Rationalisation of European equity and derivative exchanges

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This article outlines recent structural changes in EU equity and derivative markets, and some of the main factors underlying the increasing trading links between exchanges, both within countries and across borders. It concludes that such links are likely to continue to prove attractive, and notes that this raises a number of issues for market participants, exchanges and regulators.

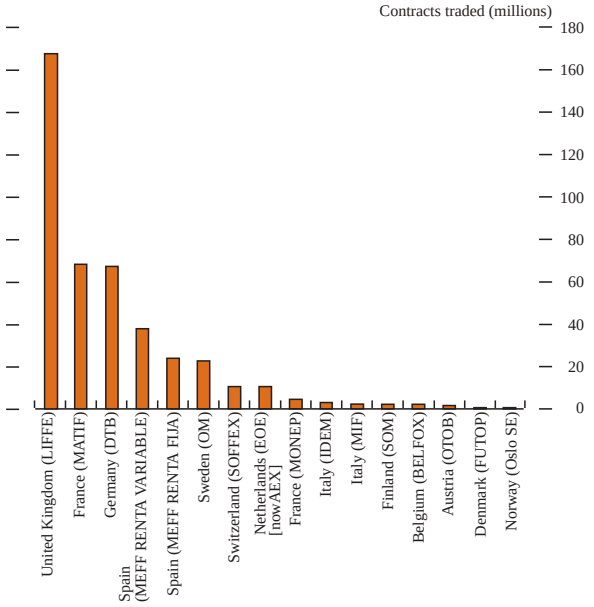
Introduction

The structure of Europe's equity and derivative exchanges(1) is changing rapidly. Mergers between equity and derivative exchanges have already taken place in a number of European countries, and more are planned. Where regional stock exchanges remain, they are largely also being consolidated. In addition, cross-border co-operation (and competition) between exchanges is increasingly taking new forms, as alternatives to the traditional cross-listing of products are developed. Shared electronic trading platforms and the provision of remote trading terminals—both of which enable exchanges to reach a wider market—are becoming more common. This in turn modifies the familiar notion of where a market is based: the location of its systems can now be quite distinct from where trading takes place. Derivative exchanges have been particularly active in this area, motivated by competitive pressures—in which the prospect of European Monetary Union (EMU) is a key driver—and assisted by technological developments. Other recent changes, in particular the implementation of the Investment Services Directive, have significantly reduced the obstacles to cross-border market access within Europe and so have facilitated this tide of change in market organisation and structure.

The eventual outcome may be a significantly different international market environment and pattern of trading activity worldwide. Turnover on the London International Financial Futures and Options Exchange (LIFFE) in 1996, for example, was the highest of any European derivative exchange (see Chart 1) but was broadly the same as the German, French and Swiss derivative exchanges (DTB, MATIF, SOFFEX) combined. If the planned alliance between these latter exchanges goes ahead, turnover on their shared position could exceed this, even without generating additional activity. As in any industry, a change of this scale could in turn influence how—and where—business is done, and affect other associated markets.

This article sets out the main recent developments in the structure of European equity and derivative exchanges, and considers some of the factors behind them.

Chart 1
Turnover of European derivative exchanges in 1996



Note: 1996 FIA statistics do not include turnover of individual equity options. Commodity derivative exchanges have not been included.

Source: FIA.

Mergers within countries

The recent and planned mergers between equity and derivative exchanges build on previous domestic rationalisation of equity exchanges. Regional stock exchanges were once commonplace in Europe, but improvements in communication and the increasing importance of intermediaries' size and scale of operations have reduced their rationale. Only Germany and France still have active regional trading floors, though activity is steadily concentrating in Frankfurt and Paris respectively. The United Kingdom's regional stock exchanges amalgamated as long ago as 1973, Italy's in 1994, and Switzerland's in 1996 (when electronic trading began there).

Financial derivative exchanges, being much younger (the first European derivative exchanges—the London Traded Options Market and the Amsterdam European Options Exchange—were established in 1978), were never set up on

(1) The derivative exchanges involved principally list financial derivative products.

a regional basis and have often developed separately from the well-established stock markets. In London's case, the traded equity options market did begin as part of the Stock Exchange, but merged with LIFFE in 1992. Here too, though, changes are now taking place and there have been a number of mergers between equity and derivative markets within countries: in Switzerland in 1993, in Germany in 1994, and in the Netherlands in 1997, creating the consolidated equity/derivative exchanges the Swiss Exchange, the Deutsche Borse and the Amsterdam Exchange respectively. In Denmark, the Copenhagen Stock Exchange (which also offered derivatives trading) merged with the derivative clearing house (the FUTOB clearing centre) in 1997. Mergers between equity and derivative exchanges are also planned in Austria, Finland and, most recently, France. In addition, discussions are continuing between the equity and derivative exchanges in Sweden about co-operation, including a possible merger.

There are several reasons for these equity/derivative mergers:

- Changes in business organisation, though costly in management time, provide scope to reduce costs. For example, the merged German and Swiss exchanges have integrated product development and marketing departments; the Amsterdam exchange plans to integrate functions and move to one building. Members may also benefit from having to deal with only one exchange, with harmonised rules and regulations. As well as reducing costs, these changes to business organisation may facilitate the development of new cross-market products.

- Technology has widened the potential gains from merger. Though these merged equity and derivative markets currently retain separate electronic markets, it will be possible to integrate the two in the future. An integrated equity/derivative market should be less costly to operate than two separate markets. The same is true of clearing—the Amsterdam Exchange plans to integrate equity and derivative clearing into one clearing house, which would allow the benefits of cross-margining. In addition, a merged equity/derivative exchange can use information and experience from one trading system to develop another. For example, the Swiss Exchange used lessons learned from the derivative exchange system when it developed an electronic system for the stock exchange in 1996.

- Competition is also an important factor. There is likely to be fierce competition for euro derivative products after EMU, and local currency interest rate products in participating countries will disappear. This could threaten the independent survival of some exchanges, and increase the pressure to reduce costs. Competition is also leading directly to cross-border consolidation (outlined below); some exchanges are merging partly to strengthen their national markets, in order to bolster their bargaining position in the event of subsequent European consolidation. For example, one reason cited by the Copenhagen stock exchange for its merger with the FUTOB clearing centre, and by the French exchanges for their planned merger, is the desire to have one body to represent their national markets in international negotiations.

The current round of equity and derivative exchange mergers may also be related not only to the very recent (and planned) cross-border co-operation, but also to the earlier wave of rationalisation of regional equity exchanges: with fewer parties involved, co-operation agreements are likely to be easier to reach and the possibility of an inconclusive outcome to any vote on such a proposal much reduced.

Another factor that may have facilitated mergers is the change in attitudes of equity market participants towards derivative markets. Where derivatives were once seen as a threat, taking business away from the cash market and from traditional broking firms, it is now more widely accepted that the two markets are often complementary; many firms are now active in both areas of business, having developed the necessary derivatives trading expertise. As most of these markets remain mutual organisations (though there are significant moves towards demutualisation here, as in other spheres of financial activity), the acceptability of co-operation or merger therefore depends crucially on members' perceptions of their own best interests. A high degree of membership overlap should reduce the obstacles to merger. Membership overlap is not easily measurable, because group entities are often members of the stock exchange and the derivative exchange under the names of different subsidiaries. But there is typically now an overlap in the range of 15%–60% between the equity and derivative exchange memberships within countries.(1)

Cross-border co-operation and competition

The character of cross-border activity of exchanges in 'same product' markets is also changing. Until now, derivative exchanges have usually linked up through cross-listing products—allowing one or more of their products to be traded on another exchange (see the box on page 408). This increased exchanges' access to potential users of the product (generally in another time zone) and to intermediaries willing to trade and distribute it; at the same time it could add to their own product range, through a reciprocal agreement to trade some of the other market's established products. Stock exchanges, on the other hand, have tended to compete rather than co-operate, either by encouraging dual listing or by offering alternative trading facilities (as the London Stock Exchange did successfully for a while with SEAQ-I).

Electronic trading platforms make other forms of co-operation and competition possible. They allow both the

(1) Calculated from individual exchanges' membership lists.

Cross-listings on derivative markets

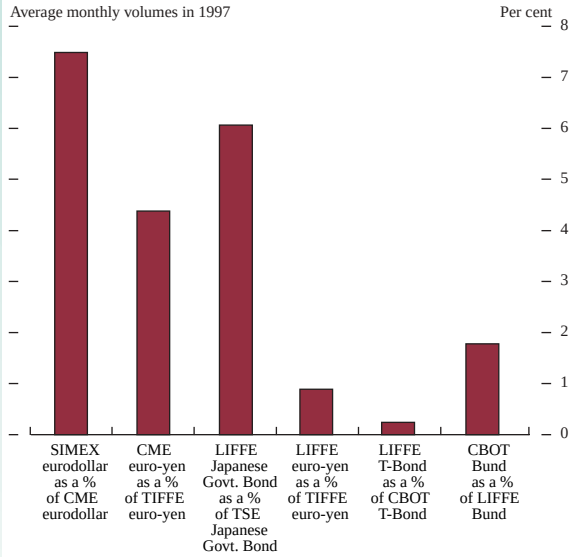
Cross-listing of contracts on derivative exchanges allows members of one exchange to trade contracts associated with/introduced by another exchange when it is closed. This involves an exchange A arranging for its product(s) to be listed on another exchange B, usually when exchange A has closed for the day; and may involve exchange B similarly allowing its product(s) to be traded after-hours on exchange A. This type of link is mostly between open-outcry exchanges. Exchanges A and B are typically in different time zones, so this arrangement provides a way for an exchange to reach a wider market for its existing products by both extending the trading hours for which the products are available and offering them to new customers. This differs from shared electronic orderbooks, which allow members from both exchanges to trade both exchanges' products simultaneously.

There are two main types of cross-listing arrangements: (1) contracts that are cross-listed but return to a single 'home' clearing house (the clearing house for the exchange that introduced the contract), usually at the end of the trading day; and (2) mutual offset, where clearing members may choose to have their side of the trade cleared locally (at the clearing house of which they are a member), so positions can be transferred between the two clearing houses. Mutual offset implies that contracts traded on one exchange can be transferred to or liquidated on the other exchange and add to/offset existing positions there. Examples of cross-listing links between financial derivative exchanges are given in the table below.

Cross-listing of products has had only limited success in generating additional turnover: trading volumes on the links have not been large, with the principal exception of the CME-SIMEX link, where volumes are thought to have been at the expense of LIFFE's eurodollar contract. Link volumes have also been low relative to turnover of the contract on the home exchange (see the chart). There may simply not be sufficient demand for after-hours trading of all products. These links are also costly to establish in terms of management time and often have major systems implications, particularly in relation to clearing aspects. There appears, however, to be a substantial defensive/spoiling element to these links—linking prevents other exchanges from doing so, or from listing similar products. Another motivation may be that they can provide an exchange with favourable publicity and marketing profile.

Looking forward, DTB and SIMEX signed a link agreement in June 1997 that will allow DTB's Bund, Bobl, and Schatz contracts to be traded on the SIMEX floor during its open-outcry hours. It is also envisaged that SIMEX members will be able to install DTB screens to trade all DTB products during DTB trading hours.

Link volumes as a percentage of volumes of the contract at the home exchange(a)



Source: FIA Fact Sheet.

(a) This chart shows volumes of a contract traded on a link as a percentage of the volume of that same contract traded at the 'home' exchange, ie where the contract originated. This is a way of illustrating the significance of link volumes.

Exchanges with cross-listing arrangements	Start date	Contracts covered	Type of clearing arrangements for cross-listed contracts
Chicago Mercantile Exchange (CME) *and* Singapore International Monetary Exchange (SIMEX)	1984	CME's eurodollar futures SIMEX's euro-yen futures (since 1996)	Mutual offset
London International Financial Futures and Options Exchange (LIFFE) *and* Tokyo International Financial Futures and Options Exchange (TIFFE)	1996	TIFFE's euro-yen futures	Trades transferred to home clearing house (TIFFE) at end of day
London International Financial Futures and Options Exchange (LIFFE) *and* Tokyo Stock Exchange (TSE)	1997	TSE's Japanese government bond futures	Contracts held intra-day only —LIFFE JGB contracts are automatically closed out at the end of the LIFFE business day
London International Financial Futures and Options Exchange (LIFFE) *and* Chicago Board of Trade (CBOT)	1997	LIFFE's Bund futures and options CBOT's T-bond futures and options	Trades transferred to home clearing house at the end of the day (LIFFE for Bunds, CBOT for T-Bonds)

trading of exchanges' products simultaneously from either exchange—the co-operative approach, generating economies of scale and other benefits—and remote trading. Remote terminals allow an exchange to widen its direct membership to include foreign-based participants who can trade its products from other (generally EU) countries in exactly the same way as local members. This is a recent development, and depends heavily on electronic trading to be fully effective.

Shared electronic trading platforms

A shared electronic trading platform, involving Scandinavian derivative exchanges, was established earlier this year. Another is planned between the German, Swiss and French derivative exchanges. The Copenhagen Stock Exchange and the Stockholm Stock Exchange have also signed a letter of intent about a trading link for securities.

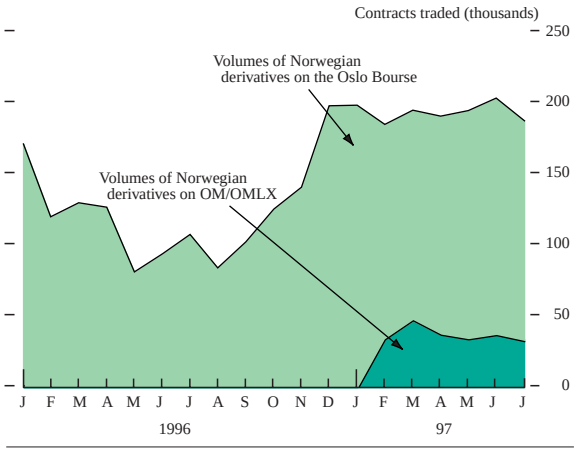
- *The Scandinavian experience*

  Sweden's OM Stockholm/OMLX[1] and Norway's Oslo Stock Exchange are developing Europe's first shared trading platform for derivative products involving independent exchanges. Since February 1997, members of each exchange have been able to trade simultaneously all equity-based derivatives listed on the other exchange.[2] (Both exchanges use OM's Click trading system.) Clearing occurs locally at each exchange; that is, at the clearing house of which the firm is a member, rather than at the clearing house attached to the exchange that originally introduced the contract.[3]

  Preliminary evidence indicates that this link has increased liquidity in Norwegian equity derivative products: more than 200,000 Norwegian derivative contracts were traded on the OM/OMLX platform from February to July 1997, the equivalent of 24% of the volume of Norwegian derivatives traded on the Oslo Stock Exchange. (Volumes of Swedish products traded on the Oslo Stock exchange have, however, so far been negligible.) Virtually all of this activity was on London-based OMLX rather than Swedish OM, suggesting that demand came from international firms in London trading on OMLX, rather than from Scandinavian firms. It does not seem to have been at the expense of Oslo Stock Exchange volumes: Chart 2 demonstrates that from February to July 1997, volumes on the Oslo Stock Exchange actually rose by 2%, in contrast with lower Q2 volumes (compared with Q1 volumes) on the Oslo Stock Exchange in the previous two years.

  OM Stockholm/OMLX also began a link with the Finnish Securities and Derivatives Exchange (SOM) in September 1996, which enables Finnish bond and interest rate products to be cleared on OM and *vice versa*. The relevant exchanges also hope to include SOM in the OM-Norway link.

Chart 2
Turnover of Norwegian derivatives on the Oslo Bourse and on OM/OMLX



- *The EUREX proposal*

  The German and Swiss derivative exchanges, the DTB and SOFFEX, announced on 4 September that they planned to establish a common market for their products on a single trading and clearing platform by mid 1998 (called EUREX). This was followed on 17 September by an announcement that the French exchanges (SBF–Bourse de Paris, MATIF and MONEP) will join the link, which will initially involve MATIF's fixed income derivatives being traded electronically on a system that will be linked to EUREX. It seems to be open to other exchanges to join if they wish. If this alliance goes ahead (and there is clearly much to be done before it can become a practical reality), it would—on current turnover—create the largest derivative market in Europe.

  But it is difficult to predict combined turnover if the exchanges do link up. First, some contracts are likely to cease to exist after EMU. Differences in bond yields may remain as a result of differences in governments' credit risks, but short-term interest rate (STIR) contracts are likely to converge, perhaps leaving only one STIR contract for the EMU area. Second, though the combined turnover of the DTB, SOFFEX and MATIF currently exceeds LIFFE's turnover, LIFFE's turnover has been growing faster. On the other hand, the linked exchanges, should the proposals be successfully implemented, may create an additional pool of liquidity and attract new users to the market.

  Many of the details of the proposed platform have still to be worked out. In essence, the plan is that the DTB

(1) OM Stockholm and OMLX (The London Securities and Derivatives Exchange) are part of the same company, OM Gruppen, and operate as two exchanges linked through an electronic common trading platform.
(2) There was a delay in June 1997 in providing access to Swedish products to members of the Oslo Stock Exchange.
(3) An OMLX member trading a Norwegian equity derivative product via the joint orderbook, for example, will have its trade cleared at OMLX rather than on the Oslo Stock Exchange.

and SOFFEX will link their electronic trading systems and clearing functions to allow members of each exchange to trade both exchanges' products. The MATIF link would allow MATIF members access to German and Swiss products, and *vice versa*. There will be harmonised rules and regulations. But it is not clear what other changes these links will involve; MATIF is currently an open-outcry exchange, and it seems that it will use the new electronic trading link in parallel with floor-based trading. The derivatives link may also open the way for a fully-fledged alliance embracing their respective equity markets.

Common trading platforms are not easy to establish; the exchanges need compatible electronic trading systems, and it is probably also important that they should have distinct markets and products (so that the threat of loss of business to their existing members is small and the opportunities from new products large). But unlike a fully-fledged merger, they allow the partners to retain a degree of local autonomy—for example, over product design and membership matters—which (particularly with mutual ownership structures) may be important in securing member acceptance. Linking different electronic systems can be difficult; in the Scandinavian example, the Oslo Stock Exchange adopted OM's trading system. In addition, these Scandinavian exchanges do not directly compete in the markets they cover or products they list, and none is individually a leading exchange in Europe (in terms of turnover), though when linked, they are more significant. But even in this case, the benefits of a common platform—as with cross-listing—do not necessarily accrue in equal measure to all the participating exchanges.

The difficulties involved in establishing common trading platforms are illustrated by a previous attempt by the French and German exchanges to establish a link for equities and derivatives in 1995. Discussions eventually broke down last year, with both sides agreeing that this was too expensive and problematic—possibly in part because of opposition from MATIF floor traders to a screen-based system. The current EUREX project may, however, be better placed to succeed: the French Stock Exchange, the SBF-Bourse de Paris, which is first to merge with MATIF, is already an electronic exchange. Other specific factors favour the DTB-SOFFEX link: they have the same basic electronic trading systems (though of different vintages) and they are not competing in the same markets.

Technological improvement is a key factor in the prospects for cross-border links between derivative exchanges. Most European derivative exchanges established during the past decade are electronic, and most open-outcry exchanges, established before electronic trading was feasible, have now introduced some form of electronic trading: LIFFE and MATIF now have after-hours electronic trading systems, LIFFE is also aiming to automate equity options in 1998, and the Amsterdam Exchange is planning to introduce electronic trading for derivatives next year. The extent of electronic trading has also been increasing in equity exchanges. The trading floors in London and Sweden were abandoned in the 1980s (London has also now introduced a fully electronic order book for FT-SE 100 stocks), and in Amsterdam and Oslo, traders meet on the trading floor but trade with each other mainly through electronic links. The Paris, Milan, Zurich, Helsinki and Copenhagen stock exchanges are almost entirely electronic. Germany is the only remaining major equity market in Europe with open-outcry trading, though Frankfurt's electronic IBIS system is gaining market share and now accounts for 40% of turnover.

Because it is easier to set up common trading platforms when trading is electronic, these technological advances help to facilitate electronic linkages. Cross-listing links are of course possible with open-outcry exchanges, but it is difficult for such a link to allow the simultaneous trading of both exchanges' products by all members (which is why cross-listing links are typically between exchanges in different time zones). In addition, the cost advantages are probably much greater with electronic links: a shared electronic platform can absorb additional activity at relatively low marginal cost, whereas an open-outcry link still involves the expense of two separate floors, and the savings are probably confined to marketing and product design. Provided that the systems are electronically compatible—or one partner adopts the other's system (perhaps as an alternative to developing its own)—the economies of scale are likely to be substantial.

The importance to exchanges of these trading links is much enhanced by the heightened competition expected after EMU. For many of Europe's derivative exchanges, contracts based on national interest rates form a significant part of total volumes. In countries that become part of EMU and adopt the euro as their national currency, short-term interest rates for separate national currencies will be subsumed by the single euro interest rate. It therefore seems unlikely that there will be sufficient business to justify an independent futures exchange in every country in Europe. Links may provide some assurance of continuity and a role in governance that independence—particularly for the smaller markets—may not (though liquidity may flow to one of the partners of a link).

There is currently more cross-border activity—actual and planned—between derivative exchanges than between stock markets. Stock exchanges are, however, also likely to face increased incentives to follow derivative exchanges and embark on trading links. It has been suggested, for example, that EMU will result in increased cross-border share ownership. Pension fund rules typically require funds to match their liabilities with assets in the same currency. EMU will therefore broaden the range of securities that qualify as 'domestic' for these purposes and so should stimulate cross-border activity in euro securities. In addition, EMU may reduce the distinctions between exchanges in the eyes of investors. This may increase the incentives for national equity exchanges themselves to forge closer ties.

Remote trading

Remote access allows members of an exchange to trade the exchange's products from remote terminals on the same basis as local members. Use of remote terminals is increasing throughout Europe, and they are becoming a notable feature of the new market framework. With 61 remote members in October 1997, the DTB has so far been the most successful in attracting such members, though many other exchanges also have remote members.

Remote access is essentially a competitive rather than a collaborative tool, allowing an exchange to distribute its products to a wider market, but without the benefit of new products or the support of an incumbent local exchange—with the ready access to intermediaries and customers that this can provide.(1) It is potentially an easier way for an exchange to disseminate its products more widely, since it can control the process and does not need to rely on gaining the co-operation of a foreign partner.

As with electronic trading links, a key factor in the development of remote trading is the increased use of electronic trading systems: without an electronic trading platform, the most that can be achieved is remote order routing rather than direct access to the trading mechanism itself. But within Europe, it has been greatly facilitated by the implementation during 1996 of the Investment Services Directive (ISD).(2) The ISD enables a securities firm that is registered and authorised in one Member State to trade in any other without needing additional regulatory approval; equally, exchanges recognised in one Member State can gain unrestricted access to other Member States, for example by setting up terminals in them. So securities firms can now trade directly on any EU exchange without being physically present in that exchange's country, and without the additional regulatory burden of authorisation by that country's regulatory authorities.

Remote trading did take place before the ISD,(3) and in non-EU countries, such as Switzerland, where the ISD does not apply. In these cases, exchanges have negotiated bilaterally with the relevant countries. SOFFEX, for example, has a reciprocal agreement with the DTB under which SOFFEX terminals can be located in Frankfurt—there are currently twelve—and DTB terminals can be located in Switzerland.

There are of course some disadvantages to remote trading. A presence in the country where the exchange is based is valuable for obtaining local knowledge and local clients. In addition, most exchanges require a local presence for clearing, even when remote trading is offered. The consequent restrictions on cross-border settlement are a barrier to cross-border trading for firms that do not have branches throughout the European Union. But attitudes to the location of clearing members seem to be changing. The London Clearing House and MATIF, for example, each have one remote clearing member.

Conclusion

Mergers between equity and derivative exchanges within countries have already taken place in Germany, Switzerland and the Netherlands, and are planned in Austria, France and Finland. There are good reasons for such mergers: they allow cost reductions of various kinds and can improve the efficiency of the respective markets by bringing the participants closer together. They have been facilitated by the consolidation of regional equity markets and greater understanding of derivative markets by stock market participants, which have reduced previous barriers; and the potential gains from merger have increased as trading technology has become more dependent on electronic systems, which generate greater economies of scale. These factors, together with the need to establish a strong competitive position in advance of EMU, suggest that such mergers will continue to be attractive.

A distinctive feature of the current co-operation between exchanges is a new form of trading link between them—common electronic trading platforms. Though only one has so far been set up and the volumes on this (and indeed on earlier cross-listing links) have not generally been high, common trading platforms have a potentially powerful role to play in Europe. They allow exchanges to consolidate the trading mechanism and the liquidity of the market, while allowing smaller exchanges to retain independence on matters such as their internal governance and product design. For a small exchange with a limited product range and only a local customer base, a common trading platform may be a better way to distribute its products than remote trading, as the exchange can benefit from being able to offer the other exchange's products to its members, and from a larger pool of liquidity. Providing and servicing remote terminals for only a small number of participants may also not be cost-effective.

But it is perhaps in the area of remote trading—the possibilities of which are being greatly expanded through technological advances—that we may see the most change. Remote trading seems to be an easier way for an exchange to distribute its products widely than negotiating and implementing a trading link with another exchange, since it does not require co-operation and involves no loss of control. It is probably particularly suited to larger exchanges, with a well-developed product base and liquidity that they simply want to distribute more widely.

These changes in the structure and organisation of equity and derivative exchanges have a number of consequences—

(1) Remote trading can also be collaborative, though this is more likely in non-EU countries where the ISD does not apply. For example, the DTB is co-operating with SIMEX in its plans to locate trading terminals in Singapore.
(2) The ISD has been implemented in the United Kingdom, France, Italy, Belgium, the Netherlands, Sweden, Denmark, Finland, Austria, Ireland, Portugal and Greece.
(3) The GLOBEX trading system, owned by the CME, Reuters and initially the CBOT, is used as an after-hours trading system for CME and for MATIF. Plans for GLOBEX had been more ambitious, with 24-hour trading envisaged, but restrictions were placed on its use. (For example, an exchange using GLOBEX could not develop its own automated trading system.) The system was developed in 1992 and CME and MATIF both plan to abandon it in favour of the Paris Bourse's NSC trading system in April 1998.

for market participants (members and end-users), exchanges and regulators:

- Common trading platforms, consolidation of exchanges and wider product availability through remote access may all improve the price formation process: they expand the trading population and expose the contracts to a wider market. If this—as might be expected—results in more liquid, deeper markets, this could encourage new investors to participate in the market, attracted by the more efficient pricing. The Scandinavian link is an example: the ability to trade Norwegian products from London has already attracted new participants into the Norwegian derivatives market. In addition, common trading platforms may create new arbitrage opportunities, which could reinforce the price efficiency improvements.

- Mergers and co-operation on trading technology should result directly in cost reductions for exchanges, which should in turn reduce trading costs. They may also allow exchanges to develop improved trading systems more cheaply. The relative ease with which electronic exchanges can establish common trading platforms and provide remote terminals may place exchanges that rely solely on open-outcry platforms—and so cannot easily undertake these new forms of activity—at a competitive disadvantage, as fewer competitive options are open to them.

- These new forms of cross-border trading may also have regulatory implications. It will be important, for example, that exchanges operating as one market are supervised as one market. Similar issues may arise about the regulation of remote trading: it is important that remote users are subject to the same standards of regulation as local members. There may also be issues of regulatory jurisdiction to be clarified, so that remote trading is not used to exploit differences in standards in different markets. There is also a risk—if consolidation is taken too far—that a single exchange may come to dominate the market. This is potentially unhealthy, in that it would weaken the competitive forces that are creating such powerful incentives to develop cheap and efficient trading systems, to the benefit of all market participants.

It is clear that there is still some way to go before the full effects of the recent and prospective changes in structure of these markets will be reflected in the pattern of trading and the location of business within Europe. The eventual structure may well be quite different from the one we see today. But it should be more efficient, and better able to take full advantage of the facilities that modern technology can bring.