Regional and Transregional Exchanges in Europe

Hartmut Schmidt*

Summary

The position and strategy of European stock exchanges today continues to be shaped by the general and specific forces which have contributed to the rapid change in the European securities markets over the last twenty years. Specific to Europe is integration, which led to the European Monetary Union. It also led to the Investment Services Directive and to the single passport for stock exchanges. The single passport is based on the principle of mutual recognition and allows stock exchanges, once established in any member state of the European Union, to operate and to compete in all member states. Mutual recognition ties in well with electronic trading because it allows an exchange to attract business outside its home country by setting up its trading screens anywhere in Europe and, hopefully, in the world. Electronic trading has increased the stakes in the securities markets business. At the same time, it enlarged the strategic arsenal of stock exchanges. To meet these challenges, exchanges were restructured and transformed to enterprises.

A case in point is the development in Frankfurt, driven by the largest German banks, that led to Eurex and Deutsche Börse. In taking charge of the restructuring, the banks did much for the development of a market most suitable for the trading needs of large domestic and foreign financial institutions which contribute most to volume and liquidity. An excellent way to strengthen the relations to these major clients at home and abroad and to gain economies of scale and scope is to offer these institutions a substantial stake in the exchange.

In relation to the European Union, countries are becoming regions. A transregional exchange is the main or major market in the shares of companies of more than one country. To maintain or attract a dominating or major market share, the transregional exchange must cater to and link up with the big institutions. The traditional practice had to be changed. So far, the institutions had held shares primarily in their domestic exchange. Euronext, the most important transregional exchange, offered the institutions to tender their shares in the domestic exchange for shares of Euronext. The domestic exchanges became part of Euronext.

There is only room for a small number of exchanges with a transregional strategy. This explains much of the effort observed in London, Paris, Frankfurt, and elsewhere. The period of intense exchange competition has done much to make European exchanges internationally attractive. However, after five or ten

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years, the current period of progress, transition, and integration might be judged as the prelude to a period of stagnation. To provide for future competition and to disinvite systemic risk, the number of exchanges in Europe and worldwide should not become too small. In the years to come, a substantial number of regional exchanges will consolidate into transregionals or merge with other exchanges, a process that has been underway for some time. As in the past, some exchanges will simply go out of business.

Exchange which continue to compete with the transregionals need a special strategy. In countries with a single exchange, a strategy based on the home market valuation advantage is an obvious choice. Other regional exchanges focus their strategy on a clientele not served well by the emphasis of transregional exchanges on large institutions. Special strategies have been aimed at individual investors (price-improvement strategy, one-share lot strategy, securitized derivatives strategy). They served the regional exchanges well. Of course, major exchanges in Europe and beyond have also adopted some of these strategies. This forces regional exchanges to develop new markets and to improve existing ones. It is hard work to run a regional exchange, but it is a great service to the economy. Regional exchanges benefit investors and contribute to the continued dynamic development of European securities markets.

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A. Determinants of Change in the European Stock Exchange Arena

Ⅰ. General Determinants of Change

When observers look at the European stock exchange arena, there is complete agreement that the last twenty years saw more change than the preceding eighty years of the 20th century. Professor Yamaguchi kindly suggested that I speak about regional and transregional exchanges in Europe. The analysis of forces which led to this rapid change and which continue to shape the European securities markets help to clarify the present position of regional and transregional exchanges. We all appreciate the general forces or factors which have been important, such as peace, liberalization of commercial and financial transactions, progress in technology and competition. A fifth factor which I should mention is the trend toward larger business units. In almost all countries with privately owned financial institutions we have witnessed a reduction of the number of banks. But I do not believe that these general factors are sufficient to explain what has happened and what will happen in Europe. In addition to the general factors, there have been specific factors which merit focus.

A factor specific to Europe is European integration aimed at transforming the different national economies into a single market. Consequently, exchenges in Europe increasingly reach across borders and market their transaction services in distant regions of Europe. A giant step in European integration was the European Monetary Union. Securities are now quoted in Euro, which make prices directly comparable. The common currency puts an extra pressure on the exchanges in Europe to make cross-border clearing and settlement as efficient as inland transactions. Regulatory hurdles have made this more difficult than anticipated[1)]. But this challenge will be overcome, and the new infrastructure will further intensify competition among European exchanges and accelerate change. There is much to be gained. The Monetary Union created a huge capital market with a very substantial number of investors. It is well positioned for dynamic development.

II. Exchange-Specific Determinants of Change

1. Mutual Recognition

Let me now turn to exchange-specific accelerators of change. Related to this topic, I have had some exposure and experience, which I am glad to share with you. In 1975, the European Commission, DG XV/A/3, Financial Services, asked me to find out whether the stock markets in the European Community should be harmonized and integrated, possibly based on electronic trading[2)]. Therefore, I had to visit the major stock exchanges in Europe. In 1975, the Community consisted of 9 member states (against 15 states today). Looking back, the contrast I encountered during my visits was incredible. Banks could not become exchange members in England, France, Italy, Denmark, and other countries. In some places, the exchange transactions were settled by messengers who walked through the city and carried the stock certificates to the counterparties. At the same time, other countries had enjoyed central securities depositories and settlement without certificates for many years. In trading, there was a tremendous diversity and most of the trading methods dated back to the 19th century. In Copenhagen, stocks were called up in sequence. All members had to be present and witness each transaction. At some major exchanges, supply and demand in the order book were balanced in writing even without the presence of members. The London Stock Exchange still employed the jobbing system, while at the same time a group of British institutional investors challenged the Stock Exchange by operating Ariel[3)], the first electronic trading system in Europe. Ariel, eslablished in 1972, was already set up as a corporation.

Of course, some of the practices were outdated and inefficient. But this was the exception. Most of the 33 exchanges in the nine countries had tried fairly hard to reduce the spread between the cost of capital of the issuers and the investors' rate of return on corporate and government securities. In order to economize on information costs and transaction costs, the exchanges allocated the securities to various market segments distinguished by differing listing standards and trading methods.

From a public policy perspective, a new round of progress aimed at the reduction of the spread between investor return and cost of capital is always desirable. But would this reduction be achieved through an exchange restructuring by government regulation, by requiring the exchanges to become uniform across Europe, or – at the extreme – by forced integration of the 33 exchanges and the creation of a single European exchange? My analysis led me to speak out against any direct goverment intervention to achieve uniformity and harmonization.

Diversity and competition where the more promising choice. Therefore, I suggested to give brokers, banks and investors direct access to exchanges in other member states in spite of a lack of uniformity[4]. In my analysis, this would spur competition, promote efficiency and ultimately lead to a high degree of consolidation of the 33 exchanges.

In todays parlance, this proposal required mutual recognition. It seemed unacceptable in the Europe of the 70ies, because it contradicted the lead principle of uniformity, of harmonization. But this lead principle was dropped in the mid 80ies. The European Commission decided in 1985 to respect institutional differences, due to the continuing legislation of the member states based in part on differing approaches and judgements. This implied the principle of mutual recognition[5]. As a consequence, the single European passport has been introduced. The single passport allows financial institutions which are licensed and active in any EU member state to carry out passported services in all other member states under home country control. Banks were the first to obtain the passport. For stock exchanges, the single passport based on home country regulation was introduced 1993 by the Investment Services Directive.

At first glance, mutual recognition may appear to be a Europe specific factor. But it is not. The European Commission has offered mutual recognition of stock exchanges to the United States[6]. This would create a transatlantic stock market. U.S. exchanges supervised by the Securities and Exchange Commission or the Commodities and Futures Trading Commission would be allowed to offer their services directly with European investors. European exchanges, on the other hand, could set up their trading screens in the U.S. without being subject to SEC or CFTC control.

The SEC is very proud of the great securities markets that developed under its oversight: U.S. investors can pick and choose from a menu of competing markets[7]. U.S. exchanges and other trading systems offer transaction services that differ in price and quality to match investors' trading needs. If European exchanges were admitted to the U.S., this clearly would make the menu even richer. Some scholars expect that American investors would benefit from the lower transaction costs at electronic European exchanges[8]. But so far the SEC has held the position that in the U.S. investors should trade at U.S. registered exchanges. The U.S. Treasury and the SEC have declined to open the door to the U.S. for exchanges from abroad.

Nevertheless, mutual recognition will remain on the agenda. Mutual recognition implies that there is no ex-ante superiority of any regulator or market organizer. It respects the achievements in market efficiency and investor protection in other countries. Mutual recognition accepts that investors and companies gain from diversity of transaction and listing services. A truly global securities market requires mutual recognition of U.S., Japanese and European exchanges. It also requires a good number of exchanges to provide for competition and to restrict systemic risk[9].

2. Electronic Trading: From "Cooperative" to Enterprise

The second exchange specific accelerator of change is electronic trading and its effect on exchange governance. In the 70ies, exchange competition was still unknown in Europe. But it was not the single passport that marked the start of exchange competition in Europe. At a 1980 European Communities conference in Brussels which was to pave the road towards a single European stock exchange, Sir Nicholas Goodison, the Chairman of the London Stock Exchange, got up and declared that London would become the most efficient and competitive exchange in Europe. After overcoming a regulatory struggle with UK authorities and restructuring the exchange in the 1986 Big Bang, London attracted substantial market shares in

Italian, Swedish, French and German stocks by a NASDAQ like system called SEAQ International. In addition, LIFFE, a new financial futures exchange was set up in London in 1982[10]. Its most successful contract was the Bund Future, a contract on German government bonds launched in 1988[11]. Investors and intermediaries switched much of their business from the national markets to London.

All this challenged the exchanges and their members on the continent[12]. The successful reactions of the Paris Bourse and of the banks in Frankfurt led to electronic trading systems and made continental exchanges self confident competitors in the European securities trading arena.

The key respons of the Frankfurt banks was the Deutsche Terminbörse (DTB). It stands out because within ten years it would become the world's largest futures and options exchange. But even more important is the lesson it contributed to the emergence of exchanges which are enterprises. In contrast to traditional exchanges, which may be viewed as cooperatives, the DTB was set up in 1988 as a corporation. Five major shareholders controlled the new company. But neither legal form nor corporate control was the characteristic that was soon to make the DTB an enterprise. It was electronic trading.

Many scholars view traditional exchanges as mutual institutions or cooperatives[13]. This reflects an economic, not a legal perspective. The traditional exchange is seen as a business entity. It is an institution to provide for low-cost trading. For this purpose it has set up, maintains, and enforces trading rules and it operates communication facilities such as a trading hall. The costs of all these facilities are typically covered by the exchange members' annual contributions. In abstract, this matches a cooperative that operates harvesting equipment for farmers, or a call center for taxi drivers. In any case, the product which a member sells in the marketplace is produced and sold by the member, not by the cooperative. Of course, the facilities of the cooperative are a key element in the production process. The product, which the exchange member sells to his client is the transaction, the purchase or sale of a security. Just as the farmer grows the potatoes himself, the exchange member produces the transaction himself[14]. He does this on the exchange floor.

Now enter electronic trading. In the trading of futures on the DTB and elsewhere, this familiar pattern changed. It is no longer the member in the crowd who produces the transaction. The transaction is produced by the exchange's computer through automated matching, and it is sold to the participant for a fee. Consequently, the exchange is no longer a facility provider whose costs are covered by members. Electronic trading leads to demutualization. The exchange becomes a regular firm. It produces transactions and covers the cost of facilities out of transaction fee income. Formerly the exchange management aimed at keeping the costs of the facilities low. Now the objective has become to generate fee income and possibly to maximize profits or shareholder value[15].

I vividly recall how stunned the German financial community was when the DTB published its first annual report in 1991. The new exchange started trading in 1990. In the three years up to the end of 1990, DTB had invested a total DM 110 millions. Transaction fees in 1990 and 1991 were DM 54.2 mio. and DM 99.2 mio[16]. The cash flow of DM 43 mio. in 1991 enabled the DTB to pay its DM 55 mio. bank borrowing down to DM 25 mio[17]. DTB was profitable right from the start. Was it also maximizing shareholder value?

For the first three terms I was a member of the DTB board, and my answer is clearly no. Board structure was not conducive to maximizing value. A key issue was how to gain market share in the Bund future vis a vis the LIFFE. When I spoke up in favor of offering DTB terminals to banks and brokers outside Germany, the chairman told me to stop pontificating. At this time he and other major shareholder representatives held the view that banks and brokers abroad should place their DTB orders with German banks[18]. Like members of a cooperative, the banks on the board looked after their interests, not after the value of the exchange.

To increase the low market share in the Bund future, the board later softened its position[19]. The competent German regulator[20] was asked to explore regulatory arrangements with other states which would allow the DTB to set up terminals abroad[21]. It turned out that some countries declined. 1993 in May the first DTB screens became operational in Amsterdam. The Netherlands were the first country to adopt a mutual recognition policy.[22] This was the start of what is now called cross border remote membership. Back then, DTB CEO Jörg Franke called his novel strategy home delivery of DTB products to other financial centers[23].

In 1991, the claim that this cross-border strategy would help to improve liquidity and gain market share was unproven. At first, there seemed to be no academic support for it[24]. Only after a number of years this strategy turned out to be a success. The strategy was based on a superior transaction service, on screen trading and on German law that has always required exchanges to accept additional traders without limit[25]. LIFFE had traded the Bund future since September 1988, DTB since November 1990. From 1993 to 1996, consistent with the first mover advantage thesis, DTB market share stagnated at about 30 percent, even though total transaction costs were lower at DTB[26]. The resistance of several countries, notably the UK to permit DTB screens, made it difficult to implement the strategy. However, the European Union's Investment Services Directive of 1993 provided DTB with a single passport. Even European Union countries shielding their exchanges from competition had to allow DTB screens on their territory after the end of 1995. In September 1996, the CFTC permitted DTB screens for Bund future trading in the U.S. In a great effort, the DTB more than doubled the number of its members during the years 1996-1998 to 312[27]. During the same period, the DTB market share in Bund future trading increased from 30 to 100 percent. At many exchages in Europe and beyond this event triggered a strategic repositioning. Never before and thereafter the opportunities and dangers of exchange competition became more obvious.

Switzerland deserves an extra note in this development. It is not a member of the European Union. The single passport did not open up Switzerland. In order to secure business from the large banks there, the DTB merged with the Swiss Options and Futures Exchange (SOFFEX) in 1998. The new exchange was called Eurex. In this way, the Swiss and the German large banks maintained a strong influence. They became indirect shareholders of the new exchange and jointly obtained a position of control[28]. Consequently, they were assured that the exchange would continue to cater to their trading needs and would not use its increased market power against them.

The five major DTB shareholders represented a huge share of German banking. They liked the ease and speed of decision making at the DTB. As the DTB turned out to be a money machine, they decided to use the DTB both as a model and a source of finance for spot market restructuring. Their aim was to set up an electronic equities market and to concentrate stock trading on the IBIS, later on the Xetra platform. They established a corporation patterned after the DTB that has run the Frankfurt Stock Exchange since 1991[29]. This corporation was to become known as the Deutsche Börse AG[30]. Compared with the preceding chamber-of-commerce or "cooperative" regime, the shareholder votes held jointly by the five banks made it much easier to deal with dissenting parties and to reduce the income opportunities of

Table 1 Major European Exchanges

Exchange	Equity Volume Year 2001	Domestic Capitalization End of 2001	Number of Listed Domestic Companies End of 2001
London	5,074,989	2,413,272	2,438
Euronext	3,588,707	2,070,467	1,131
Deutsche Börse	1,609,878	1,203,681	749
Madrid	943,554	525,840	1,461
Borsa Italiana	791,254	592,319	288

(Volume and capitalization in millions of Euro, volume single counted)

Source : Federation of European Stock Exchanges (FESE), European Stock Exchange Statistics-December 2001, Brussels 2002.

specialists and floor brokers by transition to electronic trading. DTB first became a subsidiary[31] and was then merged on the Deutsche Börse AG[32]. DTB contributed most of professional exchange staff to the new organization. From then on, the strategy has been to gain an edge on competitors abroad by integrating spot, futures and options trading and the related clearing and settlement[33]. The implementation of this strategy and the adoption of related strategies has been left to the management of the exchange[34].

What is the general lesson to be learned? The advent of electronic trading opened up the opportunity for major exchanges to become large enterprises. The income structure changed and income increased. More staff and a new kind of management was needed. Electronic trading enlarges the strategic arsenal of the exchange. Electronic trading greatly facilitates it to target a transregional clientele and to reach out for customers worldwide. The scope of transaction related services can be extended from order routing to back office operation. The exchange can adapt and apply its systems to other markets in order to diversify[35] and to obtain economies of scale and scope. As a first step in this direction, securities markets within a country are consolidated and both the spot market and the market for derivatives in securities are brought together within one exchange organization. Beyond this, the systems may be used to set up and run markets for commodities, electricity or other products[36]. Of course, the systems can also be sold to and maintained for exchange organizations abroad. These great opportunities have challenged the exchange executives and accelerated change in the European securities markets.

These opportunities may involve mergers and takeovers. Therefore, on the legal side, the exchanges had to adopt a form of business organization that is widely used today and backed up with much legal practice and experience. Consequently, new exchanges were set up, old ones reorganized as corporations. This legal development also facilitated the adjustment of the exchanges to the increasing concentration of securities trading on large financial institutions and to the resulting inhomogenity of exchange members. The large financial institutions who do most of the business on the exchange obtained the biggest interest in the exchange corporation. They now have the dominating influence on the exchange. The admission of public shareholders and the subsequent exchange listing have left this influence intact. The institutions are likely to maintain a dominating interest[37]. They want to make sure that their trading needs are met. They also want to prevent that the exchange uses its market power for monopoly pricing[38]. This implies continued control of exchange management by vote. In contrast to this

Table 2 Electronic Equity Trading Volume of Major European Exchanges in 2001

Exchange	Electronic Equity Trading Volume
Euronext	1,656,092
London	1,047,313
Deutsche Börse	959,837
Borsa Italiana	658,041
virt-x	447,931
Madrid	441,997
Stockholmbörsen	327,770

(Volume in millions of Euro, single counted)

Source : Federation of European Stock Exchanges (FESE), European Stock Exchange Statisticso-December 2001, Brussels 2002.

continued voting control thesis, the demutualization thesis expects market control to take over: As competition among exchanges becomes more broadly based, there may come a point when institutions for their trading needs will rely on market control and no longer on voting control. In my view, this point is still beyond the horizont.

This lesson was fairly well understood in the late 90ies. As a consequence, exchange managements engaged in a confusing number of attempts at cross-border alliances, joint ventures and mergers. Only the successful major attempts and plans for such attempts are reported below. In the sections that follow, London and Deutsche Börse are not dealt with. As discussed, Deutsche Börse has achieved transregional status on the derivative side. An attempt to merge with the London Stock Exchange failed in 2000. A second so far unsuccessful initiative is the New Europe Exchange (Newex). The Newex Börse AG is held equally by Deutsche Börse and Wiener Börse. It was set up in 2000 to establish a market in stocks of companies located in what used to be communist countries (now called central and eastern European countries)[39]. It has not attracted much issuer and investor interest[40]. Trading currently takes place on the Frankfurt Stock Exchange floor[41].

London is by far the largest equities market. Based on its unique tradition as a world financial center, London has attracted an unparalleled number of foreign banks. Consequently, the London Stock Exchange reports substantial volume in foreign shares (in 2001 close to Euro 3,000 mio.), which may partly be a reflection of London market makers' activities at foreign exchanges[42]. However, like Xetra. it is the main market only for domestic shares. The London exchange runs an electronic agency-auction market (SETS) since 1997 and also a dealer market that reports volume to the exchange. Since the volume of the electronic trading system contributes much to the financial strength of the exchange, it is provided in Table 2. Tables 1 and 2 have to be seen against the background that there was no consolidation of stock and derivatives markets in the United Kingdom. In Table 2 London ranks second. The well known problems to rank exchanges by volume statistics led Merton Miller to suggest an approach based on the value which an exchange created or represents for its shareholders[43]. At the end of October 2002 the market value of the shares of London Stock Exchange plc was Euro 1.6 milliards, Euronext N.V. had a market value of Euro 2.4 milliards, Deutsche Börse AG of Euro 4.0 milliards.

B. Consolidation and Transregional Exchanges

I. Euronext

In the late 80ies, Paris and Frankfurt, the largest continental European exchanges were favorably positioned to fully exploit the opportunities related to electronic trading. Besides their size, both are rooted in an attractive basic structure of trading. In contrast to the London dealer auction market[44], they have long favored an agency auction market architecture. Both successfully met the challenge by London's SEAQ International and started their first electronic trading system in the late 80ies. Paris had the advantage of early cooperation with the Toronto Stock Exchange[45] and built on the Canadian trading system CATS. As to be expected, the essential lines of development in France paralleled those in Germany. Open outcry derivatives markets MATIF and MONEP were created in 1986 and 1987 in a still tightly regulated environment. Legislation in 1988 gradually opened up exchange trading to domestic banks. Management of the Paris and all six regional stock exchanges was handed over to a central exchange council[46]. In 1991, the seven stock exchanges were consolidated into a national market[47]. Mutual recognition opened the exchange for institutions from other members of the European Union in 1996. At the same time, all exchanges became corporations. In 1997 the ParisBourse was created. This consolidated all stock and derivatives exchanges in France and later extended the advanced electronic trading system NSC to MATIF and MONEP. In the same year, the name Euronext was used for a ParisBourse and Brussels cooperation aimed at the use and marketing of the NSC system[48].

In Belgium, the regional exchanges had gone out of business. The Brussels Stock Exchange and BELFOX derivatives exchange consolidated in 1998. In the Netherlands, Amsterdam Stock Exchange and European Options Exchange (EOE) were merged to become AEX in 1997[49]. The EOE, established in 1978, was the first European exchange with a cross-border strategy.

In 2000, ParisBourse, Amsterdam and Brussels Exchanges established the corporation Euronext N.V. in the Netherlands. The shareholders of the exchanges tendered their shares against the shares of the new corporation and created a major transregional or transnational exchange in Europe. The common core is the joint trading, clearing and settlement[50] system. In a regulatory sense, the exchanges remain independent. In order to be admitted to the joint trading system, a company may list at any of the three exchanges[51].

The consolidation of exchanges by Euronext advanced further by the acquisition of LIFFE in 2001. Moreover, the shareholders of the exchange in Portugal joined Euronext and tendered their shares to Euronext N.V. Thus, Euronext Lisbon became the fifth Euronext exchange. Euronext went public and sold 24.86 percent of its shares to the public[52].

II. virt-x

Switzerland is well known for asset custody and management. This used to be reflected by an unusually large number of exchanges given the size of the country. Recent consolidation started in 1991 when the Lausanne Exchange handed over its business to the exchange in Geneva. In 1996, Basel, Geneva, and, most importantly, Zürich united to develop an electronic trading system called EBS. For this purpose, the three exchanges[53] had established Schweizer Börse[54] in 1993 as a private association, also known as SWX, which also held for some time the derivatives exchange SOFFEX[55]. Originally, EBS was not to be used for cross-border remote trading[56], but SWX gained London recognition as overseas investment exchange and its first cross-border member in 1999[57].

However, to conveniently market EBS terminals in all countries of the European Union, a single passport was needed. SWX entered into negotiations with Tradepoint Financial Networks plc. This small British exchange had licensed and adjusted an electronic trading system from Vancouver Stock Exchange. In September 1995 it began trading about 400 stocks of British companies. As major European stocks were added, Tradepoint claimed to be the first pan-European market. It provided a choice of clearing and settlement platforms in the UK and on the continent[58]. In spite of its sophisticated trading services and low fees, the exchange met with little investor acceptance.

As a result of the negotiations with SWX, Tradepoint was renamed virt-x plc and all major Swiss stocks were transferred to the new EBS platform of virt-x plc licensed from SWX. The SWX obtained a 39 percent share in the renamed public company[59]. The new platform was assigned to a fully owned subsidiary, virt-x Exchange Limited. It opened in mid 2001 with 613 stocks representing about 80 percent of European market capitalization[60]. A unique no-action letter of the SEC entitled virt-x to offer its transaction services via terminals in the U.S. to financial institutions including institutional investors[61] to a limited extent.

Compared with the London Stock Exchange, Euronext, or Deutsche Börse, virt-x Exchange Limited is not exactly a leading exchange. At times it was considered weak and prey for a takeover. But in early 2002 it turned profitable and achieved an average market share of nearly 10 percent of the volume in the stocks it trades. At present it is the main market for Swiss stocks, based in London. It remains to be seen whether it will acquire a major share in other European stocks.

Ⅲ. Easdaq and Nasdaq Europe

Since the early 80ies there has been much discussion whether Europe should open up exchanges to smaller companies to stimulate economic growth[62]. It was frequently argued that European financial institutions impede public equity issues of small and young companies. For these institutions, negotiated infusions of venture capital and private equity might be more profitable than open market financing.

The development of markets for junior companies has had its up and downs. After a number of very successful years in the early 80ies, the Unlisted Stock Market (USM) in London was closed down. Similar markets elsewhere, e.g. the Second Marché in France, also seemed to lose their initial attractiveness. However, as exchange competition in Europe intensified in the mid 90ies, the exchanges were anxious to add new companies to their list. The major European exchanges felt challenged when the European Venture Capital Association initiated the creation of a European Association of Security Dealers (EASD). Based on Nasdaq support, the EASD was to set up a new exchange, entitled to a single passport and aimed at so far unlisted growth companies. Exchange members were to be recruited throughout Europe[63]. By mid 1996, Easdaq obtained exchange status in Belgium.

Exchanges in Amsterdam, Frankfurt, and Paris, responded with a Euro. NM Alliance and each created a new markets for growth companies in 1997[64]. In addition, other European exchanges stepped up their efforts to attract smaller companies. Many were successful. The new Frankfurt segment, Neuer Markt, exhibited spectacular growth for three years after its start in March 1997.

Against all these counter efforts, Easdaq never gained substantial market share. In 2001 Easdaq was taken over by Nasdaq Europe, a U.K. company held by Nasdaq in the U.S. and various European and U.S. investment bankers as minority shareholders. Settlement is based on DTCC[65] services. With 43 listed and 291 traded securities the market has remained small[66].

Nasdaq Europe intends to establish the Nasdaq Deutschland AG by a capital reconstruction of the Bremen Stock Exchange operating company. It will hold 50 percent of the shares. Other shareholders will be Berlin Stock Exchange, Bremen holding company BWB, and German banks. The market is scheduled to open in 2003 for the trading of 3,000 major U.S., German and other European stocks[67].

C. Regional Exchanges

I. Definition and Strategy

What is a regional exchange? What is a region? This paper deals with Europe. In relation to Europe, a region may comprise a number of countries, such as Belgium, Luxemburg, and the Netherlands, a single country of Europe, such as Denmark, or a part of a country, such as Bavaria in Germany. For purposes of this paper, region is defined as a country or as a part or province of it. In the first case, the regional exchange is a national exchange, and its strategy is to be defined under this perspective. Transregional exchanges in the previous section have a common characteristic. They are the main market for the stocks of companies from more than one country in Europe, or their strategy aims at a major market share in such stocks. A national exchange aims at being or becoming the main market for stocks of companies located in a single country.

In the second case, it is much more difficult to arrive at a definition and a matching strategy. Such exchanges frequently do not like to be called regional or provincial. The exchanges in the U.S. outside New York protested against being called regional. They pointed to the national and international participation in their trading[68]. Though there are many, none of the locality related criteria is sufficient to define a regional exchange[69].

Regionals are smaller than the giants in the exchange industry. As in other industries, the customer is better off if there are competing firms. Regional exchanges, both national and provincial, simply are competitors with a strategy that does not aim at being or becoming a transregional exchange. They are special-strategy exchanges.

II. National Exchanges

At national exchanges, locality is a key factor for strategy. Valuation of securities is important for trading, and locality matters for valuation. Valuation requires information of three kinds. The first is information on valuation models. The second is information on events, such as government or central bank action, or changes in the sales of a company. Translation-model information is the third kind, it serves to translate event information into valuation model input categories such as expected cash flows and discount rate[70]. Geographical proximity implies familiarity with national language, institutions, and policies. From this, nationals can gain a comparative advantage in translation model information. The may also have superior event information or even have some influence on company events. Consequently, local professionals have a chance to be better than foreigners at valuing domestic companies[71]. Moreover, they perceive less risk in domestic companies than foreigners.

There is empirical evidence for this. The first is the well documented preference of shareholders for domestic shares[72]. Moreover, there is a well established home-market effect. If foreigners trade a stock among themselves while the home market is closed, bid-ask spreads are wide on the foreign exchange, e.g. in London. The spreads narrow immediately once the market in Frankfurt[73] or Paris[74] opens. Finally, Hau[75] has shown that the profitability of trading shares for own account by banks is positively correlated with the proximity to the issuing company's headquarter.

Viewed in this way, it appears natural that most exchanges are national exchanges. Countries with provincial exchanges are exceptions. The special strategy of a national exchange can be built on exploiting this valuation advantage. Of course, this requires education and employment of a substantial group of finance professionals at the national financial center. It also requires a low transaction-cost exchange to fend off would-be competitors. A stand-alone national exchange with an internationally competitive trading system has a favorable strategic position. Of course, a transregional exchange may try to free ride on its quote information and become a real threat. Therefore, a national exchange has an incentive to consider a trading system with limited pre-trade transparency. Periodic ex-post reports of the exchange on implicit transaction costs could do much to assure investors of the exchange's attractiveness.

If there is limited interest in domestic shares abroad, a stand-alone strategy is the prime choice. Given such limited interest, challenges of the Newex type will not succeed. The effort of Newex to take away market share from the national exchanges reborn in eastern and central Europe may have been premature[76].

Once the stocks of the main national companies become subject to much international interest, national exchanges may want to consider to market their national expertise within a transregional framework like Euronext. In some instances, foreign interest may be limited to neighboring countries with similar language, law and governance. Then a more limited arrangement might be preferable. The case in point is the NOREX Alliance, which at present unites the Scandinavian exchanges in Sweden, Denmark, Norway, and Iceland. Companies are encouraged to list their shares on only one NOREX exchange. These exchanges focus strictly on providing competitive uniform transaction, listing and admission services. They are not in the business to develop, sell and maintain systems. For their electronic trading, they rely on an internationally successful provider, currently on OM Gruppen. Their joint company, Nordic Exchanges A/S (NOREX) provides services to them. Between Euronext and NOREX there is a big difference: Euronext exchanges are a part of Euronext, NOREX exchanges own NOREX.

Ⅲ. Other Special-Strategy Exchanges

1. Remaining Exchanges

In Europe, most exchanges which were viewed to relate to a part of a country have disappeared. For France, Belgium and Switzerland, this was dealt with above. In the U.K., the provincial exchanges merged with London in 1973[77]. In Italy, the "Borsa italiana S.p.A." was established in 1997 to consolidate the stock and derivatives markets in Italy[78]. In Spain, the four exchanges in Madrid, Bilbao, Barcelona, and Valencia have cooperated since 1989 to set up and run the joint electronic trading platform now known as SIBE. For this purpose, the four independent exchange corporations established and have owned the Sociedad de Bolsas[79].

Currently, there are plans underway to consolidate the entire stock and derivatives markets in a single holding company named "Bolsas y Mercados Espanoles"[80]. This would enable the Spanish exchanges to enter with their full weight in any cross-border agreement. But most likely it would also restrict the pursuit of any special strategies by the three smaller Spanish exchanges.

All this places the focus on Germany, given the fact that most European countries have had just one stock exchange in the period after Word War II. For the last fifty years, Germany has had eight stock exchanges. As elsewhere in Europe, stock exchange policy was built on consensus. This implied much cooperation but little change. In 1986, the year of the London Big Bang, a new agreement of the German exchanges aimed at strengthening their international position by a coordinated effort. This agreement for most purposes impeded special strategies of individual exchanges[81] and led to a consolidation of clearing, settlement and service corporations, to the joint electronic trading system IBIS, and to the creation of Deutsche Börse AG. In 1991, Frankfurt intended to merge the eight exchanges. But this plan had to be abandoned. It was close to impossible to sort out the tax and legal issues of a merger because the exchanges were run by associations and chambers of commerce, not by corporations. Moreover, the Frankfurt intentions were clear enough to revive some interest in stand-alone survival at the seven exchanges outside Frankfurt. In 1997, when IBIS was replaced by the new trading system Xetra, Deutsche Börse discontinued the practice to install the electronic trading system legally as a joint market place belonging to all exchanges. This stripped the seven exchanges of most of their trading volume, and many experts expected them to close down within a few years.

2. Special Strategies

At this point, the seven exchanges[82] could no longer rely on cooperation with Deutsche Börse. They had to review their own strategic choices. The strategy that had been long recommended was to focus on the securities of third order local issuers[83], not on stocks of European or national interest. This strategy leads nowhere. Of course, it is based on the valuation advantage of geographic proximity. But in contrast to a securities market with a single national exchange, it is nearly impossible to exploit this advantage in a national market with several exchanges to which banks and brokers with countrywide branch networks have access. Moreover, the volume to be generated by securities of third order issuers falls short of what is needed to operate an exchange. A second recommended strategy is to specialize in foreign stocks. It is also unlikely to work for small exchanges because of the valuation disadvantage, the related preference for domestic shares, and the substantial costs of linking up with the main markets of foreign shares.

Strategies that work have to be focused on unsatisfied needs. The anonymous Xetra system is designed to meet needs of large market participants who control Deutsche Börse and of others who contribute much to volume. Individual investors do not have screen access and are disadvantaged participants. Fortunately, the floor trading system, now computerized, turned out to imply an individual investor strategy. Empirical research has shown that the specialists on the German floors execute most individual investor orders inside the bid-ask spread of the Deutsche Börse electronic trading system. This price improvement is owed to reputation based trading. In the non-anonymous floor trading system, the specialist has sufficient clues to distinguish between regular investors and parties who want to trade on superior information. In this environment, regular investors obtain a price improvement[84].

The price improvement strategy has contributed much to the continued existence of regional exchanges in Germany. However, Deutsche Börse has now designed a single market maker system that rests on this strategy. It provides this system, called Xetra Best, to single banks (or to groups of banks). The banks and brokers, before they send investors' orders to the exchange, know even better than the specialists on the exchange which of the investors most likely have no superior information. Xetra Best allows each bank to internalize orders of investors. For its own account, the bank executes sell orders slightly above the Xetra bid and buy orders slightly below Xetra ask. The resulting trading profits are supposed to cover the bank's costs for the Xetra Best system. It is too early for evidence on this.

A second strategy aimed at individual investors reduced the round lot to one share. Odd-lot orders were disadvantaged because the exchanges used to execute them only once a day in a single price batch auction. There was no way to benefit from intra-day price volatility. The one-share round lot opened up continuous trading to all individual investors[85]. The strategy was first implemented by Bremen and Stuttgart at the end of 1997. It was marketed by the Stuttgart exchange with success. It doubled Stuttgart's market share in equities from 2.6 percent in 1997 to 5.2 percent in 1998[86]. This success provided much encouragement for the regional exchanges to search for new strategies. Of course, Deutsche Börse also adopted this strategy. But for technical reasons, implementation in Xetra was delayed until August 2002.

The one-share lot strategy earned Stuttgart much income and an exceptional reputation. Since then, the exchange has been considered the champion of the individual investor. This was a good basis for marketing a new exchange segment in Stuttgart, the Euwax or European Warrants Exchange. In Germany, there is much individual investor interest in warrants and other bank issued securitized derivatives. They originally were traded in-house, the issuing bank acting as the monopoly market maker. Stuttgart improved the position of the investors by organizing an agency auction market and by continuously improving it. For example, with the advent of securitized barrier options, Stuttgart recently adopted the rule that all orders expire immediately once a barrier is hit. Stuttgart has become the largest market for securitized derivatives in Europe. Today, no one doubts that it will continue to exist.

The three special strategies mentioned above unite in a market improvement strategy concept: Improve transaction services for all clients not fully satisfied by the transregional or national exchanges[87]. Allow investors to benefit from intraday volatility. Improve markets, bring products from the over-the-counter market to the exchange. A recent application of this concept is the Hamburg "fonds-x". In contrast to the widespread markets for exchange traded funds, fonds-x provides a low-cost secondary market for the continuous trading of managed mutual funds shares which are not designated by the issuing investment company for exchange trading[88].

A market improvement may also be achieved by moving on to unintermediated markets. Exchanges and other market organizers could provide transaction services directly to investors. But this seems to be one step too far for markets which are run and controlled by intermediaries. Taking up this issue would require to discuss what alternative trading systems contribute to the market improvement for specific clienteles. This is beyond scope of this paper[89].

Notes

1) Murray [2002], pp. 19-20.
2) Program of Study. Schmidt [1977], pp. 441-442.
3) Automated Real-Time Investments Exchange Limited. Another early attempt of competition among securities markets in Europe was

the Nightingale market, a forerunner of the "new markets" in Europe mentioned below in section BⅢ. Schmidt [1984], pp. 44-45, 69-75.

4) Schmidt [1977], p. 370. Issuers already were able to list cross border. For a recent discussion of market driven stock exchange development Murray [2002] and Arlman [2002]. For a legal discussionof harmonization versus competition and the role of mutual recognition Bagheri/Nakajima [2001] and Steil [2001].

5) Commission of the European Community, Completing the Internal Market: White Paper from the Commission to the European Council, Brussels 1985. The principle of mutual recognition is complemented by the principle of minimum harmonization, which is to safeguard basic public interests by a minimum standard that is met or surpassed in any EU member state. Steil [2001], p. 47.

6) Pozniak [2002], No. 23-25. EU will US-Anlegern Marktzugang erleichtern, in: Handelsblatt, No. 94, May 17/18, 2002, p. 37. Hofheinz [2002].

7) SEC [1994], pp. Ⅱ6; Ⅲ1-14; AⅣ1-13.

8) Domowitz/Steil [2002], pp. 316-318.

9) On margin calls and systemic risk Prigge [1977], pp. 8-11, 84-107.

10) Kynaston [1997], pp. 80-89.

11) Kynaston [1997], pp. 191-202.

12) Pagano/Steil [1996], pp. 4-31.

13) Ferrarini avoids the term cooperative because the definition could vary across different legal systems. Ferrarini [1998 Stock exchange governance], p. 144.

14) Or outsources the production to a specialist or floor broker.

15) As the reader will notice below, there has been no demutualization. It would require that the exchange goes public, and all shares are sold to outsiders. As a matter of fact, major members have maintained control when exchanges went public.

Exchange literature is usually not quite clear as to the characteristics that make a traditional exchange a cooperative. Some authors refer to a consumer cooperative but do not elaborate. Major traditional exchanges have not relied on members contributions. They have earned fees for listing services and for price and volume data dissemination including index data. Moreover, they collected transaction fees even though the exchange members themselves consummated the transactions on the floor. Seen from this perspective, the switch-over to automated trading lacks the essentiality of a transmutation. At a first glance, there seems to be no way to define the emancipatory step from "cooperative" to enterprise.

Without or with automated trading the exchange supplies the firms which are its members or customers with key services. The core of this relationship is not changed by the introduction of electronic trading. The customers continue to depend on these services and they continue to maintain capital and other strong links with the exchange aimed at securing an adequate and uninterrupted service. Such links, present in many industries, do not imply a cooperative. If, accordingly, the cooperative is eliminated as a point of departure, electronic trading simply enlarges the strategic arsenal of the exchange management. While the strategies at traditional exchanges are very limited, the advent of electronic trading systems opens up opportunities to expand cross border, to provide order routing and back office services to members and non-members and to sell trading systems and related systems to various clients. Thus, the exchange management may strive to use these opportunities and to make the exchange look like an enterprise.

To secure sufficient demand for their services, exchanges may want to establish capital links with banks or their transaction related subsidiaries. On the other hand, suppliers of electronic trading systems may want to strengthen their position as a supplier by taking interest in an exchange. The sole shareholder of the Stockholm Exchange is, for example, the system provider OM Gruppen. OM [2002], p. 58, Note 13. OM also holds major staked in other securities and commodity exchanges and unsuccessfully tried to take over the London Stock Exchange in 2000.

16) DTB [1992], pp. 34-35.

17) DTB [1992], pp. 36, 45. The cash flow of DM 58 mio. (transaction fees DM 141 mio.) in 1992 was used to pay off the remaining debt, DTB [1993], pp. 34, 45.

18) Niederschrift über die Sitzung des Vorstandes der Deutschen Terminbörse am 11. Juni 1990, p. 13; Niederschrift über die Sitzung des Vorstandes der Deutschen Terminbörse am 16. August 1990, p. 14. For an example related to the plan to merge Deutsche Börse and London Stock Exchange Prigge [2001], p. 42.

19) Niederschrift über die Sitzung des Vorstandes der Deutschen Terminbörse am 1. November 1991, p. 11.

20) At the time an executive unit of the state Hessen.

21) Based on this report the board changed the rules to admit cross-border members. Niederschrift über die Sitzung des Vorstandes der Deutschen Terminbörse am 2. April 1993, pp. 8-9.

22) In principle, this policy, established in 1993, was restricted to government bond trading. Except for DTB, it facilitated phone trading by foreign institutions.

23) DTB [1993], pp. 38-39. Other early cross-border participants were located in Switzerland and in France. The arrangement with France was based on the TRADEUS Alliance between DTB and MATIF. In 1994, the cross-border strategy was adopted for the electronic stock trading system IBIS, the predecessor of Xetra. Deutsche Börse [1995], pp. 16, 51. Sometimes Stockholm is said to have invented remote foreign membership (in 1995). Pagano/Steil [1990], p. 41.

24) The first academic encouragement of this strategy I heard 1994 at a conference in Memphis, Tennessee, when a paper by Paul Kofman, Tony Bouman and James Moser was presented on "Is there Lif(f)e after DTB?"

25) Until 1920, at Hamburg Stock Exchange any citizen could trade. Admission by the exchange was not required. The exchange building constructed in 1841 took about 5000 traders and was later enlarged.

26) For details Book [2001], pp. 128-139.

27) Book [2001], p. 144.

28) The Swiss Exchange (SWX) and the Deutsche Börse AG were allocated each 50 percent of the votes in the Eurex Zürich AG, which

holds a subsidiary for the Eurex business on the German side and runs the Swiss Eurex business. However, Deutsche Börse is entitled to 80 percent of the Eurex income. Book [2001], p. 270.

29) Originally, it was named Frankfurter Wertpapierbörse AG, which took over the exchange from the Frankfurter Industrie-und Handelskammer. Arbeitsgemeinschaft der Deutschen Wertpapierbörsen [1992], p. 41; Deutsche Börsen [1993], pp. 40-44.

30) The new name has been used since 1993. With the name change, seven regional exchanges purchased a joint 10 percent share in the corporation. Deutsche Börse AG went public and obtained a Frankfurt listing early in 2001.

31) The DTB shareholders tendered their shares for shares of the Deutsche Börse AG. DTB [1993], pp. 39, 41. The transfer of shares was completed on February 26, 1993.

32) Effective January 1, 1994. Deutsche Börse AG [1995], p. 50. Eurex required a de-merger, the Eurex Zürich AG was created as a joint German-Swiss subsidiary. Cf. note 28.

33) Deutsche Börsen [1993], p. 40.

34) In Germany, the key role of the exchange management resulted from amendments of the Exchange Act in 1994. Before the amendments (Zweites. Finanzmarktförderungsgesetz of July 26, 1994) a committee elected by members (Börsenvorstand) was in charge of running the exchange, aided by the exchange management (§ 3 Exchange Act). The amendments renamed the committee (Börsenrat) and reduced its powers to the appointment of managers and to rulemaking. It is often overlooked that exchanges in Germany have a dual structure. Under company law they have a supervisory board and an executive board. As institutions under public law they have an exchange board and an exchange management. Generally, the members of the exchange management and the executive board are identical, while the members of exchange board and supervisory board differ to some extent.

35) The benefits of diversification have become obvious in the 2001-2002 bear market. Derivative exchange income has been hardly, if at all, reduced, while income from stock trading dropped sharply.

36) This revives the concept of the universal exchange. Göppert [1932], pp. 102-3, Schmidt [2001] pp. 399-400.

37) For a discussion based on recent involvements of major banks and brokers in electronic securities markets. Prigge [2001].

38) Hansmann [1998], p. 736. Book [2001], p. 328, after analyzing and documenting the unusually high degree of concentration in the exchange industry.

39) Osteuropabörse mit drei Segmenten, Börsen-Zeitung, October 24, 2000.

40) Newex wird Teil des Frankfurter Freiverkehrs, Börsen-Zeitung, May 17, 2001, p. 5.

41) A similar initiative is Latibex, a market segment of the Bolsa de Madrid which serves as an Atlantic bridge for finance and investment in Latin America. Now in its third year, Latibex reports 24 listed companies.

42) Friederich/Tonks [2001], p. 12.

43) Miller [1990], p. 3.

44) Also referred to as competing dealer market. The basic structures are monopoly dealer market, dealer auction market, agency auction market and unintermediated auction market. Booth et al [1997]; Viswanathan/Wang [2002], pp. 127-167.

45) Jörg Foshag, Börse Paris putzt sich, Börsen-Zeitung, May 11, 1985, p. 3.

46) Pense/Puttfarken [1997], pp. 999-1002.

47) Jörg Foshag, Frankreich bildet nationalen Wertpapiermarkt, Börsen-Zeitung, January 15, 1991.

48) Börsen Paris und Brüssel gründen Euronext, Börsen-Zeitung, December 20, 1997, p. 11.

49) Remien [1997], pp. 1117, 1098-1103. Stock exchange and derivatives exchange also merged to a corporation in Austria, Finland, Sweden, Switzerland and Portugal. Book [2001], p. 245. Angelika Engler, Portugals Börsen rüsten sich um, Börsen-Zeitung, March 21, 2000.

50) Settlement is outsourced to Euroclear. Euronext [2002], p. 31.

51) Die Euronext im Markt für Börsenplätze, Neue Zürcher Zeitung, September 23/24, 2000, p. 24.

52) Euronext [2002], pp. 5, 45.

53) The exchanges in Neuchatel and St. Gallen went out of business. There remains a small-cap exchange in Bern where trading is done over the phone.

54) Blanchard [1997], pp. 915, 963-970. EBS was developed on the basis of the Australian trading system.

55) Merged with DTB to Eurex in 1998.

56) Elektronische Börse Schweiz in Betrieb, Börsen-Zeitung, August 3, 1996, p. 3.

57) Erster "Remote member" der SWX in London, Neue Zürcher Zeitung, March 27, 1999, p. 24.

58) Paneuropäische Komplettlösung, Börsen-Zeitung, July 11, 2000, p. 1.

59) virt-x Press Release of October 23, 2000. SWX Media Release of January 21, 2002 went public.

60) virt-x Press Release of July 9, 2001.

61) virt-x Press Release of June 20, 2001.

62) Schmidt [1984].

63) Easdaq bezieht definitiv ihren Sitz Brüssel, Börsen-Zeitung, June 20, 1995, p. 4. Lettmayer [1997], pp. 797-802.

64) "Nieuwe Markt" vor dem Start, Börsen-Zeitung, February 28, 1997, p. 12. Milan joined in 1999. CONSOB [2000], pp. 32-33.

65) U.S. Depository Trust and Clearing Corporation.

66) NASDAQ Europe, Weekly Factsheet, August 5-9, 2002.

67) NASDAQ Europe, Press Release, June 18, 2002.

68) United States General Accounting Office [1990], p. 53.

69) Schmidt [1992], pp. 110-112. For example: exchange location outside a capital, regional membership only, or not subject to national supervision. If they would restrict themselves to companies in the province, most provincial exchanges could not survive.

70) Schmidt [1985], pp. 342-344.

71) Gehrig [2000], pp. 432-434.

72) Gehrig [1995] points out that it is a frequent misconception to view this preference as an anomaly.
73) Schmidt/Iversen [1992], pp. 387-392.
74) Pagano/Roell [1990], p. 104.
75) Hau [2001].
76) For a perspective on these exchanges Köke/Schröder [2001].
77) Schmidt [1977], p. 54.
78) Ferrarini [1998, La riforma di mercati], pp. 41-56; Costi [2000], pp. 234-237.
79) Bolsa de Madrid, Fact Book 2001, pp. 38-41.
80) Bolsa de Madrid, Press Release, February 15, 2002.
81) They were subject to approval by the majority of all exchanges. Giersch/Schmidt [1986], pp. 84-86 (no. 196-203).
82) Located in Berlin, Bremen, Düsseldorf, Hamburg, Hannover, München and Stuttgart.
83) Breuer [1990], p. 104.
84) Schmidt/Iversen/Treske [1993]; Schmidt/Oesterhelweg/Treske [1996]; Freihube/Krahnen/Theissen, [1999]; Grammig/Schiereck/Theissen [2001]; Schmidt/Schleef/Küster Simic [2001]; Theissen [2002]. For related research in the U.S. Beneviste/Marcus/Wilhelm [1992], and recently Battalio/Jennings/Selway [2001]. The specialist's updating of stale quotes upon arrival of an order may also contribute to price improvement.
85) Schmidt [1996], p. 64. Schmidt/Oesterhelweg/Treske [1997], p. 407. The one-share round lot was discussed with regional exchange executives in January 1997.
86) Deutsche Börse, Umsatzstatistik zum Finanzplatz Deutschland (various years). Together the seven exchanges outside Frankfurt had an equity market share of 20.5 percent in 1997 and of 15.2 percent in 1998. In 2001 this share down to 10 percent (Stuttgart 2.7 percent).
87) Oehler [2000], p. 357, stresses that regional exchanges should serve local banks and both individual and institutional investors.
88) The stock exchange in Hamburg also established a market for limited partnership shares.
89) So are exchanges and other platforms that aim at trading bonds.

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