as a result of a particular set of circumstances (in this case the potential takeover of the London Stock Exchange) can over time result in unintended consequences. This is a fear that we have about the Balls Act. When the original Financial Services Act was introduced in 1986, there was a vigorous debate about the ability of the SEC in the US to veto rule changes on the exchanges, and whether this should be introduced in the UK. The UK exchanges (and the LSE in particular) argued that such a power would significantly undermine the self regulatory responsibilities that the LSE still enjoyed. The fact that this principle has been breached with relatively little debate about its long-term consequences is perhaps a little disturbing. One of the exchanges to which we spoke was already clearly more than a little nervous over the long-term implications of the Act.

A major threat to the particular attraction of FSA regulation exists within Europe: the creation of a single European regulator that happened to be based somewhere other than the UK. A representative of a very large investment bank to whom we spoke repeated the favourable references to the FSA, while at the same time complaining bitterly about pan-European business now needing to be handled by a multiplicity of national regulators. In a particular incident he had to discuss with regulators, because it crossed several borders (a not uncommon occurrence by any means), he discovered that he had to explain his actions to no fewer than six different national regulators. Clearly, he said, it would have made far more sense to have to deal with only one regulator which had responsibility for the whole of Europe.

In many ways the ideal solution would be for there to be one EU regulator and for that regulator to be located in London employing the FSA's pragmatic approach to regulation. As long as the UK remains outside the Eurozone, however, the possibility of that happening would seem to be nil. It is highly unlikely that those EU countries within the Eurozone would ever agree to a single EU regulator being located outside the Eurozone. It would

therefore seem that the inefficiency of having to deal with a multiplicity of national regulators will continue to make life difficult for investment banks with pan European business for the foreseeable future.

Our overall conclusion is that the FSA is a very important part of the financial services infrastructure, whose operational approach is a significant factor in the continuing importance of London as an international financial centre.

### **5.5 Eurozone Membership**

It is not part of our remit to discuss the advantages or disadvantages of the UK not adopting the Euro as its currency. There is, however, a non-currency dimension to the UK not having adopted the Euro: the fact that it has not been involved in the decisions on financial structural matters that now take place as a matter of routine within the Eurozone at both Finance Minister and Central Bank Governor level.

The most obvious example of this aspect of our non-participation in the Eurozone is the debate currently taking place over the desire by the ECB to build a settlement operation for the Eurozone as a whole (known as Target 2 Securities or T2S). The implications of this particular initiative are discussed in a later section of this report. The issue to discuss here is whether the UK is damaged by not participating in the discussions themselves.

Those to whom we spoke who were aware of the diminished role of the Bank of England in Eurozone discussions were clearly very concerned by the potential implications of this exclusion. One of the major complications arising from the UK's non-participation in the Eurozone is the fact that developments within the Eurozone are of direct concern to the financial services industry in London, but that industry is not represented in discussions about them. It is not just propaganda to say that London is the financial centre of the EU. The fact is that something between 40% and 50% of all financial services business in the EU originates in London (and one estimate has put it as high as 57%). If, therefore, the London financial services industry does not have a champion within the Eurozone at Finance Minister or Central Bank Governor level, there is a serious danger that measures will be taken that have an adverse impact upon the whole sector.

There seems to be no overt desire at this stage on the part of players such as the ECB to deliberately exclude the London community from their deliberations. Indeed, in the case of T2S the ECB has already had exploratory discussions in London. The fact remains, however, that combining the UK's non-participation in the Eurozone with the apparent desire of the Bank of England to confine its role quite narrowly to monetary policy is producing a clear and forceful perception in the City that its interests are in serious danger of being under-represented in discussions within the Eurozone. This perception is leading to a re-evaluation by London's major players of the way in which they interact with the various institutions of Europe, specifically the EU Commission and the ECB. We will look at these implications in the next chapter of this report.

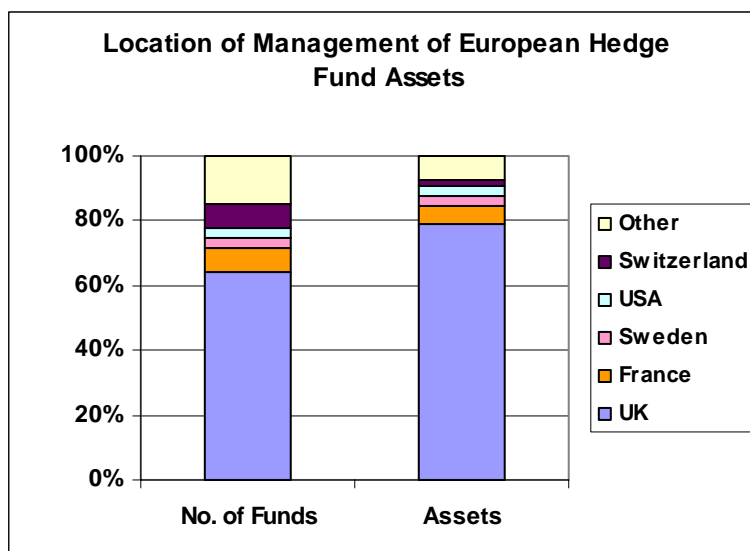
## 5.6 *Taxation*

It is clearly the case that taxation and transport are not part of the financial market infrastructure. Nevertheless the shift to electronic markets has made it much easier to locate staff just about anywhere where their employer has an office, and thus factors such as taxation and transport have become more significant than they have been in the past.

Taxation, both personal and corporate, has clearly become a very significant issue in the City. For many years, London has served as an attractive place for banks to locate their international staff for a variety of reasons relating to the cultural life, the language, the time zone advantages, the dynamism of the City, its work ethic and its favourable tax regime for foreigners and foreign companies. This last advantage has, however, begun to diminish in attractiveness.

On the corporate tax front, other European countries have begun to realise the advantages of competitive tax rates. Ireland, in particular, has introduced corporate tax rates that are significantly lower than those that prevail in the UK and this has had a significant impact upon the attractions of Dublin as a financial centre. Dublin has many of the same attributes as London in terms of time zone, language and culture. As a result, a number of companies have started to relocate at least part of their operations to Ireland. Similar moves have been taken, or are under consideration, to Luxembourg and Switzerland. Major hedge funds have now started looking seriously at Switzerland as a more attractive location. None of those to whom we spoke saw these other centres overtaking London as a financial centre in the short to medium term. Several, however, pointed out that if a significant fiscal advantage existed in relocating a part of a company's operations elsewhere, they would certainly look seriously at the choice. In order to offset this competitive challenge many felt that it would not be necessary for the UK to reduce corporate taxation levels all the way to those prevailing in some of these other jurisdictions, merely to move to a more competitive differential. London has many advantages that other centres lacked, and there is a price worth paying for those advantages. The point that was made to us was that the price currently being paid is probably becoming too high.

The European Hedge Fund industry has been growing rapidly in the past few years - to \$400bn in June 2006. As can be seen in the chart below, London has been the major locus of this growth, but the hedge fund industry is both mobile and tax-sensitive so the continuation of this primacy cannot be taken for granted.



Position at June 2006. Source: EuroHedge

A more significant threat (and certainly a more emotive one) is the danger being posed to London's foreign community on the personal tax front. For many years it has been possible for high skilled foreign workers in London (by far the highest proportion of whom work in financial services) to pay tax on only a proportion of their earnings, with the remainder of their earnings falling under their home regimes. In recent years, the UK Treasury has started chipping away at this incentive to work in London in a fairly significant way. A few investment bankers told us very forcibly that this would in the very near future begin to have a serious effect upon the attractiveness of London to foreign workers. One bank had surveyed its staff in a number of different European locations as to their preferences for living outside their home countries. London was clearly one of the favourites, but New York was equally popular. And for UK nationals, Paris was the clear favourite.

This is a complicated issue for a government of any political hue to tackle. It is particularly sensitive for a Labour Government. The recent publicity given to large bonuses being paid out to relatively young staff working for major investment banks inevitably gives rise to charges of "obscenity" by those on the left of the Labour Party. It is not our job to address the moral issues that these bonuses give rise to (although it is worth pointing out that HM Treasury gets 40% of all of these bonuses and that it is surely better that the large profits earned by investment banks are shared out with its staff who actually did the work rather than being kept in the coffers of the bank). What is of concern in the context of this report is the impact of personal tax on those technically non-domiciled in the UK, who do currently live in London but who could locate anywhere in Europe or North America. If the Treasury continues to make the personal tax regime less and less attractive to non-domiciles then there will soon come a time when these mobile individuals will ask their banks to locate them elsewhere.

There is already anecdotal evidence that a few of the high earning senior hedge fund managers are relocating outside the UK. With technology as advanced as it is today there is no reason at all why they could not conduct their business as effectively from any other part of Europe as from London.



There is further anecdotal evidence of non-resident directors of banks having to enter into debates with HM Revenue and Customs about the UK taxation implications of the use of hotels, car hire etc while in the UK for regular board meetings. The Chancellor of the Exchequer must soon decide whether the Treasury should continue to reduce the rations of the goose that lays the golden egg.

## ***5.7 Transport Infrastructure***

In our meetings with City practitioners we made it clear that our remit was only to discuss the infrastructure of the capital markets. Notwithstanding this, it was very difficult to dissuade them from raising the issue of London's transport infrastructure.

The vehemence of the unsolicited comments we received on this topic was quite striking. What seems to have become known as the HTT problem (Heathrow, Tube and Traffic) appears to be having a very significant impact on the efficiency of the banks to which we spoke. The problems with traffic and the Tube have been current for some years now. What has changed is the way in which the very severe problems now being experienced at Heathrow have come to be regarded by the City as of major significance. One banker informed us of a high level meeting which recently took place in London with participants arriving from throughout Europe and North America. Owing to delays at Heathrow and subsequently traffic congestion in London, 8 of the 10 coming from abroad failed to arrive before the conclusion of the meeting.

What seems to worry the City most is that when Terminal 5 comes on stream in 2008 the problems of overcrowding at Heathrow will still not be solved. There are strong rumours (emanating from BA staff) that it will take the creation of Terminal 6 and another runway before Heathrow has the capacity to operate at a level of efficiency that even comes close to other major airports in Europe. Public opposition to both of these developments is likely to be considerable. The concern is that, with very long lead-times for the investment projects required to solve these problems, they are likely to have an increasingly negative effect for many years on the willingness of key financial services people to locate in London.

We draw no conclusions from this as it was not part of our terms of reference. Such was the level of concern expressed, however, that it would be remiss of us not to mention it.

## **6 Implications for London as an International Financial Centre**

### ***6.1 Introduction***

Over the last three decades the performance of infrastructure providers in London has varied. Those that have performed least well, at least up until recent years, have for the most part been industry-owned and they have missed some significant strategic opportunities. The more successful have been those commercial providers which have shown an ability to reform themselves more rapidly (such as Reuters) or else take advantage of new opportunities with better vision (such as ICAP) than the industry-owned providers.

One of the most important infrastructure providers is of course the Bank of England. Its role has changed very significantly since it became independent in 1997. Decisions by the Bank, whether positive (to concentrate almost exclusively on the determination of monetary policy) or negative (not to participate in the European Target 2 payments system) have had a profound effect upon the industry in London. The Bank used to play an important role as an active promoter of the UK financial services industry. If it is no longer interested in so doing, and is adopting an approach more akin to that of the Fed in the United States, then it leaves a vacuum which needs to be filled. How?

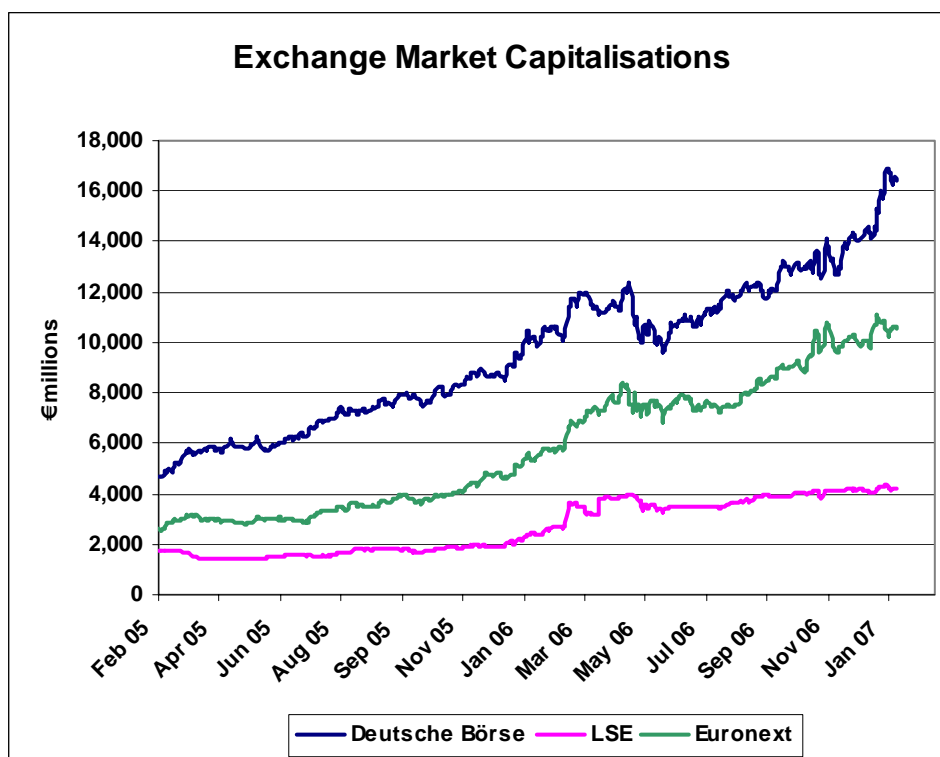
There would seem to be no doubt that the quality and performance of the infrastructure providers have a direct impact on the success or otherwise of London as a financial services centre. It is clearly necessary to examine just how the performance of some of these infrastructure providers has helped (or hindered) London as a financial centre in the past, and how the situation might change in the future.

### ***6.2 The Performance of Industry-Owned Infrastructure Providers***

Let us take three examples – the London Stock Exchange, LIFFE and the London Clearing House. We have described them as “industry-owned” because for the larger part of the period under discussion they have been mutually owned by their users. More recently, of course, this has changed: the LSE is now publicly-owned, LIFFE is part of the Euronext grouping (soon to be part of the NYSE/Euronext grouping) and LCH.Clearnet is an amalgam of a mutual and a publicly-owned entity. Looking at these infrastructure providers today they all seem to be in rude health. They each, however, have rather a long list of missed opportunities behind them.

In the case of the LSE, the performance of the exchange from Big Bang in 1986 for at least the following 15 years was disappointing to say the least. In 1986 it was without doubt the pre-eminent exchange in Europe, and its main competitors – Paris and Frankfurt – were not even within striking distance. In

the period since then, the LSE failed to move from an electronic quote-based system to a full scale electronic trading system as quickly as it should have, failed with the Taurus project, designed to modernise its settlement system,<sup>28</sup> failed to maximise the value of its derivatives market (which it then misguidedly sold to LIFFE in 1992), and as a result it ultimately failed to maintain its primacy over the other main exchanges in Europe. The LSE also failed to capitalise on the lead that SEAQ International had built up in trading international shares. Its final failure came when LIFFE was taken over by Euronext rather than by the LSE in 2002. As a result of the appointment of two successful and commercially-minded chief executives, Jean-François Théodore at Euronext and Werner Seifert at the Deutsche Börse, each of these competitors was able to make significant advances on the LSE, to the point where both eventually outstripped the LSE in terms of breadth of products traded, size and market value.

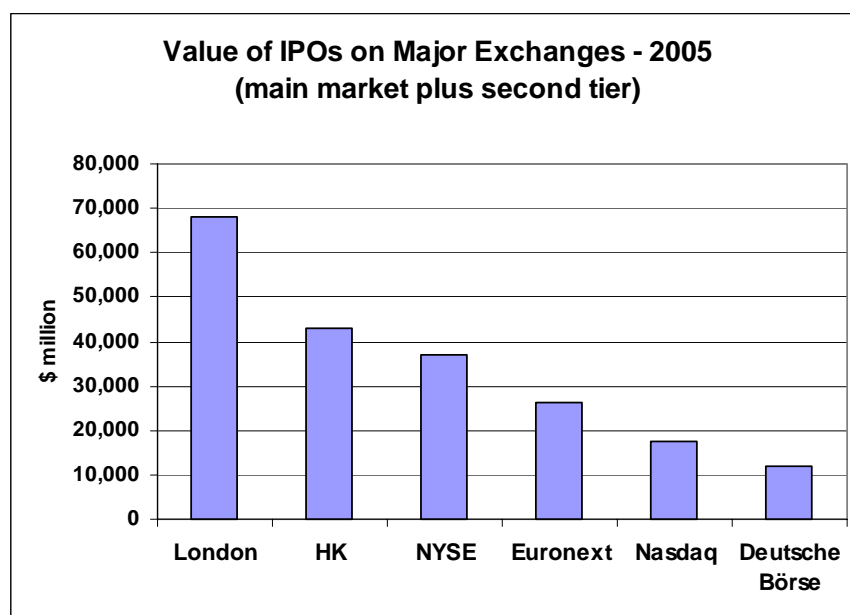


Source: Bourse Consult

Some commentators have suggested that the LSE's failure to take a proactive role in the consolidation of the exchange industry, which has now been in progress for almost a decade, is essentially a product of the loss of confidence resulting from this succession of setbacks. Whether or not that is the case, the fact remains that in all the bids and counter bids that have been going on in Europe since 1999 it has been the LSE that has been on the receiving end of approaches from other, larger players rather than leading the process itself. What has changed over the last four years is the benefit that the LSE has gained from the new regulations that were introduced in the US in 2002 in the wake of the Enron and WorldCom scandals. Sarbanes Oxley

<sup>28</sup> See the excellent description of this story in the Henley Management College paper of 2001 entitled *Taurus and Crest, Failure and Success in Technology Project Management*, [http://www.ecch.com/casestudy/product\\_details.cfm?id=21816](http://www.ecch.com/casestudy/product_details.cfm?id=21816).

has acquired almost mythical status as a disincentive to companies listing their equities in the US. As a result the LSE, in particular its AIM market has benefited considerably. And as the AIM market has prospered, so have the fortunes of all those associated with it, such as the Nominated Advisers (Nomads). To its credit, although the LSE derives little in direct revenues from the AIM market, it has maximised the value to be gained from the unusually generous largesse of US regulators. As a result its share price has gone up considerably, but it still trades on a multiple significantly below that of the New York Stock Exchange, Euronext and the Deutsche Börse.



Source: WFE

It is therefore difficult to describe the record of the LSE as an infrastructure provider over the last 20 years as an unalloyed success. The question that has to be posed, however, is has this held back the growth of London as a financial centre? On the evidence before us today, it is hard to say that the City has been damaged at all by the shortcomings of the LSE. Of course, we do not know how much more attractive the picture might have looked like had the LSE been more visionary. Nonetheless, London is without doubt the most important centre of international equity trading in Europe, and possibly in the world. Given its success since the introduction of Sarbanes Oxley (consolidated by the successful defence of its independence in the face of Nasdaq's bid) it is probably correct to say that when the LSE does not perform particularly well, the damage this inflicts on the City is relatively minor, and when it does well, as it has been doing for the last few years, it helps the City significantly.

LIFFE is in many ways another example of missed opportunity in the City. In its early years it enjoyed quite dramatic growth, especially in its innovative trading of futures and options on the FTSE 100 index. It liked to compare its dynamism with the sloth then all too evident at the LSE. At its open outcry peak in the early 1990s, it managed to buy the LSE's traded options market (the London Traded Option Market – LTOM for short). This market in options on

equities was an ideal purchase for LIFFE as it consolidated its position as the main market in London for the rapidly growing trade in derivatives.

By the mid 1990s, however, it was becoming clear that LIFFE, which had clung tenaciously to open outcry trading, was being challenged by the growth of electronic trading systems. Its biggest and most profitable contract was interest rate futures on the German Bund. The Deutsche Börse, under its then new CEO Werner Seifert and its Chairman Rolf Breuer (of Deutsche Bank) made a concerted effort to repatriate this market to Germany. It offered traders in London very low cost electronic access to the Eurex market, on which its version of the Bund traded. For the first time traders were able to compare directly the costs of trading electronically and by open outcry. They discovered that for any given trade in an identical product (the Bund) the cost of trading by open outcry – taking into account all the overheads of operating on the trading floor – was no less than five times greater than the cost of trading electronically. In a short space of time this cost differential, aided by some strategic decisions by the big German investment banks, led to the market in the Bund moving to Germany.<sup>29</sup> Of course the traders in this product remained where they had always been – in London. As we note elsewhere, over 50% of all trades on Eurex today come from London.

The position of LIFFE in the face of the loss of the Bund contract was parlous. Its response was to embrace electronic trading and to put into place a chairman and a chief executive whose task it was to rescue LIFFE and make it fit to become a viable exchange once more. Sir Brian Williamson and Hugh Freedberg succeeded well beyond most expectations, to the point where they were able to persuade Euronext to pay a very good price (indeed some said too high a price) to purchase LIFFE in 2002 – much to the chagrin of the LSE, which was unable to use this opportunity to correct its mistake in selling LTOM to LIFFE back in the late 1980s. Today, under broadly the same management which brought it back from the brink, Euronext-Liffe, as it has now become, is doing very well. Under the very new ownership of NYSE-Euronext it stands a good chance of breaking into the US market and thus becoming even more successful.

So did the travails of LIFFE and the loss of the German Bund contract to Eurex inflict long-term damage on London as a financial centre? Given that today the centre of the European futures and options business is London, the answer must be no.

This brings us to the London Clearing House (known as LCH.Clearent since its merger with the French clearing house in December 2003). This is one of the older infrastructure providers in London, having initially been set up to clear the trades done on commodity exchanges such as the London Commodity Exchange (now owned by LIFFE), the London Metal Exchange and subsequently the International Petroleum Exchange. By the early 1990s, the growth of trading in financial futures and options, had made LIFFE its biggest customer. At the time LCH's owners were the four main UK clearing banks.

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<sup>29</sup> There is an interesting description of this story in the paper *Exchange Competition and the cross listing of interest rate futures* produced by the School of Management and Business, University of Wales, Aberystwyth. [http://www.aber.ac.uk/smba/en/research/research\\_papers/2006/2006-5.pdf](http://www.aber.ac.uk/smba/en/research/research_papers/2006/2006-5.pdf).

Despite the fact that clearing can often be the most profitable part of business conducted on an exchange, the clearing banks showed little interest in using the LCH as a profit centre. Functionally, they allowed it to operate as a utility and did not really get involved in its operations.

The Bank of England was less than impressed by this policy of benign neglect, particularly at a time of dramatic growth in the trading of derivatives of all kinds, and in the mid 1990s “persuaded” the clearing banks to pass ownership to the users of the market. This process was completed in 1996. Between then and its merger with Clearnet in 2003, the LCH enjoyed a period of significant growth – largely on the back of the rapid growth of LIFFE. For the first time it secured the business of the LSE to act as its Central Counterparty (in the wake of the LSE’s failure to introduce Taurus). In addition, it introduced innovative ventures such as SwapClear, all of which added to its product diversity.

As a consequence of its position as clearer to many of the major derivatives markets, the LCH operates a key role in managing the risk profile of the London market as a whole. When a market failure occurs, particularly one which has systemic risk implications, the LCH has to work closely with the Bank of England and the exchanges to resolve the problem. A good example of the way in which it becomes involved in such situations was the Barings crash of 1995. The LCH was responsible for identifying all the open positions Barings had with other banks and ensuring that these positions were closed out without unnecessary disruption to the market.

The story of the LCH would therefore seem to have been one of relative stability and success, particularly compared to those of the LSE and LIFFE. Given the volume of business now being transacted on two of its clients, the LSE and LIFFE, the LCH was now responsible for clearing a much larger volume of business than used to be the case. The member owners of the LCH began to wonder nervously whether its financial reserves would be sufficient to handle a really significant failure. (The Barings crash involved losses of £800 million; by contrast, Credit Lyonnais lost over £1.5 billion before being bailed out by the French government). If the LCH had insufficient resources then they as owners would be the next port of call for fresh capital.

The desire to see a significant increase in the capital base was one of the major factors behind the merger of the LCH with Clearnet, its French counterpart. Another contributor was the apparent potential for technological savings. It was suggested that “From the moment the contract was signed in December 2003, the plan was for the newly formed clearing house to replace the 30 or so legacy systems it inherited with a single platform for clearing trades based on Java and Oracle technologies.”<sup>30</sup> Sadly the project went badly wrong and deadlines were increasingly missed. Finally the situation led to a change of chairman and chief executive. Today LCH.Clearnet is in the middle of a serious re-examination of its overall role. It has never been fully clear whether it should be operating as a mutually-owned market utility or a for-profit public company. The new management is

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<sup>30</sup> Computer Weekly, 18 July 2006, <http://www.computerweekly.com/Articles/2006/07/18/217038/did-lack-of-it-involvement-at-outset-doom-lch-clearnets-grand.htm>.

now attempting to agree a resolution of this issue with users and owners through the development of a coherent mixture of the two models from which it has evolved.

We have already drawn attention to the view of several of our interlocutors that there was real value to the clearing house being located in London. LCH.Clearnet has always been headquartered in London, however,, and it is therefore difficult to speculate how London would have fared had it been located elsewhere. It does seem fair to say, however, that any sub-optimal performance on the part of LCH.Clearnet has had little negative impact upon the success of London as a financial centre.

### **6.3 *The Bank of England***

The position of the Bank of England has changed significantly since its independence in 1997. Where once it acted as both the regulator of banking affairs in London, and to a great extent as the promoter and protector of the financial services industry, it now interprets its role as being confined almost exclusively to managing monetary policy.

The impact this move is having on the City can be encapsulated by looking at the specific example of the ECB's wish to create a settlement engine for Eurozone countries (known as Target 2 Securities, or T2S). This project came to light during the second half of 2006 when the ECB announced its desire to build such a system in the wake of the work it had already done on the Target 2 bank payments system. A securities settlement system is, of course, a much more complex proposal than a straightforward payments system. In this case, it is further complicated by the fact that many of the settlement systems already in place in Europe are multicurrency. As Target 2 was a purely euro-based system would T2S similarly be confined to securities denominated in euros? If so, what would happen to securities denominated in non-euro currencies? And what about the ambitious plans of companies like Euroclear to create a pan-European settlement engine? How would those fit in?

Given the importance of London-based financial services to the European securities industry it was clearly essential that the UK participated in the T2S debate. As the ECB works through other central banks, it immediately became apparent that the UK would have a problem. The Bank of England, not having participated in Target 2, saw no reason why it should become involved in T2S (although it did take a benign and non-interventionist interest in the project). The financial services community in London was therefore left to interface with the ECB through its own devices. Since November there have been two sets of London-ECB discussions and the ECB itself has given two general presentations on T2S in Frankfurt to which London-based organisations were invited. At the time of writing, the proposal, which was due to have gone to the ECB governing board in late February, looks to have been postponed to allow time to provide additional information to the EU's Financial Services Committee, an Ecofin body. Although the ECB is not required to follow the views of this committee, it would be politically imprudent not to take account of them.

T2S may represent a watershed in the way in which the London financial services community relates to both the EU Commission and the ECB. It has been clear for some time now that the industry can no longer rely on the Bank to act as its champion in discussions at the European level. Yet given the contribution of London to the European financial services sector, it is of paramount importance that its voice is heard in both Brussels and Frankfurt.

Most of the major City market institutions either have offices in Brussels or staff based in London whose job it is to track developments in Brussels and Frankfurt. The UK's main trade associations also have individuals or departments whose role it is to monitor EU and ECB initiatives. In the absence of any coordination by the Bank of England, it seems inevitable that there will have to be a further increase in the level of interaction on an individual bank or trade association basis. H M Treasury, of course, provides support to the City but cannot fill the role of coordinator of City views – by definition its responsibility is to look after the interests of the UK as a whole, and not just wholesale financial services (however important that sector is to the UK economy). Thus when there is a need for central coordination the only body in a position to undertake this role is the City of London Corporation, which has an office in Brussels and a senior EU Advisory Group to monitor affairs. One of those we interviewed questioned the logic and appropriateness of this role being undertaken by a local government body, but the general view among those to whom we spoke was that it was important that this role should be undertaken, and that the City of London Corporation was particularly well suited to take on the responsibility, as it has done in the case of T2S.

#### **6.4 *The Effects on Employment***

One of the factors that was frequently cited as encouraging the growth of London as a financial services centre was the availability of talent. It needs to be clearly understood that this refers not just to UK nationals but to all nationalities. The UK's relatively liberal immigration laws have enabled London in general and the City in particular to attract talented individuals from all over the world. One of those we interviewed said that he had never once had a problem in getting a work permit at short notice from the Home Office for a skilled person he had wanted to bring into his bank from abroad. The skills of the French in options trading (a product of excellent mathematics teaching) are already well known, but in addition the City has continued to attract well-qualified intellects from India, China, Germany, Japan, the United States, Switzerland, Australia, South Africa and numerous other countries. With the heavy investment taking place in more and more sophisticated technological solutions, however, it is necessary to address the question of whether there will be reduced employment opportunities in the future.

To date, there is little evidence to suggest that the increased use of technology has reduced opportunities for employment in the City. There has, however, been a progressive and significant change in the types of jobs available. For many years the City was a place where talented individuals who left school at the age of 16 or 18 years, and who had a head for mental arithmetic, could easily find jobs as traders on the floors of the open outcry



exchanges such as LIFFE, the LME, the IPE etc. These were the so-called "barrow boys" of the industry. Many of them made significant amounts of money as "locals" (trading on their own account and providing liquidity for the big banks). These individuals have now all but disappeared, due to the almost complete transition to electronic trading. They have been replaced by much more highly qualified individuals who have the ability to develop the "black box" systems required by the growth of algorithmic trading.

Thus what is being seen with the move to high technology trading is not a reduction in employment but a shift in focus to the employment of individuals skilled in computer programming for trading. The question for London, and indeed for the UK as a whole, is whether we are producing sufficient people who have the skills and qualifications to meet this demand. There is anecdotal evidence from the banks to which we spoke that many of those with the necessary skills are in fact coming from countries other than the UK, including France, Germany and increasingly Eastern Europe, especially Russia. If the City is going to continue to provide employment opportunities for UK citizens it is perhaps time for the government to look closely at the UK education system to ensure that it is equipping Britons with the requisite skills and qualifications to enable them to compete with other nationalities when banks hire specialist programmers.

## 7 The Future for Infrastructure Providers

### 7.1 Introduction

Having looked at the way in which infrastructure providers have operated in the past we need now to examine the way in which they are likely to operate in the future. We are clearly going through a period of great change and innovation (although it is difficult to think of a time over the last twenty years or so when this statement would not have been correct). Part of that change is being driven by the increasing use of technology, and part by changes introduced through new legislation and regulation.

### 7.2 The Future Roles of Infrastructure Providers

We see infrastructure providers as having two broad roles going forward. Firstly they will need to continue providing a service that is solid, reliable, well regulated, and above all cost effective. Secondly they will need to respond to new needs from the market: as innovation in the markets gathers pace we will see the formation of new contracts and even entirely new product classes. Infrastructure must respond rapidly to these initiatives, at the appropriate time in their evolution, to allow market growth to be maintained.

Thus the infrastructure of the future will need entrepreneurial organisations, a pool of innovative, expert people, the ability to fit into existing infrastructure, access to technology components which can be quickly and cheaply woven together with pieces of bespoke development, inter-connectivity through standards, inter-operability, and free access to parts of vertical silos.<sup>31</sup>

We see these enabling factors becoming more and more available as time goes on. Therefore we expect to see more contestability *vis a vis* incumbent infrastructure providers, easier, cheaper innovation to support new products, and an infrastructure continually changing in response to vibrant, developing markets.

### 7.3 Possible New Infrastructure Providers – Exchange Trading

The recently announced Project Turquoise venture provides an interesting insight into the future. Project Turquoise is a proposal by seven of the major investment banks in London to create a platform that has the ability to execute trades on behalf of its members. It has been described to us as an extension of the internalisation of trades that banks will be allowed to perform across the EU once MIFID comes into full effect. (Internalisation is already allowed in some EU jurisdictions, such as the UK, but not in many others). Banks using Turquoise will be able, in the first instance, to internalise trades as far as possible within their own systems. Where this is not possible, trades

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<sup>31</sup> Vertical silo is the term commonly used to describe an infrastructure organisation with a trade execution function vertically integrated with clearing and/or settlement functions.

could cascade down into Turquoise, and where execution in Turquoise is not possible, they could then cascade down into the relevant stock exchange.

Some commentators have suggested that Turquoise is no more than an attempt by the banks to put pressure on the exchanges to bring down their transaction costs. If this is so, then it is already having an effect. Both Euronext and the LSE have announced (during their recent M&A activities) that in the medium term they expect to bring down the cost of trading to their customers. Indeed, if the precedent of the United States is anything to go by, there will be a constant downwards pressure on trading fees for the foreseeable future. From what we have been told by the banks, and from the evidence of the investment they are making in Turquoise, this is, however, no shot across the bows of the exchanges – it is a serious attempt to take advantage of the opportunities presented to them by MIFID.

Turquoise is likely to use some off the shelf technology. It will plug into the public data streams of the major exchanges, and into the quote vendors, using generally accepted standards and off the shelf messaging software. It will plug into the existing clearing houses and settlement services – and we would assume that EU Competition Commissioner Neelie Kroes is going to make sure that this is possible. It will be integrated with the other markets in the dealers' offices through smart order routing systems which are also available off the shelf. In essence, this means that the innovative part of Turquoise is actually the manner in which all these parts are put together. The technological challenge itself is relatively limited, and will become even smaller as the standardised components and plugs and sockets evolve over time.

Turquoise is not alone. Over the last few months similar initiatives have been announced by a number of competing providers, including Chi-X, Liquidnet, Nyfix Millennium, and Pipeline Trading. Within the banks themselves, discrete trading systems have been in place for some time, including Pool (Morgan Stanley), Sigma X (Goldman Sachs), Crossfinder (Credit Suisse), Price Improvement Network (UBS) and BIDS (the Block Interest Discovery System owned by Citigroup, Goldman Sachs, Lehman Brothers, Merrill Lynch, Morgan Stanley and UBS). It is worth noting that most of these initiatives emerged from innovations originating in the US – we should not lose sight of this fact in the euphoria that surrounds the growth of London as an international financial centre.

#### ***7.4 Possible New Infrastructure Providers – Clearing and Settlement***

The European Commission has strongly encouraged the clearing and settlement industry to adopt a Code of Conduct with the objective of improving the integration and efficiency of European post-trade processing. The Code of Conduct will require the incumbent clearing and settlement providers to unbundle their services and to improve access and interoperability. The clear intention is to encourage the adoption of access standards and common procedures and to increase the possibility of contestability between current incumbents.

As clearing and settlement become more standardised – which will take longer than trading standardisation because there are more processes and more special cases to deal with – we can expect similar effects as in the trading field. Opportunities will gradually emerge for the entry of competitors to the incumbents. New entrants could come from two directions:

- A major venture such as Target 2 Securities which aims to replace many of the functions of the existing European national CSDs.
- Banks or bank consortia “upstreaming” the clearing houses and CSDs by netting out trades so as to reduce the number of transactions they submit to clearing and settlement and the resulting fees paid. Although at the time of writing the participants in Project Turquoise are keeping their cards close to their chests, there is said to be a clearing and settlement component to the venture, and we might speculate that a pre-netting arrangement of this sort is being contemplated.

If London is to continue to be a competitive global finance centre, it needs to foster an environment in which incumbent providers can be challenged and innovative services can be built using the facilities of existing services.

## 8 Conclusions

The purpose of this study was to analyse the role of financial infrastructure – the exchanges, clearing houses, settlement organisations and regulators - in maintaining London's competitiveness as a financial centre. In pursuit of this objective, we have looked at the way in which the past performance of the infrastructure providers has impacted upon this competitiveness in the past, at the way in which industry consolidation is currently affecting the same providers, and the extent to which the system has benefited from government policy. Through our discussions with users and providers, we have also attempted to determine what the management of the infrastructure institutions believe they need to do to maintain and improve their competitiveness, and what support they believe they require from owners, participants and government so to do. The conclusions we have reached are the following.

### ***8.1 How has the performance of London's infrastructure providers impacted upon London's competitiveness?***

London's main infrastructure providers today can be broadly grouped into previously industry-owned institutions (for example, the LSE, LIFFE, CREST, and LCH.Clearnet), the private sector (ICAP, Reuters etc) and regulators (specifically the FSA and, to a lesser extent, the Bank of England). We will look at each of these in turn.

The previously industry-owned infrastructure providers have had a chequered history. The LSE has clearly failed to consolidate or build on the pre-eminent position it had in Europe at the time of Big Bang. It has been overtaken in terms of market capitalisation by both the Deutsche Börse and Euronext, both of which have been run on a more entrepreneurial basis and have managed, in contrast to the LSE, to secure important positions in the rapidly growing derivatives sector. Notwithstanding that rather sad past, over the last few years the LSE has, through a combination of a global move away from the use of the US capital markets and successful management initiative, has succeeded in re-establishing itself as Europe's main international equity market.

LIFFE and the LCH have had similar problems which have now been vigorously tackled. The future of LIFFE seems to have been secured, initially by its acquisition by Euronext and now by Euronext's acquisition by the New York Stock Exchange. In the derivatives field, however, it has to be conceded that LIFFE still lags some way behind the Chicago Mercantile Exchange, which has trading volumes well in excess of those of LIFFE.

The story of the private sector infrastructure providers such as Reuters and ICAP is quite different. Of course Reuters has itself been through some painful periods of adaptation, but we would argue that it has been able to handle these more rapidly and efficiently than the formerly industry-owned providers. ICAP is an excellent example of a company that has grown dramatically over

a relatively short period of time simply as a result of some inspired entrepreneurial leadership.

In relation to these first two groups therefore we would conclude that, until recently, the lack of entrepreneurial leadership in the formerly industry-owned infrastructure providers significantly hampered their growth and impeded their ability to maintain their European pre-eminence which was evident at the time of Big Bang in 1986. On the other hand, the private sector group of infrastructure providers seem not to have been damaged at all by this sub-optimal performance of the first group.

As far as the regulators are concerned, there is no doubt whatsoever that the quality (and quantity) of regulation in London is one of the major factors behind the desire of so many foreign companies wishing to locate here. We were told time and time again just how crucial the role played by the FSA was. Although there will always be ways in which regulators can improve their performance (and several suggestions were made to us about the need for the FSA to improve its understanding of some of the markets it regulates) the overall assessment of the FSA by market participants was favourable.

The role of the Bank of England is rather different. Having long since lost its role as a regulator of banking activities, it has now reached a clear view that its role should be confined strictly to monetary policy. This means that it no longer has the motive or the resources to act as a champion of the City in Brussels or Frankfurt. It is ironic that at the same time as this is happening, the ECB is looking to extend its role beyond banking into the securities sector via its proposed creation of the Target 2 Securities settlement system.

## ***8.2 How is industry consolidation affecting London's infrastructure competitiveness?***

Industry consolidation has the capability to improve or damage London's competitiveness. In the case of LIFFE, which is now effectively owned by the New York Stock Exchange, the prognosis seems quite positive. The NYSE (like the LSE) has suffered for some time from not having a foothold in the rapidly growing derivatives market. With LIFFE in the fold, it now has an opportunity to attack the dominance of the main Chicago players. Given the dominance of the latter it has to be said that this will be a challenging task, but at least with the capital resources of the NYSE behind it, LIFFE now has a real chance of making inroads into the difficult US derivatives market.

The position of the LSE is less clear. Its successful defence against the Nasdaq bid is a credit to the determination of its board and senior management. There seems little doubt that, had Nasdaq succeeded in taking control of the LSE, then notwithstanding the Balls Act (enabling the FSA to veto any rule changes which smacked of US "regulatory pollution"), a perception might have grown that the LSE was effectively a US exchange in sheep's clothing. That could easily have led to a loss of confidence by global issuers in the LSE as a viable alternative to listing in the United States.

The LSE, however, is left with Nasdaq as a substantial shareholder, which will make it very difficult for it to consider taking on any other partners, or merging with, for example, a European exchange. This albatross around the neck of the LSE could affect its actions for some time to come, unless of course Nasdaq divests itself of its shareholding in the LSE as it once threatened to do during the bid process. Given the dramatic downward pressure that this would put on the LSE share price it is difficult to see what benefit Nasdaq would gain from such a course, but one cannot always predict the actions of a rejected suitor. The effects of the consolidation process cannot yet be said to have benefited the LSE. If, however, it takes a proactive role in seeking a more acceptable partner than Nasdaq, one that does not have the baggage of US regulation, then there is still a possibility that consolidation could benefit the LSE. It may well be that the recently announced project linking the LSE and the Tokyo Stock Exchange could be the first step in this direction.

### ***8.3 How has the industry benefited from government policy?***

The most obvious point to make under this heading is that the policy adopted by successive UK governments, of setting relatively liberal rules for the marketplace and letting the market get on with it, has been largely beneficial. The Treasury has over a long period of time let the City operate relatively free of government intervention. It has taken care at the same time to monitor what goes on in the City and has worked to ensure that decisions in Brussels do not impact adversely on the City (for example, the long debate over withholding tax). In addition, the Government's fiscal and immigration policy has to date operated to the long term benefit of the City. It has to be said, however, that concerns are now beginning to be raised about the taxation regime. In addition, the government will need to watch closely the extent to which its reasonable desire to crack down on unlawful tax avoidance has the unintended consequence of driving legitimate business and key talent offshore.

Overall, UK government's arms length approach taken contrasts favourably with the more interventionist stance adopted by some continental European governments. These latter have often been tempted to intervene on behalf of their own financial services sectors. There is very little evidence that such interventions have had any lasting benefit.

### ***8.4 What do infrastructure providers need to do to maintain their competitiveness?***

The short answer to this question is that the previously industry-owned infrastructure providers need to be as entrepreneurial as their private sector counterparts. The move from a mutually-owned structure to a publicly-owned one has been a long and difficult learning process for many of London's infrastructure providers. One of the main purposes of making such a change was to introduce a more aggressive and entrepreneurial attitude to the management of these organisations. It has not always proved easy to change what in some cases is 200 years of history. While it may not have

been a mistake to demutualise the exchange, more care might have been taken to introduce competition in parallel with that process.

In order to maintain competitiveness, infrastructure providers need to be exposed continually to real competition. The new providers of MTFs (multilateral trading facilities, a MIFID definition), which are effectively budding infrastructure providers, must be allowed to operate and flourish in direct competition with established providers. Publicly owed private sector monopolies run as much danger of becoming uncompetitive as mutually-owned monopolies.

### **8.5 *London vs New York***

Considerable coverage has been given in recent months to the suggestion that London has overtaken New York as the world's most important international financial centre. It is important to view this in context. London and New York are not engaged in a football match – this is not Manchester United versus Chelsea. If it were, we would have to ask why the world's best players (like Goldman Sachs, Morgan Stanley, Merrill Lynch, Credit Suisse, Deutsche Bank, BNP Paribas and many others) were playing for both teams. Thus terms frequently used by the media (such as the "fight" between London and New York) are quite inappropriate. The true situation is far more complex.

The financial centres in London and New York are inextricably interdependent. Professional staff move seamlessly from one location to another depending on the strategic requirements of their banks. These strategic requirements evolve over time. What has changed in recent years is of course the move to more interventionist regulation in the United States. This has been one (but only one) of the reasons why there has been an increasing international trend for companies, which might in the past have looked for a listing on Nasdaq or the New York Stock Exchange, to look instead at the London Stock Exchange, in particular its lower tier AIM market. Nothing, however, is for ever, and there are already rumblings that the shine has begun to go off the AIM market.

In other markets the picture is different. In derivatives, notwithstanding the growing success of LIFFE, there can be little doubt that the world's trading centre has for some time, and remains to this day, Chicago. With the impending merger of the Chicago Mercantile Exchange and the Chicago Board of Trade this dominance shows every sign of continuing. In the bond markets, London ironically has benefited considerably from the introduction of the Euro. Whereas previously bond traders were faced with a multiplicity of European currencies, some of little interest and low liquidity, bond trading has now been concentrated into one large and liquid currency. As a result, the bond market (in both London and Luxembourg) is in rude health. But it has to be said that the market in US Treasuries in the United States is also huge. In foreign exchange, however, once again London is in the lead and has been so for several decades.



Perhaps the most significant point to make is that the US has been the source of most innovation in financial services. It is difficult to think of any new instrument in the equity and derivatives markets which has not been invented in the United States – products such as Exchange Traded Funds, financial derivatives, equity derivatives, credit derivatives, even carbon traded products (which were based on the innovative sulphur dioxide contracts created in the US) all originated in the United States. In addition to the products themselves, the initiatives to support new markets (such as credit derivatives) have also come from the US. This might suggest that European infrastructure providers are still too preoccupied with jockeying for position in the old markets than seeking new ones. Without the incredibly rich source of innovation from across the Atlantic, it is debatable whether London would be as successful as it is today.

None of this is meant to decry London's skill in exploiting the opportunities that comes its way. In addition, the manner in which US regulation has helped London over the years has been quite striking. The Eurocurrency market which began in the late 1950s and early 1960s was helped enormously by Regulation Q, which prevented US banks from offering interest rates above a certain level. In London no such constraint existed. Similarly the existence of an interest equalisation tax on foreign bond issues in the US from 1963 onwards meant that it became very expensive for foreign borrowers to raise capital in there. This led to the enormous growth of the Eurobond market in London and Luxembourg. One of the reasons why there was such a flood of US banks to London after Big Bang in 1986 was that the Glass Steagall Act prevented banks in the US from conducting both retail and investment banking simultaneously. Again no such restriction existed in London. More recently, the Sarbanes Oxley Act, in itself an entirely understandable response to scandals such as Enron and WorldCom, has acted to the benefit of a less oppressive London regime. The protectionist noises coming out of the United States in the wake of the DP World saga might be adding further support to the view of a number of the world's largest non-US issuers that they may not be welcome in the United States.

It is therefore probably quite accurate to describe London today as the world's major international financial centre. But in saying this it is worth remembering that the enormous size of the US domestic market and its unrivalled reputation for financial innovation means that London is fortunate to be so closely interconnected with the US market.

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## Annex: Organisations Interviewed

Bank of England  
Bank of New York  
Citigroup  
Credit Suisse  
Crest UK Market Advisory Committee  
Deutsche Bank  
DTCC  
Eurex  
Euro MTS  
Euroclear  
Euronext.liffe  
Financial Services Authority  
ICAP  
IntercontinentalExchange  
International Capital Markets Association  
International Financial Services, London  
International Swap Dealers Association  
JPMorgan  
LCH.Clearnet  
London Investment Banking Association  
London Stock Exchange  
Morgan Stanley  
Reuters  
TradeWeb  
UBS

## The City of London Corporation

The City of London is exceptional in many ways, not least in that it has a dedicated local authority committed to enhancing its status on the world stage. The smooth running of the City's business relies on the web of high quality services that the City of London Corporation provides.

Older than Parliament itself, the City of London Corporation has centuries of proven success in protecting the City's interests, whether it be policing and cleaning its streets or in identifying international opportunities for economic growth. It is also able to promote the City in a unique and powerful way through the Lord Mayor of London, a respected ambassador for financial services who takes the City's credentials to a remarkably wide and influential audience.

Alongside its promotion of the business community, the City of London Corporation has a host of responsibilities which extend far beyond the City boundaries. It runs the internationally renowned Barbican Arts Centre; it is the port health authority for the whole of the Thames estuary; it manages a portfolio of property throughout the capital, and it owns and protects 10,000 acres of open space in and around it.

The City of London Corporation, however, never loses sight of its primary role – the sustained and expert promotion of the 'City', a byword for strength and stability, innovation and flexibility – and it seeks to perpetuate the City's position as a global business leader into the new century.

