THE STOCK MARKET'S CHANGING STRUCTURE AND ITS CONSOLIDATION: IMPLICATIONS FOR THE EFFICIENCY OF THE FINANCIAL SYSTEM AND MONETARY POLICY

This article analyses the trend towards consolidation among stock exchanges and its implications for monetary policy, as well as for the efficiency of the financial system. During the past year, there has been a wave of consolidation of trading activities, with several mergers taking place among stock exchanges. While several factors are driving this trend, barriers to further consolidation still exist. Ongoing consolidation among stock exchanges, inspired by both market and policy-makers, has been motivated mainly by the idea of gains in efficiency and productivity. In the euro area, consolidation of stock exchanges can improve the efficiency of the financial system, increasing the liquidity for investors and the possibility of financing for euro area firms. At the same time, it will be crucial to find the right balance between consolidation and competition. Structural developments in the stock market are of great interest to a central bank, since an integrated and developed capital market spurs economic growth and creates a favourable setting for monetary policy. In particular, it is important that all investors and savers have equal access to an efficient financial system within a given currency area. Improved efficiency will enhance the effective transmission of monetary policy as well as risk sharing for investors and issuers, both within and outside the euro area, as it will be easier to diversify across regions, sectors and currencies.

1 INTRODUCTION

Stock markets are a vital part of the financial system, as they improve risk sharing among economic agents and therefore spur economic growth. They perform the function of channelling resources from savers to the corporate sector. The more active the trading on stock markets, the easier it is for listed businesses to find the capital they need for development. In turn, liquidity on stock markets increases as the transaction chain for securities trading becomes more efficient. Overall, for stock markets, greater scale and volume combined with efficiency are important ingredients for creating greater opportunities.

In the early days, most stock exchanges offered trades on a limited number of domestic financial assets. Over time, structural changes, such as more sophisticated technology and changes in ownership, have induced competition between stock exchanges, allowing room for exploiting economies of scale and increasing the number of financial products offered, spurring on consolidation. In the euro area, following the start of the Monetary Union, these developments were part of a general process of financial integration across countries that aimed at improving the efficiency of the financial system, increasing market liquidity for investors and the possibility of financing for firms.

From a policy point of view, it is important to highlight that stock markets and monetary policy are interrelated in various ways. An efficient stock market promotes risk sharing for investors and issuing firms in that it increases the possibilities for economic agents to allocate capital across space, time and risk. At the same time, a developed and efficient stock market generally creates a favourable setting for monetary policy, because monetary policy impulses are transmitted in a smoother way.

In this context, the purpose of this article is to analyse the ongoing trend towards consolidation of stock exchanges in the light of its possible implications for monetary policy. The current wave of consolidation of trading activities was already forecast by several observers shortly after the introduction of the single currency and following the progress in the integration of EU financial markets. Initially, it took place at the national level, with the consolidation of national trading structures, and at a regional level, primarily with the creation of Euronext and, to some degree, through the enlargement of the OMX (the Nordic/Baltic marketplace). In the past year, there has been a second wave of consolidation involving entities located outside the euro area: two large consolidations, which have already been finalised (NYSE Euronext and the London Stock Exchange (LSE) with Borsa Italiana), and the planned merger between NASDAQ and the OMX Group. Although the latter has only a marginal impact on the euro area, it is an interesting example of consolidation across different regions. This article highlights the driving factors behind this observed trend and describes some of the barriers to further consolidation.

The article is structured as follows. Section 2 elaborates on the evolution and structure of stock exchanges, including the trend towards the consolidation of stock markets. Section 3 discusses the conceptual background to the current trend towards consolidation and the factors favouring and hampering it. Section 4 describes links between equity markets and monetary policy, as well as how changes in the structure of these markets may affect the conduct of monetary policy, and Section 5 concludes.

2 THE EQUITY MARKET IN THE EURO AREA: EVOLUTION AND STRUCTURE

The history of equity markets can be traced back to 12th century France, when the first brokers are believed to have developed trading in debt and government securities. Unofficial equity markets existed across Europe throughout the 1600s, whereby brokers would meet outside or in coffee houses to make trades. The Amsterdam Stock Exchange, created in 1602 to trade shares in the Dutch East India Company, became the first official stock exchange. By the early 1700s there were operational stock exchanges in France and England, with the United States following in the later part of the century. Almost all developed countries have or have had at some point a domestic market place for raising companies' capital. In many countries, regional exchanges also existed, until they became consolidated with others.

Consolidation in the euro area has mostly occurred within countries. At the national level, many of the consolidation deals have been mergers among regional exchanges and between the cash and derivatives markets. The Deutsche Börse was formed in 1992 by the merger of eight regional stock exchanges in Germany. In 1999, Germany still had eight regional stock exchanges, but following mergers, there were only five remaining regional stock exchanges in 2005.[1] Consolidation in Italy took place in 1995 when, with the advent of electronic trading, it was decided to close all regional stock exchanges, which were owned by the government, and concentrate all the activities in Milan. In 1997, the decision was taken to privatise the stock exchange and found a listed company, Borsa Italiana. In Spain, the four regional stock exchanges (Barcelona, Bilbao, Madrid and Valencia) have been cooperating since 1999 under Bolsas y Mercados Españoles (BME).[2] In 2002, the Athens Stock Exchange and the Athens Derivatives Exchange merged to form the Athens Exchange, which is run by Hellenic Exchange Holdings.[3] In 2005, there were 22 securities exchanges (stocks and derivatives) in the 12 euro area countries compared with 30 in 1999.[4]

Lately, consolidation has also taken place across regional borders. The evolution of Euronext (see Box 1), the Nordic-Baltic mergers (see Box 2), and the merger between the London Stock Exchange and Borsa Italiana are noteworthy examples.

1 Apart from the Frankfurt Stock Exchange, also Berliner Börse (including Bremen), Börse Düsseldorf, Börsen Hamburg-Hannover (BÖAG), Bayerische Börse and Börse Stuttgart.

2 BME is a company that integrates securities markets and financial systems in Spain. The parent group comprises four stock exchanges, MF Mercados Financieros, Iberclear and BME Consulting.

3 In April 2007, the Bulgarian government announced plans to sell a 44% stake in the Bulgarian Stock Exchange. Several exchanges in the EU have shown interest in buying a stake.

4 See H. Schmiedel and A. Schönenberger, 2005, "Integration of securities market infrastructures in the euro area", ECB Occasional paper No. 33, and "Integration, regulation, and policy of securities market infrastructures in the euro area", 2006, in *Journal of Financial Regulation and Compliance*, Vol. 14, No. 4.

Box 1

THE CASE OF NYSE EURONEXT

In 1999, concurrently with the start of Stage Three of EMU, eight European stock exchanges started discussing the possibility of a more integrated European equity market, which would offer a single interface to their customers, giving access to the various national exchanges. These discussions broke down. Instead, three members – the Amsterdam, Brussels and Paris exchanges – decided to pursue a separate integration initiative and, in September 2000, a new company, Euronext, was created from the merger of these exchanges.

The creation of Euronext was followed by the acquisition of LIFFE (London International Financial Futures and Options Exchange) – the London-based derivatives market – and the merger with the Portuguese exchange, BVLP (Bolsa de Valores de Lisboa e Porto) in 2002.

Euronext is a cross-border exchange. Since November 2003, the users of the Paris, Brussels, Amsterdam and Lisbon exchanges have been operating on a single trading platform. It was decided to use the Paris market's NSC system as the platform for all three cash markets (NSC is an electronic trading system that provides an electronic, transparent order system in which orders trade on a price/time priority). Cash trading fees were subsequently harmonised across the different markets. In early 2005, Euronext began to overhaul its listing arrangements with input from finance industry professionals, aiming, in particular, to enhance the liquidity and visibility of small and mid-sized firms on its markets. These reforms culminated in the creation of a single list, Eurolist, encompassing all regulated markets. Companies can gain access to Eurolist from any of the four market places depending on the domestic market and legal framework of their choosing. The four exchanges comprising Euronext are all served by the same central counterparty clearing house (LCH. Clearnet SA), while the settlement of transactions is handled by the Euroclear Group.[1]

The merger has enabled the exchanges to combine their efforts and utilise the same platforms, substantially reducing technology costs. The efficiency gains arising from the integration of exchanges forming Euronext have been estimated to be positive.[2] For example, traded volumes have increased and bid-ask spreads have been reduced. The volatility of large-cap securities has also decreased. However, these positive effects seem to be concentrated mainly among larger firms involved in cross-border activities.[3] IT and staff costs also decreased between 2001 and 2004.

As the latest step in the evolution of Euronext, following several competitive offers, the shareholders of Euronext recently decided to accept the offer of NYSE and created NYSE Euronext, the holding company that combines NYSE Group, Inc. and Euronext N.V., which was officially launched on 4 April 2007. Through this merger, NYSE Euronext has brought together six cash equities exchanges in five countries and six derivatives exchanges. NYSE Group, Inc., a wholly owned subsidiary of NYSE Euronext, operates two securities exchanges: the New York Stock Exchange LLC (the "NYSE") and NYSE Arca, Inc. (formerly known as the Pacific Exchange). At the same time, Euronext N.V. is a subsidiary of NYSE Euronext.

1 See "Payment and securities settlement systems in the European Union", Blue Book, fourth edition, ECB, 2007.
2 See M. Pagano and J. Padilla, 2005, "Efficiency gains from the integration of exchanges: lessons from the Euronext natural experiment", a paper prepared for Euronext.
3 See U. Nielsson, 2007, "Stock exchange merger and liquidity", Reykjavik University, winner of the 2007 Josseph de la Vega prize.

The stock exchanges on the two continents are currently working as two separate entities. There is no common trading platform or interconnection between Euronext and NYSE. Companies cannot be listed automatically on a common list, since the merger has taken place across regions with different legal and regulatory requirements. Thus, if companies choose to be listed in both markets, they still have to undergo separate listing processes. A company applying to be publicly listed must first be approved for admission by the relevant national regulatory authority. For example, a French company going public and cross-listing at both Euronext Paris and NYSE must first be approved by the AMF (Autorité des Marchés Financiers) in France and the SEC (Securities and Exchange Commission) in the United States.

However, according to NYSE Euronext, cross-border products and services, international listings in multiple currencies and time zones are foreseen.[4] A common trading platform is planned for implementation by the end of 2008, which would allow floor participants to trade the entire NYSE Euronext portfolio, thus exploiting substantial merger-related technology synergies. There also seems to be scope for leveraging the currently limited overlap of common members and customers in the derivatives exchanges. This could be done by introducing a global trading infrastructure and implementing a simple cross-access approach. However, the impact of such changes to the current regulatory framework, and in particular, possible "regulatory spillover", has to be carefully considered.

4 In this context it is worth mentioning the recent proposal by the SEC (US Securities and Exchanges Commission) to start accepting from foreign private issuers financial statements prepared in accordance with International Financial Reporting Standards without reconciliation to US GAAP, as currently required.

This is part of a wider process which also involves stock exchanges outside the EU, the latest finalised example being NYSE Euronext, reflecting the increasing globalisation in capital markets.

Consolidation can take place horizontally, with mergers between securities exchanges providing similar services. This normally implies moving from a system with different trading platforms to one consolidated platform (as in the case of Euronext or the Nordic list at OMX) or to an interconnected platform. In other cases, consolidation may simply lead to the combination in one holding group of trading platforms which remain, at least initially, separate (as is currently the case with NYSE Euronext).

Box 2

THE EVOLUTION OF THE NORDIC BALTIC STOCK EXCHANGE – OMX

Equities trading in the Nordic and Baltic countries has become increasingly integrated in recent years. This followed the overall financial integration in the area, but was also spurred on by several mergers of exchanges. The mergers with the OMX Group as the leading actor are one of the most noteworthy merger activities in the European Union (EU), since it currently includes seven countries, several currencies and central securities depositories (CSDs).

In 2003, the OMX Group (the owner of the Stockholm Stock Exchange) bought HEX Plc., which owned the stock exchange and CSD in Finland, which, in turn, included the exchanges in Tallinn and Riga. The following year, the OMX bought a major share in the Vilnius Stock Exchange. In 2005, the Copenhagen Stock Exchange was merged with the OMX by acquisition and, one year later, the OMX acquired the Icelandic EV, the owner of the Iceland Stock Exchange and Icelandic Securities Depositories. The OMX is therefore now the full or major owner of stock exchanges in seven countries. It is a publicly traded company and is listed on four stock exchanges in the Nordic region.

The concentration of the property in the OMX group was followed by the stipulation of the NOREX Alliance, which is a strategic alliance between the stock exchanges operating in the OMX Group and Oslo Stock Exchange. This alliance has led to a far-reaching harmonisation of equities trading in all eight Nordic and Baltic countries and has resulted in uniform rules for membership of the different stock exchanges.[1] This means that trading rules and membership requirements, as well as training and authorisation of brokers have been harmonised. Trading in the stock exchanges that participate in the Alliance takes place in a common trading system, SAXESS. As a result of the NOREX Alliance, a member of one of the stock exchanges can become a member of the other stock exchanges without having to undergo a formal and time-consuming admission procedure.

Moreover, in October 2006, the OMX introduced a common Nordic list with local shares from Stockholm, Helsinki and Copenhagen. Icelandic shares were introduced during spring 2007. Members of the cash market, for example, banks and securities firms, can trade equities, equity rights, convertible loans, subscription options, premium bonds, retail bonds, ETFs and warrants. The products can vary according to the local market, but only a single membership is required to participate in the market. The shares traded on the Nordic market are traded in the local currency of the exchange where the company is listed. The majority of securities companies also have a currency exchange service in place for trading in foreign currency.

The Baltic market, including exchanges in Tallinn, Riga and Vilnius also has one common securities list, a common trading system and harmonised market rules. In legal terms, the companies are still listed on their home market and supervised by the local financial supervisory authority. The Tallinn, Riga and Vilnius exchanges have identical trading day length and structure. In Tallinn, the euro is used as the trading currency, whereas local currencies have remained the trading currencies in Riga and Vilnius.

In general, the aim of creating an integrated stock market is to simplify trading for the stock exchange members, improve liquidity and facilitate trade in Nordic and Baltic shares. This integration means that stock exchange members and investors have access to Nordic and Baltic shares in a uniform way. It favours trade since it facilitates cross-border transactions and international marketing of the Nordic and Baltic stock markets.

For an issuer, the vast majority of the listing requirements are harmonised between the stock exchanges in Helsinki, Stockholm, Copenhagen and Iceland. However, because of special requirements regarding national legislation or other differences in the regulatory framework in a special jurisdiction, some discrepancies may still exist in the listing requirements between the four stock exchanges. They are separate legal entities in different jurisdictions, and each exchange therefore has its own regulation.

1 This is not without exception. For example, at present, the NOREX Member Rules are adopted by the Nordic Exchanges. Stock exchanges in Riga, Tallinn and Vilnius have adopted separate sets of rules, with very similar contents to the NOREX Member Rules.

Today, Euronext is by far the largest stock exchange in the euro area, as measured by market capitalisation.[5] It is followed by the LSE, Deutsche Börse, BME Spanish Exchanges, OMX and Borsa Italiana (see Table 1). Euronext is comparable in size to NASDAQ, while it is significantly outperformed by the market capitalisation of NYSE. In terms of ratio, which is measured as market capitalisation of domestic shares over GDP, the picture changes slightly. It turns out that, among euro area exchanges, the Luxembourg Stock Exchange has the highest market capitalisation over GDP, followed by the Spanish Exchanges and Euronext (see Chart 1). The EU-based exchanges, namely the LSE and OMX, are also important in terms of market capitalisation over GDP. Deutsche Börse and Borsa Italiana have relatively low ratios among the largest exchanges in the euro area. The cluster and hierarchy of exchanges are also present in terms of equity turnover. As such, Euronext and Deutsche Börse are the main markets, followed by BME, Borsa Italiana and OMX (Table 1). Overall, these measures point to a rather concentrated market. As of June 2007, the four largest exchanges in EU represented 83% of the total value of share trading. This figure increases to 91% if the five largest players are considered.[6]

The number of listed companies across euro area main stock exchanges has developed differently across time and domestic markets (see Chart 2). In total, the number of listed companies increased from 3,900 at the end of 1998 to 4,900 at the end of 2000, corresponding to an average annual growth of 12.3%.[7] Also, despite a decreasing number of listed companies at Deutsche Börse and Euronext in recent years, the long-term trend seems to be towards an increase, albeit at a slower rate. In 2002, approximately 6,300 companies were listed in euro area stock exchanges, with this figure reaching around 6,500 in 2007, corresponding to an average annual growth of 1%.

In addition to the main stock exchanges, some market places also have specific alternative lists for smaller and growing companies. In the euro area, these lists are connected to the Borsa Italiana

5 This section deals with the LSE and Borsa Italiana as separate units.
6 According to the Federation of European Securities Exchanges (FESE). Eighteen stock exchanges are included in the total.
7 See "The euro equity markets", ECB, August 2001.

Table 1 Market capitalisation and equity turnover

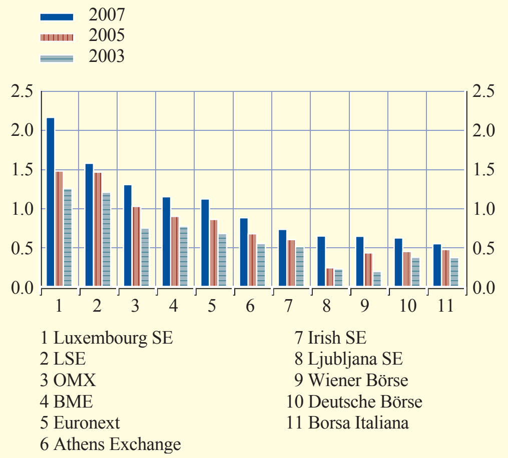
(EUR millions)

Exchange	Market capitalisation	Equity turnover
Euronext	3,139,342	2,020,444
LSE	2,988,761	4,163,429
Deutsche Börse	1,448,281	1,592,055
BME	1,125,103	1,115,484
OMX	954,922	683,190
Borsa Italiana	814,235	896,774
Athens Exchange	172,266	55,954
Wiener Börse	165,875	47,949
Irish SE	129,094	50,840
Luxembourg SE	71,718	94
Ljubljana SE	17,622	1,380

Source: FESE.
Note: Data for stock market capitalisation refer to June 2007. Equity turnover is the value of equity trading in the first half of 2007.

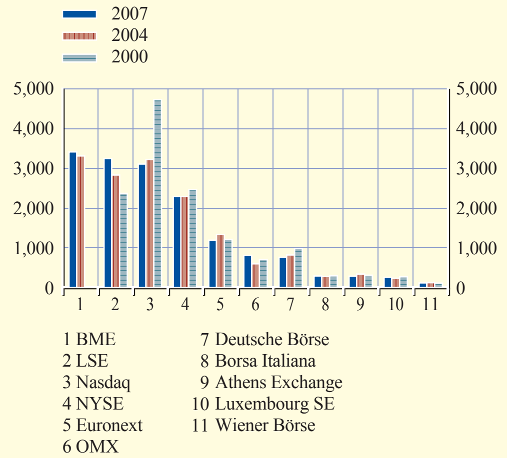
Chart 1 Stock market capitalisation

(as a percentage of GDP)



Sources: FESE, Eurostat, SedlaBanki, Statistics Iceland.
Note: GDP 2006 has been used for the calculation of the ratio for 2007. Data for stock market capitalisation refer to June 2007.

Chart 2 Number of listed companies in selected exchanges



Sources: World Federation of Exchanges, FESE and BME

Table 2 Underwriting fees and trading costs

Exchange	IPO underwriting fees (%)	Admission fees (% of value)	Total trading costs (bp)
LSE (main market)	3.3	0.02	25.2
AIM (UK)	3.5	0.00	n.a.
NYSE	6.5	0.02	23.5
NASDAQ	7.0	0.02	30.8
Euronext	1.8	0.04	27.0
Deutsche Börse	3.0	0.00	27.1

Source: Oxera (2006)
Note: The underwriting fees are a percentage of the total amount issued. Admission fees relate to a market capitalisation of £500m.

(Mercato Expandi), Deutsche Börse (Entry Standard), Euronext (Alternext) and in liaison with the Irish SE, Athens Exchange and Wiener Börse, respectively. In the EU, the LSE has the largest alternative list for smaller and growing companies, known as AIM. A common characteristic of these lists is that smaller companies are able to raise capital with less of a regulatory burden compared with the traditional stock exchanges. Thus, the structure of the stock exchange has an important influence on the costs incurred by companies.

The remaining part of this section deals with an estimate of the different cost components that are related to trading. These cost components concern the distribution costs (for example, through an IPO) and the liquidity costs (trading). These costs are important since they drive a wedge between the net return required by investors and the cost of equity capital faced by issuers. The distribution costs consist of direct costs, such as underwriting, professional and initial listing fees and of the discount on share prices in the Initial Public Offering (IPO). The liquidity or trading costs relate to the direct trading costs, which include brokerage commissions and fees, annual listing fees and corporate governance costs. They also include indirect liquidity costs, captured by bid-ask spreads and trading volumes. International studies have shown that the cost of listing and raising equity, as well as trading costs, differ to some degree across regions.[8] Indeed, in a comparison between the largest exchanges in Europe and in the United States, underwriting costs are estimated to be highest in the United States, followed by exchanges based in the United Kingdom and by Deutsche Börse. By comparison, underwriting costs at Euronext are low. As for trading costs in a secondary market, total costs of trading appear to be lowest on the NYSE and LSE, followed by Euronext and Deutsche Börse (see Table 2).

3 WHY CONSOLIDATION?

Consolidation among stock exchanges is aimed at taking advantage of the significant economies of scale and scope present in securities trading. Technological progress is a main driver of this process. On the one hand, it allows for the expansion of the pool of investors and firms trading in a market, thus increasing volume and liquidity and lowering trading costs. On the other, demand by investors for greater speed and capacity in transaction execution fosters competition among exchanges, which are

8 See "The Cost of Capital: An International Comparison", by Oxera Consulting Ltd, June 2006

required to make large investments in technology. Mergers in the exchange industry can thus help to slim headcounts, achieve substantial cost savings and consolidate the balance sheets.

However, too extreme consolidation may lead to disadvantages, since competition between stock exchanges may be challenged. Indeed, extreme cases of consolidation may encourage a tendency towards monopoly. While in the short term it may increase the profits made by exchanges, less competition may lead to higher listing fees and trading costs, and be harmful to both issuers and investors.[9]

As outlined in Section 2, to start with, stock exchanges arose locally as the natural way to minimise the cost of information. The primitive state of telecommunications technology at the beginning of the last century meant that securities exchanges could work only via face-to-face bargaining and proximity to the companies listed on the exchanges. The subsequent reduction in communication costs and changes in regulations – that harmonised the requirements across exchanges at least in the same country – led to increased competition between stock exchanges as firms tended to choose the most efficient exchange on which to list their shares.

IMPACT OF CONSOLIDATION

In the 1960s, several researchers had already pointed out that both the average operating costs of stock exchanges and bid-ask spreads tended to decline with an increase in trading volume, suggesting the presence of economies of scale both for exchange operations and market making. Moreover, it was highlighted that trading volume tends to cluster where execution costs are the lowest, in turn, reinforcing the process.[10] In the United States the consolidation process started after the 1940s. The technological and regulatory changes taking place around that time enabled the over-the-counter market to compete in the business that had previously been the domain of regional exchanges. These exchanges, in turn, started to compete to gain order flow on NYSE-listed firms. This competition led to a series of mergers between regional exchanges. Empirical studies on the consolidation of regional stock exchanges in the United States suggest that the volume of trading and their market share increased at the expense of other regional exchanges that were not involved in the mergers. The bid-ask spreads recorded on the merging exchanges tended to narrow, which is consistent with the view that consolidation increases competition among financial centres to the benefit of securities investors. Thus, the new merged exchanges were able to exploit economies of scale and compete more effectively with the NYSE.[11]

More recent analysis undertaken ahead of the introduction of the euro again pointed out the existence of substantial economies of scale among stock exchanges. However, these gains seemed to be more significant for exchanges that were located in regions with a more harmonised regulatory structure.[12] Consistently, as outlined above, in the euro area consolidation first took place at country level. Subsequently, the advent of the single currency and the disappearance of foreign exchange risk coupled with further technological progress – the rise of electronic trading – gave impulse to different levels of consolidation (mergers and network agreements) involving exchanges located in different countries. This strategy was largely beneficial in improving the performance of exchanges, as it was significantly associated with an increase in market capitalisation, growth and lower transaction costs.[13] Indeed, for

9 See T. H. McInish and R. A. Wood, 1996, "Competition, fragmentation and market quality", in *The Industrial Organization and Regulation of the Security Industry*, eds. A. Lo, National Bureau of Economic Research. Analysing the quality of markets for NYSE-listed companies, they conclude that competition between market centres is beneficial for market participants.

10 See H. Demsetz, 1968, "The cost of transacting", in *Quarterly Journal of Economics* 82, and B. Chowdry and V. Nauda, 1991, "Multimarket trading and market liquidity", in *Review of Financial Securities 4*.

11 See T. Arnold, P. Hersch, J. H. Mulherin and J. Netter, 2001, "Merging markets", *in Journal of Finance 54*.

12 See I. Hasan and M. Malkamäki, 2001, "Are expansions cost effective for stock exchanges? A global perspective", in *Journal of Banking & Finance* 25.

13 See I. Hasan and H. Schmiedel, 2006, "Networks and stock market integration: empirical evidence", in "Transparency, Governance and Markets" by M. Bagella, L. Becchetti and I. Hasan (eds.), Elsevier.

Euronext, traded volumes have increased and bid-ask spreads have been reduced, while the volatility of large-cap securities has decreased (see also Box 1). In addition, technological progress has facilitated the creation of economies of scope and scale. European exchanges, for example, have been quicker, compared with those in North America, to adopt electronic trading and create cooperative market linkages between stock and derivatives exchanges.

FACTORS FACILITATING CONSOLIDATION

The transition from being member-owned stock exchange organisations to becoming profit generating and listed companies has been a driving force behind the exploitation of economies of scale in the exchange industry. The changing trend in ownership and corporate governance should not be underestimated. This resulted partly from global competition and economies of scale. At the same time, this development facilitated consolidation. The demutualisation of stock exchanges has been extensive during the past ten years. According to the World Federation of Exchanges, 73% of its members were for-profit organisations in 2005, compared with 63% in 2000 and 38% in 1998.[14] This transition in governance allows exchanges to modernise their technology, avoid concentration of ownership power, gain easier ongoing access to capital, obtain a management structure that is more flexible in responding to changing industry and market conditions, engage in M&A deals and creates a catalyst for pursuing new business strategies.[15] This might, in particular, be the case for stock exchanges changing their governance from being government-owned to publicly traded companies. Privately-run companies might be better equipped to meet new market challenges and, in addition, publicly traded companies might be more M&A friendly. Finally, publicly traded companies, like several stock exchanges, are in general more transparent, with higher availability of company information. Thus, the transition in corporate governance makes it easier to acquire and merge with other stock exchanges. It also implies that exchanges now have customers rather than members, that are subject to competition of listing and trading membership from other stock exchanges and other initiatives.

Apart from the competitive pressure arising from technological progress, more recently, two additional themes have emerged that provide strong incentives for consolidation even across regions: the need for diversification of revenues and the new competitive environment stemming from globalisation. Industrial-based consolidation among different types of exchange has been the response of these institutions to a rising need for diversification of revenues. Growth in the cash equity market in the past few years has been slower when compared, for example, with the derivatives market, which provides a strong incentive for exchanges to reduce risk linked to their revenue streams. Exchange groups in the EU have very different revenue structures between cash and derivatives trading. For example, at both Euronext and Deutsche Börse, revenues from derivatives trading are larger compared with cash trading, while the opposite holds true for the LSE, BME and OMX.

Finally, the globalisation of markets has given a strong impetus to consolidation. Increasingly, investors are looking to diversify their portfolios more at a global level, taking advantage of non-domestic market growth. Exchanges are thus competing in giving investors more opportunities to trade across asset classes and time zones. Also, competition from alternative trading venues, such as the Alternative Trading System (ATS), Multilateral Trading System (MTF) and systematic internalisers has increased.[16] The more recent cases of consolidation across regions (OMX, NYSE Euronext and LSE-Borsa Italiana) should be seen in this context.

14 World Federation of Exchanges, 2006, "Cost and Revenue Survey 2005".

15 See R. Lee, 2002, "The Future of Securities Exchanges", Wharton Financial Institutions Center, 02-14.

16 ATS and MTF are systems operated by an investment firm or a market operator, that bring together multiple parties interested in buying and selling financial instruments, such as shares, bonds and derivatives. A systematic internaliser is an investment firm creating markets outside a regulated market or an MTF.

FACTORS HAMPERING CONSOLIDATION

Despite the factors governing the abovementioned consolidation, the euro area stock markets still have potential for further integration. Particularly in an international context, and taking into account the home-market bias, information costs and regulatory barriers de facto prevent stock exchanges from competing simply on the basis of lower execution costs.[17] In theory, technology advances and the trend towards more uniform regulations could lead to the emergence of a single global centre in Europe. However, there are still some significant barriers. For example, it has been argued that while information can generally be transferred easily via electronic networks, "complex local information" needs face-to-face communication and thus telecommunication will not eliminate the importance of location as long as small market frictions (access cost and heterogeneous information) exist.[18] In addition, volume of trading across exchanges in different nations is affected by different legal frameworks, language barriers and cultural differences between countries and complex cross-border activities.[19] Investors are more likely to hold, buy and sell stocks of firms that are located close to them and prefer companies that disseminate information in their native language.

In the past, national regulation and legislation constituted barriers to cross-border consolidation. However, many initiatives are currently under way to try to overcome these barriers. Indeed, a number of legal and regulatory initiatives and measures have been adopted with the aim of achieving an integrated European financial services market. One major initiative is the implementation of the measures included in the Financial Services Action Plan (FSAP) launched in 1999. The measures most relevant for stock markets and their consolidation are the Directive on Markets in Financial Instruments (MiFID, which replaces the Investment Services Directive) and the Prospectus Directives (see Box 3). It is possible that the MiFID will have a profound impact on the organisation and business strategies of investment firms, exchanges, asset managers and other types of financial market intermediaries. It should lead to more integrated European capital markets, but will also have a significant impact on market structure and development, such as greater competition.[20] The implementation of the MiFID has already led to changes in market structure. For example, in November 2006, seven large investment banks – which together generate half of the volume of the trading on the LSE – announced that they had set up their own trading platform.[21]

In addition, the Code of Conduct for Clearing and Settlement which was signed on 7 November 2006 by the European market infrastructure associations, including the Federation of European Securities Exchanges, will have a fundamental impact on the European stock exchanges. The Code of Conduct aims at offering market participants the freedom to choose their preferred service provider by establishing price transparency, free access and interoperability, and service unbundling. As such, the Code of Conduct will help to increase competition between stock exchanges.

17 See, for example, J.-K. Kang and R. M. Stulz, 1997, "Why is there a home bias?: An analysis of foreign portfolio equity ownership in Japan", *Journal of Financial Economics*, 46, 3-28, and the extensive literature on home bias. For the European case, see, for example, J. McAndrews, and C. Stefanadis, 2002, "The consolidation of European stock exchanges", in *Current Issues in Economics and Finance*, Federal Reserve Bank of New York, Volume 8, Number 6.

18 See J. Gaspar and E. Glaeser, 1996, "Information Technology and the Future of Cities", NBER Working paper No. W5562.

19 See Brennan, M. and H. H. Cao, 1997, "International portfolio investment flows", *Journal of Finance*, 52 (5), 1851-1880

20 See J.-P. Casey and K. Lannoo, 2006, "The MiFID Revolution", ECMI Policy Brief, No. 3, and C. Skinner, 2007, "The Future of Investing in Europe's Markets after MiFID", Wiley Finance.

21 Known as "Project Turquoise" and the seven banks involved are Citigroup, Credit Suisse, Deutsche Bank, Goldman Sachs, Merrill Lynch, Morgan Stanley and UBS.

Box 3

THE FINANCIAL SERVICES ACTION PLAN AND STOCK EXCHANGES

The EU regulatory framework of relevance for stock exchanges and investment services in general has been subject to a complete overhaul with the completion of the Financial Services Action Plan (FSAP). The MiFID, the Prospectus and the Transparency Directive contain some innovative rules that are intended to increase competition among stock exchanges, and between the latter and new trading venues.

More specifically, the MiFID abolished some existing obstacles to competition between trading venues, in particular, by ruling out the concentration rule, i.e. a provision mandating execution of share trades on the national stock exchange as a requirement for the 'best execution' of transactions by investment intermediaries.[1] The MiFID requires Member States to allow internalisation of orders and, therefore, to eliminate concentration provisions. This is done to promote competition between trading venues and to offer investors a choice between different trading functionalities, such as regulated markets, Multilateral Trading Facilities (MTFs)[2] and internalising intermediaries. At the same time, the Directive regulates internalisation, with provisions aimed at creating a level playing field between the three types of trading functionalities mentioned above and at assuring the same level of investor protection with respect to all trading venues.[3] Moreover, with the implementation of the MiFID, a new EU harmonised framework is in place as regards authorisation of regulated markets and transparency requirements.

Finally, according to the MiFID, a transferable security that has been listed on a regulated market can subsequently be admitted to trading on other regulated markets, even without the consent of the issuer.[4] This provision, accompanied by the exemption from the obligation to publish a prospectus in line with the conditions specified by the Prospectus Directive, has two important consequences: first, it allows for more competition by regulated markets – at national and cross-border level – as regards trading securities listed by other stock exchanges; second, in case of alliance between two exchanges, it enables them to trade the same security in all regulated markets without necessarily merging them.

The existence of harmonised rules at EU level as regards the regulated markets and investment firms, together with an improved regulatory framework for cooperation among supervisory authorities, has certainly been instrumental in facilitating consolidation among European stock exchanges. Additional complexities have been encountered in forging alliances with non-European stock exchanges owing to doubts related to the possible extraterritorial reach of different legal and regulatory requirements. These were addressed with solutions agreed by the supervisory authorities involved. Further convergence at global level and reciprocal mutual recognition of rules concerning investment services and issuers may address possible legal obstacles to international consolidation of stock exchanges.

1 The 'concentration rules' were introduced in some Member States, such as France, Italy and Spain. Other Member States, including the United Kingdom, left intermediaries free to execute these transactions off-exchange and also to 'internalise' them in compliance with general best execution requirements. For a description of the national systems, see R. Davies, A. Dufour and B. Scott-Quinn "The MiFID: Competition in a New European Equity Market Regulatory Structure" in "Investor protection in Europe: Corporate law making, the MiFID and Beyond", by G. Ferrarini, E. Wymeersch, (eds.), Oxford University Press, 2006, 163-197.
2 An MTF is a multilateral trading system, operated by an investment firm or a market operator.
3 As stated in the 5th recital of the MiFID's Preamble: "It is necessary to establish a comprehensive regulatory regime governing the execution of transactions in financial instruments irrespective of the trading methods used to conclude those transactions so as to ensure a high quality of execution of investor transactions and to uphold the integrity and overall efficiency of the financial system."
4 See Article 40 (5) of the MiFID and Article 4 of the Prospectus Directive.

4 THE EQUITY MARKET AND MONETARY POLICY

Stock markets are an integral part of the financial system and perform the task of channelling savings (primarily from households) to the corporate sector, as well as providing means for investors to exchange flows. The prices observed in stock markets are of particular importance from a monetary policy point of view, since they reflect market participants' expectations of future economic growth (passive role) and they also influence real economic developments (active role).

In their passive role, stock prices contain valuable information and, as such, are one of the many economic and financial variables monitored by central banks. Stock prices can provide useful information about economic developments: they can have leading indicator properties and help to assess market participants' expectations for economic activity – but also help in identifying special factors distorting the informational content of important monitored variables like monetary aggregates.

Monetary policy influences stock prices in several ways. For example, changes in policy rates have a short-term impact on the discount rate, via changes in short-term market interest rates. In addition, monetary policy may also influence corporate earnings and dividends through its impact on investors' expectations of short-term economic growth. Stock market investors anticipate monetary policy decisions and thus the reaction of stock prices after the announcement of policy changes is usually not significant. However, unexpected changes in policy rates could affect the perceived riskiness of equity and prompt investors to reassess their investment decisions.[22] Finally, in the long term, in maintaining price stability and firmly anchoring inflation expectations, monetary policy reduces inflation uncertainty and thus also uncertainty about future stock prices.

Changes in stock prices therefore play an important role in the transmission of monetary policy. In their active role, stock markets influence economic developments mainly through three channels, namely the cost of capital, the wealth and the balance sheet channels. First, stock prices have a direct impact on firms' cost of capital and thus on their investment spending. When stock prices are high, implying that cost of capital is low, funding investment via the issuance of share is relatively cheap. The second channel operates through the impact of wealth on consumption. For example, higher stock prices increase households' financial wealth, which in turn, could lead to higher current and future consumption. This channel is believed to have been of lower importance in the euro area as compared, for example, with the United States, given the lower stock market participation of euro area households. However, equity market participation in the euro area has increased over recent decades, especially through funds invested via financial intermediaries. Investment through pension funds, in particular, is set to increase significantly in the medium term in some euro area countries, as households are saving more money to finance their retirement years in the context of population ageing and ongoing pension reforms.[23] Third, changes in stock prices can also affect more broadly the ability of firms and households to borrow through a balance sheet effect. As the value of the collateral increases, the ability to borrow and invest increases – a process known as the financial accelerator.[24]

Having so far explored the link between equity prices and monetary policy, how does this relate to the structure of financial markets? In general, more efficient financial markets facilitate the conduct and the implementation of monetary policy. Since stock markets are an integral part of the financial system, as long as consolidation among stock

22 See B. Bernanke, "Monetary policy and stock market: some empirical results", remarks at the Fall 2003 Banking and Finance Lecture, Widener University, Chester, Pennsylvania.

23 See the article "Demographic change in the euro area: projections and consequences", in the October 2006 issue of the ECB Monthly Bulletin.

24 See N. Kiyotaki and J. Moore, 1997, "Credit Cycles", *Journal of Political Economy*, Vol. 105 (April), pp. 211-48.

exchanges leads to improved efficiency, this will enhance the effective transmission of monetary policy. In addition, it will also improve the information content derived from developments in stock prices, in particular, if stock markets play a more prominent role in the financing of the corporate sector.

An efficient financial system, amplified by an efficient stock market, can contribute to a smoother transmission mechanism and ultimately to higher potential economic growth. This implies that a harmonised development of the financial system in the euro area is of primary interest to policy-makers. Therefore, consolidation of stock exchanges would be welcome if it led to an improvement in the functioning of the financial markets in all regions of the euro area.

Increased efficiency in the stock market will also enhance risk sharing for investors and issuers, both within and outside the euro area, as it will be easier to diversify across regions, sectors and currencies. This is of particular importance for a monetary union, since the financial system as a whole and thus also the stock market plays a key role in helping to absorb asymmetric shocks which may hit the economy.

In the euro area there is still further potential for consolidation, possibly resulting in a more efficient stock market. A very efficient stock market with low execution fees and transaction costs would increase its attractiveness as a financing channel for firms and as an investment vehicle for equity investors. Therefore, a more efficient stock market may result in an increased use of listed equities as a financing tool for firms.

Raising funds through the stock market is relatively less developed in the euro area compared with other regions in the world, and as such, there might be scope for further exploiting this means of financing.[25] In the euro area, equity liabilities in corporate balance sheets are mainly owned by private shareholders.[26] Further financing through equity markets may prompt a shift in the relative importance of the monetary policy transmission channels. In particular, it may lessen the importance of the bank lending channel while contributing to homogenising the transmission through the wealth effect.[27]

5 CONCLUDING REMARKS

Ongoing consolidation among European exchanges, inspired by both market and policy-makers, has been mainly motivated by the idea of becoming more efficient and productive. From this perspective, trading does not need to take place in one or a few physical places, if there is a technological agreement such that economies of scale can be maximised. The final outcome of this consolidation process is unclear, but different forms of consolidation cluster are likely to emerge in the meantime.

The process of consolidation between stock exchanges can take different forms. Consolidation may just imply that two or several companies are merged, typically in a bid to benefit from economies of scale in terms of technological platforms, a common trading system, cost cutting and lower headcounts. Consolidation may also imply that issuers are meeting a larger pool of investors by being on one single exchange list, which is the case for securities listed on Euronext and the Nordic list.

In the euro area, the de-mutualisation of exchanges and the introduction of the euro have spurred competition, as well as cooperation between trading places. This has contributed to greater efficiency and lower trading costs for involved parties. At the same time, policy-makers have contributed to the efficiency gain by implementing harmonised rules and regulations, foremost through the FSAP.

25 See the article on "Assessing the performance of financial systems", in the October 2005 issue of the ECB Monthly Bulletin.
26 See Box 1 in "Corporate finance in the euro area", ECB, May 2007.
27 See the special issue on "Monetary policy and financial integration" in "Financial integration in Europe", ECB, March 2007.

A further consolidation of stock exchanges in the euro area can contribute to increasing financial integration and improving the efficiency of the financial system. This, in turn, increases the liquidity for investors and the possibility of financing for euro area firms, as long as the trend towards consolidation maintains a degree of competition among financial centres. Indeed, it will be crucial to find the right balance between consolidation (exploiting economies of scale) and competition in a sector that is already concentrated. However, competitive pressure is also building up externally. In this respect, it is worth mentioning that, while at the beginning of the new millennium geographical proximity prevailed in determining partnership and cooperation among exchanges, more recently, mergers and alliances have no longer been limited to regional integration, but increasingly have taken place on a cross-regional scale.

The structural developments in the stock market are of great interest to a central bank since an integrated and developed capital market spurs economic growth and creates a favourable setting for monetary policy. In particular, for a central bank, it is important that all investors and savers have equal access to an efficient financial system within a given currency area. As long as stock markets are efficient enough to transmit impulses from a central bank to the real economy in a common manner, the actual number of stock exchanges does not seem to matter or, at least, is less important. The relevant factor is that market places are able to offer fast and secure trading at attractive prices, robust governance and rules, and an efficient supervision of stock markets and stock exchanges.