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**Integration of the European securities markets and links
among stock exchanges: a cross-listing, cross-membership
and cross-trading analysis**

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Integration of the European securities markets and links among stock exchanges: a cross-listing, cross-membership and cross-trading analysis

(Alessandro Carrette and Gianni Nicolini)

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Abstract

Cooperation between stock exchanges is part of a wider process concerning exchange industry integration. Demutualization, monetary union (Euro) and ICT progress allowed a stock market integration process, started at the end of the 90's, and still far to be concluded.

Integrative solutions “cooperation-based” (alliance, agreement, ect) are ones of the most appreciated by the exchanges. Two of the main integration process (Euronext and Omx) show a strong cooperative nature.

The purpose of the paper is to focus some leading indicators, ables to forecast new integration initiatives. The indicators are identified analysing different cooperatives solutions. A theoretical perspective will be adopted to identify the pro and cons of solutions with an hi-level of cooperations. Single integration solutions will be considered and each one will be compared with non-cooperative's solutions (mergers, acquisitions, free-market competition, ect.).

After a theoretical approach, an empirical analysis will follow to highlight links between stock exchanges in listing and membership activities. The listing analysis concerns the issuing behaviours of the main european countries issuers. In special case the attitude to list stocks in different exchanges (named by literacy as “cross-listing” or “multi-listing”) will be analysed. The cross-membership analysis will study the behaviours of market members that play the same role in different exchanges at the same time, linking togheter the engaged markets. The evidence of stronger links between specific stock exchanges will help to identify the development of specific market integration projects.

In particular the analysis will contribute to highlight the relationship network between stock market stakeholders. The knowledge of this network will contribute to improve the quality of forecasting processes concerning the integration process of european exchange industry.

Keywords: Cooperation, coordination, exchange industry, cross-listing, cross-membership, cross-trading, integration.

JEL Classification: G150, G180

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The integration of the European securities markets and the links among stock exchanges: a cross-listing, cross-membership and cross-trading analysis¹
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Introduction

In recent times, the process of integration of the European securities market has produced a few initial results with the conclusion of agreements and understandings among stock exchanges designed to replace the individual national infrastructures with pan-European solutions. Euronext and Omx are two examples of integration pursued through cooperative solutions based on links across organizational boundaries.

However, the links connecting various stock exchanges are not an exclusive of official integration projects. In fact, the disappearance of those barriers that, in the past, had hindered cross-border transactions ended up supporting the development of links among stock exchanges in market listing, trading and membership.

Therefore, a distinction may be drawn between an official integration, driven by the market exchanges, and a non-official integration, implemented by individual stakeholders (market issuers, intermediaries and investors), who decide to operate at the same time on a number of financial markets.

An analysis of the integration drive that fails to take into consideration the operational links among stock exchanges runs the risk of limiting the observation to official forms of integration, neglecting those integration aspects that permit to interpret in the best possible manner - if not actually to anticipate - the strategic decisions taken by the individual stock exchanges.

This paper purposes to investigate the non-official side of integration that, while being possibly less striking than official agreements among stock exchanges, is by no means less effective.

First, the paper will go over the essential stages of the process of integration of the European securities market. After having outlined the actual situation (paragraph 1), it will evaluate the differences among the various forms of integration, drawing a distinction between cooperative solutions (paragraph 2) and competitive solutions (paragraph 3). The second part of the paper is devoted to the empirical analysis of the market. Having clearly specified the assumptions of the investigation model, the paper defines the stock exchange sample taken into consideration and the historical series being analyzed (paragraph 4), and proceeds with a separate evaluation of the level of cross-listing (paragraph 5) cross-membership (paragraph 6) and cross-trading (paragraph 7) of the European markets being considered. The outcome of the analysis forms the basis of a series of remarks on the role played by the links across organizational boundaries in the process of integration of the European exchange industry. Finally, the analysis of the market data will allow an evaluation of the role of the “non-official” integration in the market integration process.

¹ This is draft version. The final version will be available in June 2006.

1. The process of integration of the European securities market

Starting from the mid-1990s, the European securities market has witnessed a series of events that created the conditions for the start-up of a process of integration among the European stock exchanges. In particular, these events included (1) the organizational transformation of the European stock exchanges, which moved from members' or mutual associations into for-profit corporations (demutualization)², (2) the replacement of individual national currencies with the euro and (3) the foothold gained by the electronic-based markets as standard solutions for the trading stage.³

The disappearance of strong segmentation elements, such as the public (or cooperative) nature of the markets, the use of a variety of currencies and the need for physical meetings to give rise to negotiations, has contributed to a considerable extent to a change in the perspectives of individual market stakeholders (issuers, investors, intermediaries, etc.), extending the contexts of their operation from a national to a continental level. All this succeeded in stimulating the relations among market participants in different countries, making the market boundaries much more permeable.

Increased interaction among the various markets has also affected the stock exchanges, which have seized the opportunity of integrating the exchange activity of various financial markets as a chance to increase their market share in the European panorama. To succeed in managing through a single infrastructure the exchanges of two or more national markets allows in the longer run to increase the efficiency of the productive stock exchange process, with positive repercussions even in respect of profits.⁴

There are a number of reasons to prefer an integrated market to various local markets. An integrated market gives the investors the guarantee of greater liquidity, as well as new investment opportunities.⁵ Even issuers profit from greater liquidity since, approaching the stock exchange markets with a view to diversifying their financing sources, the latter view integration as an opportunity of extending the group of prospective subscribers. Furthermore, intermediaries view integration as an opportunity of making the most of economies of scale and improving the efficiency of productive processes.

If those advantages turn integration into a goal that, at least in principle, may be shared by a number of market stakeholders, the actual choices as to the course to be followed in order to attain it have not been homogeneous. The initial phase of the integration process, which dates back to the end of the 1990s and the early 2000s, witnessed the experimentation of various solutions that, nonetheless, have not always led to positive results.

² Di Noia (1999), IOSCO (2001), Alemanni (2003), Nicolini (2004).

³ BIS (2001), Cybo-Ottone-Di Noia-Murgia (2001), Domowitz (2002).

⁴ Hasan-Schmiedel (2003).

⁵ When dealing with segmented markets, the investors of two countries may negotiate securities listed in the respective markets. Should they trade on a single integrated market, the investors could keep on negotiating domestic securities but would also have the opportunity of negotiating securities of the foreign market.

The initial integration attempts witnessed the involvement of the London Stock Exchange (LSE). The iX - international exchange - project was one of the first that endeavored to link two stock exchanges belonging to different countries through an integration of the relative organizational infrastructures. The project saw the Deutsche Börse (DB) as promoter and the LSE as partner of excellence. The integration process should have occurred through a merger but, problems connected with competences in the matter of supervision, as well as monetary differences contributed to the failure of the initiative. However, what caused the agreement between the German market and the British market to fail was also the takeover bid for LSE put forward by OM Technology, one of the leading providers of technological stock exchange services. Unlike the iX project, based on an M&A operation that, nonetheless, provided for an involvement of the two participants on an equal footing, the OM approach was definitely more aggressive and highlighted how the ways for absorbing a market within the context of an international initiative can be thoroughly different.

An experience with a strong cooperative basis was the “group of eight”. The initiative involved the financial markets of Amsterdam, Brussels, Frankfurt, Madrid, Milan, Paris, Zurich and, once again, London with a view to creating a pan-European blue chip stock market. The latter was supposed to operate side by side with the individual national markets where securities having local relevance would have kept on being traded. The integration would have entailed the network connection of the individual stock exchanges that, therefore, would have maintained their peculiar identity. The negotiations that had started in 1999 caused the promoters to face those typical network difficulties (coordination problems, technological differences, normative uncertainties, etc.) that, in the end, forced them to abandon the project, which never reached the implementation phase.

In addition to those referred to above, other integration projects⁶ have stimulated the European exchange industry, contributing to the experimentation of a variety of integration solutions.

An initial experimentation phase was followed by an implementation phase where the integration among the markets of different countries resolutely moved towards highly binding cooperation projects, if not directly towards M&A operations.

The beginning of this second phase has been characterized by two distinct approaches to integration. One approach, adopted by the Euronext project, is characterized by a strong cooperative nature, where the replacement of the individual national stock exchanges with a single European stock exchange is a medium-long term goal to be attained through a progressive involvement of the individual national structures. The other approach, adopted by the Deutsche Börse, combines integration through M&A operations with a competitive activity designed to turn the Frankfurt market into the pan-European reference market. Therefore, the differences between a cooperative approach and a competitive approach surface quite clearly. Even if the cooperative

⁶ Different integration projects that have characterized the initial integration phase include Euroglobex, led by Bourse de Paris, and the EuroNM project, based on the idea of a European market for companies with small and medium capitalization.

Euronext model entails by definition the cooperation and collaboration among the various infrastructures, even the competition that characterizes the Deutsche Börse model entails a considerable interaction among the markets.

2. Forms of cooperation-based integration

There are substantially two forms of market integration based on the cooperation of various exchanges: alliances and networks.⁷

An alliance may be defined as an “approach” to integration, rather than as an actual integration course. In fact, the term alliance points to a broad and changeable concept that may hardly be traced back to a pre-defined and standardized integration mechanism. The fundamental idea underlying an alliance is to share the same product and process standards as an integration requirement. Alliances, meant as agreements to harmonize the listing, trading or post-trading procedures, or as determination of common standards on regulatory and operational aspects, are weak forms of market integration. In fact, a distinction may be drawn between strong forms of integration, where the process is finalized by the replacement of the individual stock exchanges with a new exchange having international relevance, and weak forms of integration where, notwithstanding the presence of structural links among the individual participants, both the identity and autonomy of the exchanges involved are guaranteed.⁸ Alliances fall within the weak forms of integration because, as a rule, they are based on agreements that do not rule out the possibility of an annulment. The levels of harmonization and the agreed standards often constitute mere guidelines that, as such, are insufficient to give rise to integration phenomena.

A network is an integration solution generally based on the trading stage, considered as the core business of the market management activity. A network consists in a series of links among stock exchanges that are to allow the investors on the individual markets to trade not only domestic but also international securities. Therefore, a network sees to the formalization of cross-listing, cross-membership and cross-trading agreements. Hence, the individual stock exchange turns into a point of access to an international market where the logistic constraints of the open-outcry markets are avoided thanks to the telematic solutions peculiar to electronic-based markets.⁹

In a network, all the orders relative to a given security, regardless of the nationality of the investors, are passed on to the individual market where the security is listed. The order transfer arrangements differentiate the ‘hub and spoke’ models from the ‘spaghetti’ models.

In the ‘spaghetti’ model,¹⁰ the interaction among the participants is warranted by a direct link between the trading systems of the individual stock exchanges. The information flow concerning the cross-border negotiations passes through a direct link between the investor's market of origin and the market where the securities are listed.

⁷ Refer to Di Noia (1999), Domowitz (2002).

⁸ For greater details, see Nicolini (2004).

⁹ For greater details, see Breedon-Holland (1997).

¹⁰ Refer to Alemanni B., “Riorganizzazione dei mercati di capitali, impatto sugli intermediari e implicazioni sull’attività di vigilanza”, Università commerciale Luigi Bocconi – Newfin, Milan, 2001.

Therefore, in the 'spaghetti' model, the coordination among the various markets is exasperated since the number of links necessary to integrate n markets amounts to $n \cdot (n-1)$.

The 'hub and spoke' model solves the problem of the excessive number of links by the setting up of a sorting structure (hub) that centralize traders' orders, sorting them in the direction of the trading markets. The presence of this infrastructure require the presence of n links for n markets.¹¹ However, the simplification of the infrastructure is offset by a greater vulnerability of the system. In fact, with the setting up a single sorting infrastructure there is the risk of a total block of the market should the hub be blocked.

Two cooperation-based integration projects are currently under way in Europe: the Euronext project and the OMX project.

Euronext was set up in September 2000 by the stock exchanges of Paris, Amsterdam and Brussels. Later it was joined by the Lisbon Stock Exchange and the Liffe (British derivatives market). The Euronext sets itself as an explicit goal the replacement of the individual national stock exchanges with a single (new) European stock exchange. Although considered as the point of arrival of the initiative, this goal is considered a tendential reference to be approached through a preventive action of aggregation based on a network solution. Hence, individual members are requested to commit themselves in the short run by means of cross-listing and cross-membership agreements.

OMX is the result of the merger of OM Technology with the Helsinki Exchange (HEX). If, as such, it does not represent a form of integration of the European securities market, it turns into one if one considers that OM Technology has the direct control of the Stockholm Stock Exchange (Stockholmbörsen). The role on equal terms of the two parties involved in the merger causes the OMX project to fall within the cooperative agreements. The cooperative nature emerges more clearly if one considers that the stock exchanges included in the OMX project and other stock exchanges of the Scandinavian countries had already given rise in the past to an alliance (the Norex - Nordic exchange) and that, in 2005, in addition to the stock exchanges of the Baltic Republics (Latvia, Estonia, Lithuania), even the Copenhagen Stock Exchange has become a party to the OMX project.

Even the OMX project provides for links among the individual financial markets as the latter share the same technological solutions that have been developed from within the group. In this case, the technological factor has been a strong factor of aggregation.

It is interesting to note how the links among different infrastructures allow in point of fact the integration of various securities markets, giving rise to organizations having an international nature. It is even more interesting to analyze these links as forms of interaction across organizational boundaries and to study how the presence of operational links among various stock exchanges may represent a parameter to evaluate the integration prospects of formally separated realities.

¹¹ In the 'hub and spoke' model, in order to ensure the interaction among n markets it is enough for each market to set up a single link with the hub rather than $n-1$ links with the other $n-1$ network markets.

3. Cooperation vs. competition

In addition to cooperative-type solutions, the European securities market highlights projects characterized by a higher level of centralization, where the leverage of a European stock exchange passes through a competitive fight that causes a single stock exchange to prevail. That financial market may take on pan-European relevance thanks to the visibility and the efficiency that it succeeds in guaranteeing.

The main European stock exchanges that have adopted a competition-based integration approach are the London Stock Exchange (LSE) and the Deutsche Börse (DB). Although being considered in a number of integration projects, the LSE reacted up to now preferring a stand-alone position, enhanced by its market size and its role as the internationally acknowledged European financial market of reference. The DB has pursued a definite expansion strategy based on competition. In 1998 DB joined the Zurich Stock Exchange creating Eurex (derivatives market) and, over the years, it has progressively endeavored to attract foreign investors and issuers in an attempt to increase the range of traded instruments and the level of liquidity of the market.

In the DB case, cross-listing, cross-membership and cross-trading solutions are not agreed upon with other markets in order to give rise to a common market, as they are solutions that are actually implemented by listing on the German market securities that are already listed on different markets (double-listing) or by recognizing foreign intermediaries as persons authorized to trade on the DB markets. What is interesting to note is that even the solutions based on competition do not rule out links among the markets, even if the latter are not formalized through cooperative-type agreements.

Even greater relevance should be ascribed to the fact that it is not necessary for the links among stock exchanges to be implemented on the (cooperative or competitive) initiative of the stock exchanges themselves. In fact, the issuers' decision to list their securities on more than one market (multi-listing), just as the intermediaries' will to trade simultaneously in a variety of stock exchanges (multi-membership), may be the outcome of autonomous decisions. Finally, from the point of view of investors, the possibility of having access to different markets would have the effect of connecting even more the individual European stock exchanges through links across organizational boundaries.

4. Empirical analysis

The assumption underlying the work is that forms of market integration that have not been formalized by official agreements have developed side by side with stock exchange integration projects. Through the analysis of the main European securities markets, it becomes possible to investigate the links among stock exchanges that, on their own accord, followed or anticipated official integration phenomena. Therefore, while the stock exchanges are directly involved in official integration projects, in the "non-official" forms of integration the change should be ascribed to issuers, intermediaries and investors. Unlike official integrations where each cooperation agreement among stock exchanges follows a predefined strategy, the non-official forms of integration are often the result of individual behaviors that, as such, do not fall within

a unitary strategy implemented in a conscious manner.

If the presence of official agreements among various stock exchanges may succeed in affecting the behavior of individual market stakeholders,¹² it should not be ruled out that market participants might affect with their behavior the strategic decisions of the stock exchanges in the matter of integration. Financial markets that share issuers, intermediaries and investors, working to all intents and purposes in an integrated market, will get to an officialization of such integration much more easily than financial markets characterized by a strong segmentation from the points of view of listing, membership and trading.

With these hypothesis, an analysis concerning issuers, authorized intermediaries (members) and investors in the main European markets was carried out in order to check the presence of the same stakeholders in the different markets (Table 1). About issuers and members, the analysis try to verify the presence of the same participants in various financial markets, taking any overlap to be a link across organizational boundaries. For the investors, given the lack of data concerning the traders' identities, the analysis was carried out using the correlation between the yields of individual markets as proxy of the integration level.

Mercati - Segmenti	
BMEX - Barcelona (Open outcry)	LSE - London Stock Exchange - IRSU
BMEX - Barcelona (Sibe)	LSE - London Stock Exchange - ITBB
BMEX - Bilbao - SIBE	LSE - London Stock Exchange - ITBU
BMEX - Madrid - Continuous Market	LSE - London Stock Exchange - LVSD
BMEX - Madrid - Floor	LSE - London Stock Exchange - NSTS
BMEX - Madrid - Latibex	LSE - London Stock Exchange - SEAQ
BMEX - Madrid - New Market	LSE - London Stock Exchange - SEQ1
BMEX - Valencia - Corro.	LSE - London Stock Exchange - SET (ETFS)
BMEX - Valencia - Mercado cont.	LSE - London Stock Exchange - SET1
Borsa Italiana - Expandi	LSE - London Stock Exchange - SET2
Borsa italiana - MTA - SBO 1 (Segmento ordinario 1)	LSE - London Stock Exchange - SET3
Borsa italiana - MTA - SBO 2 (Segmento ordinario 2)	LSE - London Stock Exchange - STMM
Borsa Italiana - MTA Star	LSE - London Stock Exchange - TEST
Borsa Italiana - Nuovo Mercato - Altre	OM-Hex - BL Market
Borsa Italiana - TechStar NM	OM-Hex - I-List
Borsa Italiana MTA - Blue Chips	OM-Hex - Main list
Copenhagen Stock Exchange	OM-Hex - NM/Pre -List
Deutsche Borse	OM-Hex - Swedish Shares
Euronext -Amsterdam	OM-Stockholmborsen
Euronext -Bruxelles	Oslo Bors
Euronext -Lisbona	RSE - Riga Stock Exchange - Baltic Main list
Euronext -Parigi	RSE - Riga Stock Exchange - Current trading list
Ise - Irish Stock Exchange	RSE - Riga Stock Exchange - Official trading list
LSE - London Stock Exchange - AIM	SWX - Swiss Exchange
LSE - London Stock Exchange - AIMI	TSE - Tallin Stock Exchange - Baltic Main list
LSE - London Stock Exchange - CNVE	Virt-X
LSE - London Stock Exchange - IRSQ	Wiener Borse

Table 1: markets/segments taken into consideration

¹² The presence of forms of cooperation among exchanges that make it easier for the stakeholders (issuers, intermediaries, investors) to operate on the markets involved with respect to other financial markets succeeds in diverting liquidity towards the associated exchanges.

5. Cross-listing on the European market

The cross-listing analysis is based on 17,537 findings,¹³ where each finding identifies a listing. The comparison between the various markets is based on the ISIN (International Securities Identification Number) that, in addition to identifying in a univocal manner each financial instrument, permits to trace the nationality of the security.

An initial measurement of the level of connection of the various stock exchanges from the listing point of view is the breakdown of the securities listed on each market between domestic and foreign securities (Table 2). The higher the percentage of foreign securities traded on the domestic market, the higher is the level of integration of the stock exchange with other financial markets.

	Domestic securities (local-listed) (A)	Foreign securities (local-listed) (B)	Total (local-listed) (C=A+B)	% Domestic securities (local-listed) (D=A/C)	% Foreign securities (local-listed) (E=B/C)	% Total (local-listed) (F=D+E)
Austria	100	11	111	90.10%	9.90%	100%
Germany	959	5733	6692	14.30%	85.70%	100%
Switzerland	303	106	409	74.10%	25.90%	100%
UK	1614	754	2368	68.20%	31.80%	100%
Ireland	50	9	59	84.70%	15.30%	100%
France	799	44	843	94.80%	5.20%	100%
Netherland	173	92	265	65.30%	34.70%	100%
Belgium	254	39	293	86.70%	13.30%	100%
Portugal	53	2	55	96.40%	3.60%	100%
Spain	3081	44	3125	98.60%	1.40%	100%
Italy	313	9	322	97.20%	2.80%	100%
Norway	154	21	175	88.00%	12.00%	100%
Denmark	185	7	192	96.40%	3.60%	100%
Sweden	293	10	303	96.70%	3.30%	100%
Finland	154	9	163	94.50%	5.50%	100%
Estonia	13	0	13	100.00%	0.00%	100%
Latvia	43	0	43	100,00%	0,00%	100%

Table 2: domestic-foreign securities ratio in the European markets

The German market shows the most evident datum. Over 85% of the securities traded on the German markets refers to a foreign issuer. In any event, the relevance of this figure must be reassessed taking into consideration the admission to trading policy adopted by the Deutsche Börse that, even when lacking an explicit request by the issuer, allows the negotiation of securities listed on other markets. If the datum is somehow affected by the behavior of the stock exchange, the result is nonetheless the mesh of a series of links with various foreign markets.

The high level of internationalization of the Dutch market stresses the cross-border

¹³ The data, updated as at September 2005, result from the official documents of the individual exchanges taken into consideration and have been checked against the summary surveys supplied by the World Federation of Exchanges.

nature of the Euronext project.

Even the Swiss market and the British market, joined by the decision to stay out from any integration project, point to a high percentage of foreign issuers. Considering the securities traded on the Swiss market, 25.90% were issued by a foreign entity, while the figure was 31.80% for the British market.

It is interesting to note that, keeping into account the weighing related to the total number of securities listed on the individual markets, the percentage of foreign issuers out of the total number of issuers is 44.65%. However, if the German market is not taken into account, the mean value drops to 13.22%. This figure shows the limited European dimension of the individual national markets.

This opinion would be strengthened if we consider that the foreign securities listed on the Irish market (15.30%) belong to British issuers and, likewise, the foreign issuers in the Norwegian market refer to Scandinavian issuers. Therefore, the geographical aspect yields a dominant influence even in markets showing greater openness towards foreign countries.

If we fail to take into consideration the Baltic “micro-markets”, the Italian market and the Spanish market are the most closed ones. Only 9 out of 322 securities listed on the Italian Stock Exchange are from foreign issuers (2.8%). For the Spanish market, the 1.4% figure is conditioned by a high number of domestic securities (over 3,000).

In addition to investigating the international vocation of the markets, it is interesting to consider the issuers’ behavior. Table 3 below highlights the issuers’ multi-listing tendency, that is to say their tendency to list the same security in two or more markets.

	Domestic securities (local-listed)	<i>Domestic securities “multi-listed” *</i>	<i>in %</i>
Austria	100	50	50.00%
Germany	959	46	4.80%
Switzerland	303	123	40.60%
UK	1614	1005	62.30%
Ireland	50	42	84.00%
France	799	158	19.80%
The Netherland	173	75	43.40%
Belgium	254	33	13.00%
Portugal	53	15	28.30%
Spain	3081	155	5.00%
Italy	313	102	32.60%
Norway	154	29	18.80%
Denmark	185	25	13.50%
Sweden	293	74	25.30%
Finland	154	37	24.00%
Estonia	13	0	0.00%
Latvia	43	0	0.00%

Table 3: multi-listing on the European markets

** It's considered “multi-listed” a security listed on a foreign market and on a local market at the same time.*

With the exclusion of the Baltic markets (0%), 31.03% of the domestic securities are listed on average also in other European markets. Excepting the Irish and Austrian securities, where the second listing relates almost exclusively to the British and the German market, respectively, the British issuers are those who more frequently decide to list their securities in more than one financial market. It should not be overlooked that many European corporate groups often create financial companies under the British law that, listed on the London market, are subsequently listed also in their 'market of origin'. In these cases, the companies - formally established as British companies - see in the market of origin of their parent company their real domestic market. The same phenomenon may also be found in the Swiss market.

102 out of 313 Italian securities are traded also in other European markets (32.6%). Therefore, the scarce international vocation of the Italian Stock Exchange is not matched by a high home-country bias of the Italian issuers.

The values of both the German market (4.8%) and the Spanish market (5.0%) are very limited. The international vocation of the Deutsche Börse may be a cause of the home-country bias¹⁴ of German issuers. Assuming that the domestic market is able to ensure international visibility, the choice of a second listing may lose interest.¹⁵ In the Spanish market case, the limited percentage figure is attributable to the high number of national securities. Unlike the German market, the strong home-country bias of the Spanish issuers combines with a scarce international vocation of the BMX that, failing to list foreign securities and showing the issuers' strong bias, is characterized by a remarkable degree of isolation.

Going beyond the number of multi-listed securities, one may try to figure out the member of times the securities of the individual Countries request and obtain a listing on another market (Table 4). In fact, within the multi-listing context, a distinction may be drawn between securities subject to a dual listing, that is to say listed on a single market in addition to their domestic market, and securities where the domestic listing is repeated in a variety of financial markets.

¹⁴ Chan-Covrig-NG (2003).

¹⁵ Halling-Pagano-Randl-Zechner (2003).

	Total listing of domestic securities in every european market * (A)	Domestic securities "local-listed" (B)	Average number of listing (A/B)
Austria	162	100	1.62
Germany	1135	959	1.18
Switzerland	540	303	1.78
UK	4801	1614	2.97
Ireland	265	50	5.30
France	1904	799	2.38
The Netherlands	622	173	3.60
Belgium	560	254	2.20
Portugal	121	53	2.28
Spain	3705	3081	1.20
Italy	525	313	1.68
Norway	191	154	1.24
Denmark	399	185	2.16
Sweden	738	293	2.52
Finland	361	154	2.34
Estonia	30	13	2.31
Latvia	56	43	1.30
		Average	2.24

Table 4: listings of domestic securities in the European market as a whole¹⁶

Looking at Table 4, the first column shows the securities that are listed on both the domestic and a foreign market (multi-listing). The first column includes also the securities of domestic issuers that, although being listed abroad, are not listed on the domestic market (i.e., Austrian issuer listed on Germany but not in Austria).

The use of the second column as a proxy of the domestic market permits to make a few remarks on the multi-listing of the markets, taking the degree of internationality of every issuer into consideration.

On the whole, a review of data highlights a substantial issuers' preference for dual-listing solutions. Contributions in literature¹⁷ suggest that those who list their security abroad are likely to prefer the listing on a single foreign market. The second listing would address the "main" foreign market, that is to say the market deemed to ensure the maximum visibility of the security at an international level. The data show a total listing (column A) to domestic listing (column B) ratio close to two (2.2).

This datum, which attributes on average two listings to each security, pays for a moderate level of dispersion. On average, the securities of the Irish market are listed on five different markets; the UK securities have three listings and the Dutch securities 3.5 listings. With reference to the securities of the German market, the listings to home-listed securities ratio is just over one (1.1). This shows a substantial preference for the

¹⁶ The first row concern listing of austrian securities in every european markets (austrian market included). The austrian securities was listed 162 times. The austrian securities listed in austrian market are 100.

¹⁷ Pagano-Röell-Zechner (1998).

domestic market. Even the Spanish securities tend to remain within a local context, and the same happens to the Swiss securities. The datum relative to the Italian securities, listed on average in 1.6 markets, confirms a moderate openness of the Italian issuers to foreign markets.

While evaluating the degree of the issuers' openness to integration, the analysis has also dealt with the preferences with respect to the markets of destination. To succeed in knowing what are the favorite markets of the issuers of different countries permits to check the actual level of integration of the European market. In fact, a high multi-listing value is not sufficient to get to an accurate definition of the actual market integration progress. The possibility that decisions relating to the markets of destination might be conditioned by geographical, cultural and linguistic factors runs the risk of segmenting the European market in a variety of integration areas, each being extremely coherent on the inside but definitely separate with respect to the others. In that case, the level of internationalization of the individual markets takes the form of a series of relations that bind together national markets that are geographically or culturally close. Therefore, although coming out from a strictly domestic stance, the European securities market fails to reach a full integration but places itself in an intermediate position having a regional character.

Therefore, if the multi-listing decision is a factor of market aggregation, it is by analyzing the issuers' decisions with respect to the market of destination (Table 5) that the most international markets may be identified.

	Total listing of single country's securities in every european market	Wiener Borse	Deutsche Borse	SWX - Swiss Exchange	LSE TOTALE	Virt-X	Ise - Irish Stock Ex change	Euronext-Paris	Euronext-Amsterdam	Euronext-Bruxelles	Euronext-Lisboa	Euronext TOTAL	BMEX TOTAL	Borsa italiana Totale	Oslo Bors	OMX- Copenaghen (CSE)	OM-Stockholmbörsen	OMX-Helsinki	OMX-Tallin	OMX-Riga	OMX TOTAL
		Austria	Germania	Svizzera	UK	UK	Irlanda	Francia	Olanda	Belgio	Portogallo		Italia	Norvegia	Danimarca	Svezia	Finlandia	Estonia	Lettonia		
161	Austria	99	60	1	1																
1081	Germany	5	958	20	36	34		9	5	4		18	8	2							
501	Switzerland	1	120	303	31	37		5	1			6		1			2				2
3169	UK		255	4	1614	1262	9	10	5	1		16	5		2	1	1				2
183	Ireland		13		82	38	50														
1054	France		161	4	38	39		799	3	10		812									
373	The Netherland	4	80	8	50	28		18	173	8		199	3	1							
297	Belgium		29	1	2	4		6	1	254		261									
68	Portugal		15								53	53									
3666	Spain		60		32	7		4	1		2	7	3558	2							
487	Italy		96		31	34		5		2		7	6	313							
188	Norway		29		2	2		1				1			154						
213	Denmark		25		1	1									1	185					185
410	Swedem		72		22	6			1			1			4	3	293	9			305
200	Finland		37		4	2										3	154				157
17	Estonia		4																13		13
28	Latvia																			28	28

Table 5: European markets of destination of multi-listed securities

Note: for the market organized as different exchanges or different segment, was considered as follow:

- LSE (ITBB, NSTS, IRSQ, SEAQ, AIM, AIMI, CNVE, ITBU, LVSD, SEQ1, SET1, SET2, STMM, TEST, SET(ETFS))
- Borsa Italiana (MTA-Blue Chips, MTA-SBO1, MTA-SBO2, MTA-Star, NM-TechStar, NM-Altre)
- OMX (CSE, OMX-Stockholmbörsen, OMX-Helsinki (I-list), OMX-Helsinki (Main list), OMX-Helsinki (Swedish shares), TSE-Stock (I-list), TSE-Stock(Main list), RSE-Stock (Main list), RSE-Stock (Free list))
- BMEX (BMEX-Barcelona (Sibe), BMEX-Bilbao (Sibe), BMEX-Valencia (Mercado Continuo), BMEX-Valenzia (Corro.), BMEX-Barcelona, BMEX-Madrid(Floor), BMEX-Madrid(New market))

A vertical reading of the table points to the presence of three strongly international entities: Deutsche Börse (DB), London Stock Exchange (LSE) and Euronext.

These three stock exchanges list securities from nearly all the European countries. In particular, the DB and the LSE list a considerable number of securities for each European country, while the prevalence in Euronext of securities coming from the markets directly involved in the project makes the pan-European nature of the initiative the product of the capacity to aggregate from the structural point of view various financial markets. In confirmation of the cooperative nature of Euronext, there are the substantial absence of Scandinavian securities and the reduced presence of other securities outside the associated markets.

The data highlight also the strong bias of the OMX-associated Scandinavian markets against the markets outside the initiative, or rather that the OMX markets are unable to attract foreign issuers. In fact, there are only four non-Scandinavian securities listed on the OMX markets. On the other hand, the Scandinavian issuers show a greater propensity to list their securities also on continental (DB) and Anglo-Saxons (LSE) markets.

It is interesting to note that the geographical and cultural factors still wield a considerable influence on a few markets. The Austrian market is very “close” to the German market (well over a half of the Austrian securities listed on the Wiener Börse may be traded also on the Deutsche Börse), just as the Swiss market is. Likewise, the Irish market dialogues in the listing phase in prevalence with the British markets (LSE and Virt-X).

Finally, a horizontal reading of the table confirms that the German, British, French, Dutch and Italian issuers address a number of foreign markets, while others exhibit a more marked home-country bias.

6. Cross-membership in the European market

The data relative to the international operations of the individual national members¹⁸ are summarized in Table 6.

¹⁸ The term ‘member’ identifies the stockbrokers authorized by an exchange to trade on that market.

	Domestic member on local market	Domestic member on foreign market	Total domestic member (domestic+foreign)	% Domestic member in local market	% Domestic member in foreign market	Total
Austria	44	39	83	53.0%	47.0%	100%
Germany	303	57	360	84.2%	15.8%	100%
Switzerland	61	43	104	58.7%	41.3%	100%
UK	288	256	544	52.9%	47.1%	100%
Ireland	11	30	41	26.8%	73.2%	100%
France	42	104	146	28.8%	71.2%	100%
The_Netherlands	60	124	184	32.6%	67.4%	100%
Belgium	31	49	80	38.8%	61.3%	100%
Portugal	17	22	39	43.6%	56.4%	100%
Spain	119	31	150	79.3%	20.7%	100%
Italy	72	29	101	71.3%	28.7%	100%
Norway	21	7	28	75.0%	25.0%	100%
Denmark	27	10	37	73.0%	27.0%	100%
Sweden	27	55	82	32.9%	67.1%	100%
Finland	14	11	25	56.0%	44.0%	100%
Estonia	8	3	11	72.7%	27.3%	100%
Latvia	10	2	12	83.3%	16.7%	100%
Average				56.6%	43.4%	

Table 6: degree of internationalization of the European brokers (breakdown by country)

Analyzing the number of intermediaries authorized on the British market (544), many of which operate also on different markets (256), it may be noted that there is quite a widespread tendency among the European brokers to operate simultaneously on various stock exchanges. On average, 43.4% of the authorized European intermediaries (members) trade simultaneously on two or more markets. However, there is a considerable dispersion around the mean value. In fact, there are markets where the cross-border trading tendency is more marked. In France, The Netherlands and Sweden, over 65% of the intermediaries authorized to operate on the domestic markets are also recognized in other European stock exchanges. Instead, in Germany, Spain, Italy, Norway and Denmark such a value falls below 30%.

Leaving aside a geographical classification in order to adopt one based on the membership of the exchanges, a number of remarks may be made.

	Domestic members	Foreign members	Total members	% Domestic members	% Foreign members	Total
Euronext	150	325	475	31.58%	68.42%	100%
<i>Euronext-Amsterdam</i>	<i>60</i>	<i>105</i>	<i>165</i>	<i>36.36%</i>	<i>63.64%</i>	<i>100%</i>
<i>Euronext-Paris</i>	<i>42</i>	<i>104</i>	<i>146</i>	<i>28.77%</i>	<i>71.23%</i>	<i>100%</i>
<i>Euronext-Bruxelles</i>	<i>31</i>	<i>84</i>	<i>115</i>	<i>26.96%</i>	<i>73.04%</i>	<i>100%</i>
<i>Euronext-Lisbon</i>	<i>17</i>	<i>32</i>	<i>49</i>	<i>34.69%</i>	<i>6.31%</i>	<i>100%</i>
Deutsche Borse	161	143	304	52.96%	47.04%	100%
Xetra	142	140	282	50.35%	49.65%	100%
SWX-Swiss Exchange	61	29	90	67.78%	32.22%	100%
Wiener Borse	44	23	67	65.67%	34.33%	100%
BMEX	119	5	124	95.97%	4.03%	100%
<i>BMEX-Barcellona</i>	<i>35</i>	<i>0</i>	<i>35</i>	<i>100.00%</i>	<i>0.00%</i>	<i>100%</i>
<i>BMEX-Bilbao</i>	<i>9</i>	<i>0</i>	<i>9</i>	<i>100.00%</i>	<i>0.00%</i>	<i>100%</i>
<i>BMEX-Madrid</i>	<i>52</i>	<i>3</i>	<i>55</i>	<i>94.55%</i>	<i>5.45%</i>	<i>100%</i>
<i>BMEX-Valencia</i>	<i>23</i>	<i>2</i>	<i>25</i>	<i>92.00%</i>	<i>8.00%</i>	<i>100%</i>
Borsa Italiana	72	33	105	68.57%	31.43%	100%
LSE-London Stock Exchange	288	132	420	68.57%	31.43%	100%
ISE-Irish Stock Exchange	11	5	16	68.75%	31.25%	100%
RSE-Riga Stock Exchange	10	5	15	66.67%	33.33%	100%
TSE-Tallin Stock Exchange	6	9	15	60.00%	40.00%	100%
VSE-Vilnius Stock Exchange	19	0	19	100.00%	0.00%	100%
OMX-Stockholmborsen	27	45	72	37.50%	62.50%	100%
OMX-Hex	14	30	44	31.82%	68.18%	100%
Oslo Bors	21	14	35	60.00%	40.00%	100%
CSE-Copenhagen Stock Exchange	27	16	43	62.79%	37.21%	100%

Table 7: degree of internationalization of the European brokers : breakdown by stock exchange

The market with the highest percentage of foreign members is Euronext-Brussels (73.04%). The cross-membership agreements on which the Euronext project is founded, as well as the limited size of the Belgian securities market, have certainly contributed to such a result. The mutual recognition of the intermediaries authorized to operate on the other project markets explains also the high values of the other Euronext markets (Euronext-Paris, Euronext-Amsterdam and Euronext-Lisbon).

Even the Scandinavian markets (OMX-Stockholmbörsen and OMX-Helsinki) show a marked international openness.

On the other hand, the data on the BMX exchanges (only 4% of the intermediaries are foreign brokers) confirm how closed the Spanish market is. Besides, there is a good number of stock exchanges where the percentage of foreign members is close to 30% (SWX-Swiss Exchange, Wiener Börse, Italian Stock Exchange, LSE-London Stock Exchange, ISE-Irish Stock Exchange, RSE-Riga Stock Exchange and CSE-Copenhagen Stock Exchange).

Finally, it is important to ascertain whether the level of openness of a few stock

exchanges involves only the countries that are geographically and culturally closer to the domestic market or, instead, what is occurring is an actual integration that tendentially affects the entire European market.

A reading of Table 8, which shows the geographical distribution of membership in the European markets, permits to ascertaining how different markets share the same authorized intermediaries.

	Netherlands	France	Belgium	Portugal	Germany	Switzerland	Austria	Spain	Italy	Uk	Ireland	Latvia	Estonia	Lituania	Sweden	Finland	Norway	Denmark	Iceland	Luxembourg	Hungary	Cecz. Republic	Greece	Sloveny	Cipro	Liechtenstein	Argentina	Brazil	Japan	Canada	Hong Kong	India	South Korea	Bahrain	Cina	Russia	Taiwan	Polonia	Singapore	Usa	Australia			
Euronext	106	91	69	38	27	8		14	8	92	6									5																							475	
<i>Euronext-Amsterdam</i>	60	23	21	6	9	2		4	3	30	2				3					2																								165
<i>Euronext-Paris</i>	21	42	15	9	9	5		4	4	30	2				4					1																								146
<i>Euronext-Bruxelles</i>	20	20	31	6	6	1		3	1	20	2				3					2																								115
<i>Euronext-Lisbon</i>	5	6	2	17	3			3		12					1																													49
Deutsche Borse	22	15	5		161	12	18	7	7	36	3				3	1				2	7	2	1	1	1																		304	
Xetra	23	14	5		142	11	17	6	7	37	4				3		1			2	6	2	1	1																			282	
SWX-Swiss Exchange	1	3			7	61	1			15										1						1																	90	
Wiener Borse		1			9	1	44			5					6							1																					67	
BMEX	2			1				119		2																																	124	
<i>BMEX-Barcellona</i>								35																																			35	
<i>BMEX-Bilbao</i>								9																																			9	
<i>BMEX-Madrid</i>	1			1				52		1																																	55	
<i>BMEX-Valencia</i>	1							23		1																																	25	
Borsa Italiana	2	4			4	1	1	1	72	20																																	105	
LSE-London Stock Exchange	24	14	1		8	4	2	3	7	288	17					4		1	1	1	1	1					3	3	4	1	6	3	5	2	3	2	4	1	1	4	1	420		
ISE-Irish Stock Exchange	1					1				3	11																																16	
RSE-Riga Stock Exchange												10	3		2																												15	
TSE-Tallin Stock Exchange										1		2	8		3	3																											17	
VSE-Vilnius Stock Exchange														19																													19	
OM-Stockholmborsen	1	2			2	3				17					27	7	5	7	1																								72	
OM-Hex	2	1				1				12					13	14		1																									44	
Oslo Bors						1				8					4		21	1																									35	
CSE-Copenhagen Stock Exchange		1								8					6			27	1																								43	
	184	146	80	39	360	104	83	150	101	544	41	12	11	19	82	25	28	37	2	11	14	6	2	2	1	1	3	3	4	1	6	3	5	2	3	2	4	1	1	4	1	2128		

Table 8: operations of brokers (members) in the European market

The London market (LSE) proves to be the market with the greater geographical membership diversification. In fact, it is the only European market where non-European (US, Canadian Japanese, Chinese, Russian, etc.) intermediaries are allowed to operate.

Even though there are no non-European brokers in the German market (Deutsche Börse and Xetra), the latter shows a high level of geographical diversification of its membership. Likewise, it seems that Euronext has succeeded in integrating the brokers of the associated markets (France, The Netherlands, Belgium and Portugal) with the brokers of the other European countries (Germany, Switzerland, Spain, Italy, UK and Sweden).

A vertical reading of the table allows the identification, in respect of each country, of the markets where the intermediaries are more active. On the whole, the British intermediaries are those most present in the European market. Even the Dutch, French, German and Swedish intermediaries trade in most European financial markets, while the Austrian and Irish intermediaries confirm their narrow links with the German market and with the British market, respectively.

Furthermore, even in respect of membership, it may be noted that the markets in northern Europe tend to interact with each other, making no effort to establish contacts with different markets. The exception to the rule is Sweden that accommodates a number of foreign traders (above all, British traders) in the Stockholm Stock Exchange and that is present in several European markets thanks to its intermediaries.

Therefore, LSE, Deutsche Börse and Euronext prove, even in respect of membership, to be the most integrated exchanges at a European level. Instead, the OMX project shows a strong inner cohesion, as highlighted in respect of the listing aspect, where a leading role is played by the Swedish market that, on the one hand, accommodates in its market various foreign traders and, on the other, operates through intermediaries that are also active in many other European financial markets. Although neglecting the markets in northern Europe, the Italian intermediaries are instead present in the main continental markets and in the London market.

7. Cross-trading on the European market¹⁹

The level of correlation of the weekly yields of the market indexes is used as a proxy variable with a view to evaluating the trading links among the various European stock exchanges. This approach is based on the assumption that a cross-trading activity results in an attenuation of those performance-related differences among various markets that are due to the segmentation of the markets.²⁰ The need to have recourse to a proxy

¹⁹ This paragraph is based on the results of the paper “L’impatto dell’integrazione tra borse valori sui rendimenti azionari in Europa” (Impact of the stock exchange integration on the dividend yield in Europe) (Nicolini G., 2005), submitted to the national meeting on Economics of the Financial Intermediaries held at Parma on November 4, 2005, which should be referred to for greater details.

²⁰ Should the brokers on two markets be the same, the fact that they operate having the same general expectation (bull market or bear market) causes the relative performance of the two markets to be unaffected by differences in the investors’ expectations, even though differing owing to the presence of specific elements of the individual markets.

variable is due to the impossibility to see to a direct observation of the identity of the traders operating in the European markets. The historical series being used includes data going from January 1996 to June 2005.

The analysis of the correlations as such is not a statistical tool that may succeed in measuring a relation of dependence among variables. Therefore, the results shown below should be interpreted as a synthesis of a first-level analysis that is likely to detect the presence of potential links among markets and to allow evaluating the opportunity of more thorough investigations carried out with statistically sounder methodologies.

The data on the correlation among the Euronext project markets are shown in Table 9.

Euronext – Amsterdam	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Average
Euronext – Amsterdam	1	1	1	1	1	1	1	1	1	1	1
Euronext - Lisbon	0.905008	0.942563	0.912725	0.341762	0.317484	0.876281	0.96798	0.843842	-0.05634	-0.22309	0.582821
Euronext - Paris	0.9286	0.951659	0.948935	0.928995	0.844879	0.988523	0.995264	0.944824	0.556964	0.905837	0.899448
Euronext - Bruxelles	0.87223	0.677555	0.542593	-0.54457	0.250021	0.678344	0.960306	0.836971	-0.08871	0.743149	0.492789
Average	0.858421	0.812951	0.698009	0.608589	0.390851	0.848117	0.86209	0.805595	0.179802	0.738421	

Euronext – Bruxelles	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Average
Euronext – Amsterdam	0.87223	0.677555	0.542593	-0.54457	0.250021	0.678344	0.960306	0.836971	-0.08871	0.743149	0.492789
Euronext - Lisbon	0.82916	0.71663	0.486511	0.211392	-0.49718	0.595235	0.937731	0.901774	0.747188	-0.02851	0.489993
Euronext - Paris	0.788379	0.591	0.678713	-0.44326	0.253324	0.686497	0.963113	0.927115	0.645885	0.754046	0.584482
Euronext - Bruxelles	1	1	1	1	1	1	1	1	1	1	1
Average	0,797073	0,632289	0,346548	-0,27114	0,047533	0,647631	0,839137	0,872423	0,646806	0,597905	

Euronext – Lisbona	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Average
Euronext – Amsterdam	0.905008	0.942563	0.912725	0.341762	0.317484	0.876281	0.96798	0.843842	-0.05634	-0.22309	0.582821
Euronext - Lisbon	1	1	1	1	1	1	1	1	1	1	1
Euronext - Paris	0.752536	0.903316	0.873695	0.413713	0.38078	0.883725	0.976172	0.931285	0.68664	-0.43597	0.636589
Euronext - Bruxelles	0.82916	0.71663	0.486511	0.211392	-0.49718	0.595235	0.937731	0.901774	0.747188	-0.02851	0.489993
Media campione	0.830981	0.827656	0.722912	0.315746	0.304228	0.776284	0.849977	0.852215	0.612902	-0.24451	

Euronext – Paris	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Average
Borsa Italiana	0.689263	0.831935	0.942389	0.49712	0.731063	0.985385	0.993629	0.935585	0.843731	0.785073	0.823517
Copenhagen Stock exchange	0.800893	0.91024	0.488842	0.93871	0.354412	0.919184	0.96932	0.934232	0.606571	0.950088	0.787249
Deutsche Börse	0.903813	0.955545	0.950982	0.958296	0.507392	0.984118	0.99043	0.978226	0.832463	0.948833	0.90101
Euronext – Amsterdam	0.9286	0.951659	0.948935	0.928995	0.844879	0.988523	0.995264	0.944824	0.556964	0.905837	0.899448
Euronext - Lisbon	0.752536	0.903316	0.873695	0.413713	0.38078	0.883725	0.976172	0.931285	0.68664	-0.43597	0.636589
Euronext - Paris	1	1	1	1	1	1	1	1	1	1	1
Euronext - Bruxelles	0.788379	0.591	0.678713	-0.44326	0.253324	0.686497	0.963113	0.927115	0.645885	0.754046	0.584482
London Stock Exchange	0.73999	0.904494	0.736071	0.735135	0.437187	0.987425	0.992647	0.941099	0.823258	0.9131	0.82104
Omx- Helsinki	0.831699	0.910814	0.902123	0.980087	0.378789	0.820819	0.832289	0.900193	0.373836	0.929913	0.786056
Omx- Stockholmbörsen	N.D.	N.D.	N.D.	N.D.	-0.1729	0.83573	0.900458	0.93821	0.635893	0.854711	0.66535
Average	0.787147	0.790992	0.647133	0.598559	0.414989	0.851589	0,863723	0,896685	0,630142	0.763192	

Table 9: Euronext - correlation of the Euronext project markets

Source: authors (on Reuters data)

The analysis of the correlation for the Euronext project shows that, further to each integration phenomenon (start-up, enlargement, organizational integration, etc.), there is an increase in the level of correlation of yields. Furthermore, the correlation of yields among the markets involved is on average higher than the correlation that the project markets have with the other European markets. In the 2000-2005 period, the values of the Euronext internal correlation has been constantly higher than 0.90.

The Deutsche Börse (Table 10), particularly after 2000, has shown good levels of correlation with more than one European market. The correlation with the British market (LSE) is especially high,²¹ and the correlation with the Spanish, Italian and French markets is just as good.

Deutsche Börse	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Average
Borsa Italiana	0.471584	0.875017	0.913771	0.620074	0.586493	0.971844	0.982443	0.950553	0.803579	0.802641	0.7978
Deutsche Börse	1	1	1	1	1	1	1	1	1	1	1
Euronext - Paris	0.903813	0.955545	0.950982	0.958296	0.507392	0.984118	0.99043	0.978226	0.832463	0.948833	0.90101
London Stock Exchange	0.876799	0.930518	0.753512	0.765676	0.452132	0.970538	0.979762	0.953441	0.716164	0.919051	0.831759
Omx- Stockholmbörsen	N.D.	N.D.	N.D.	N.D.	-0.24278	0.809899	0.880055	0.938305	0.273873	0.864775	0.587355
Swx – The Swiss Exchange	0.895362	0.742099	0.360271	0.263929	-0.39019	0.841573	0.933687	0.950413	0.475635	0.936936	0.600972
Average	0.854539	0.820408	0.667301	0.608959	0.363525	0.850772	0.851614	0.904086	0.520821	0.738684	

Table 10: Deutsche Börse - correlation of the German market with the main European markets

Source: authors (on Reuters data)

The remarks relative to the correlations of the British market may be inferred from those made in respect of the German market. The historical series of the annual correlations (Table 11) shows that, starting from 2001, the London Stock Exchange has been experiencing a period of strong correlation above all with the German, French, Spanish and Italian markets.

²¹ In the 2000-2005 period, the average correlation between DB and LSE is 0.9448.

London Stock Exchange	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Average
Borsa Italiana	0.270529	0.914342	0.816093	0.667774	0.328089	0.978525	0.980204	0.960057	0.896584	0.811751	0.762395
Deutsche Börse	0.876799	0.930518	0.753512	0.765676	0.452132	0.970538	0.979762	0.953441	0.716164	0.919051	0.831759
Euronext - Paris	0.73999	0.904494	0.736071	0.735135	0.437187	0.987425	0.992647	0.941099	0.823258	0.9131	0.82104
London Stock Exchange	1	1	1	1	1	1	1	1	1	1	1
Omx- Stockholmbörsen	N.D.	N.D.	N.D.	N.D.	-0.12935	0.870886	0.881482	0.901675	0.40152	0.770613	0.616137
Swx – The Swiss Exchange	0.813331	0.754909	0.63537	0.136303	-0.04813	0.856469	0.955105	0.940351	-0.03413	0.866178	0.587576
Average	0.755223	0.815273	0.733687	0.567423	0.267234	0.84413	0.856545	0.883358	0.645843	0.750656	

Table 11: London Stock Exchange - correlation of the British market with the main European markets

Source: authors (on Reuters data)

The results relative to the Italian market may be inferred from what has been stated above. The correlation with the LSE and the DB is high and the correlation shows good levels even in respect of the French and Spanish markets.

Borsa Italiana	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Average
Borsa Italiana	1	1	1	1	1	1	1	1	1	1	1
Deutsche Börse	0.471584	0.875017	0.913771	0.620074	0.586493	0.971844	0.982443	0.950553	0.803579	0.802641	0.7978
Euronext - Paris	0.689263	0.831935	0.942389	0.49712	0.731063	0.985385	0.993629	0.935585	0.843731	0.785073	0.823517
Euronext-Bruxelles	0.291932	0.572714	0.54549	-0.34133	0.120968	0.68051	0.953422	0.872961	0.854629	0.792413	0.34371
London Stock Exchange	0.270529	0.914342	0.816093	0.667774	0.328089	0.978525	0.980204	0.960057	0.896584	0.811751	0.762395
Omx- Stockholmbörsen	N.D.	N.D.	N.D.	N.D.	-0.17752	0.850467	0.902834	0.846652	0.429703	0.481667	0.555635
Swx – The Swiss Exchange	0.405339	0.702516	0.308374	0.006507	0.239175	0.857126	0.936675	0.897769	0.081677	0.680472	0.511563
Average	0.468251	0.765458	0.673018	0.453883	0.397615	0.840474	0.863402	0.853926	0.689928	0.638559	

Table 12: Italian Stock Exchange - correlation of the Italian market with the main European markets

Source: authors (on Reuters data)

On the other hand, the analysis of the Scandinavian markets involved in the OMX project shows a high correlation within the project, while – although positive – the trend with respect to the other markets is less significant.

All in all, the analysis of the correlations shows an increase in the correlations in the share markets yields during the 1996-2005 period. Stressing once again that the use of market yields as cross-trading proxy pays for the assumptions made at the beginning and that the correlation analysis is not enough, from a statistical point of view, to explain the link between cross-trading and market yields, the positive and growing trend in the levels of correlation among the main markets suggests an increase in the level of integration of the securities markets, even in the presence of organizational infrastructures that are formally segmented from a geographical view point.

Conclusions

The view of the European securities market as a series of geographically segmented markets, where each country refers to a single stock exchange, is progressively losing its ability to outline the actual situation.

So far, the integration process has not witnessed the replacement of the individual national stock exchanges with a stock exchange integrated also from the organizational point of view. In fact, although involving a number of stock exchanges, the individual projects have preserved up to now the jurisdictional autonomy of the ir participants.

Nonetheless, there are several links connecting the individual stock exchanges from the operational standpoint, to the point of suggesting a view of the market where the integration initiatives promoted by the corporation or mutual association managing the market are backed up by a series of links implemented by a number of stakeholders (above all, issuers, intermediaries and investors). These behaviors are uncoordinated and often result from individual initiatives, but this does not cause them to be unfit to increase the level of integration of the market.

The analysis conducted on three different (listing, membership and trading) levels has let to rather homogeneous results. The countries where the integration has already linked together various stock exchanges (i.e., Euronext, OMX) show listing, as well as membership and trading affinities. At the same time, markets that are formally autonomous from the organizational point of view turn out to be linked through one or more of the aforementioned aspects. As regards this subject, there are emblematic affinities between the British market and the Irish market, just as between the German market and the Swiss and Austrian markets, or again those involving the Scandinavian markets. In each one of these cases, the integration takes concrete shape in a cross-border dialogue that, however, is strongly affected by geographical and cultural factors.

Analyzing one at a time the aspects of the market that are being considered, it is interesting to note that, as far as listing is concerned, each security is listed on average 2.24 times. Notwithstanding the presence of considerably multi-listed securities and of exclusively local-listed securities, the datum highlights a highly integrated European

market approach on the part of the most active issuers. Therefore, given that geographical and cultural influences still affect listing decisions to a considerable extent, it is still premature to talk about an integrated European market.

At the same time, the membership aspect shows that, in practice, in a few countries just one intermediary out of four does not belong to the domestic market (Italy, Spain, Germany, Norway and Denmark), while other markets witness a diametrically opposed situation (Sweden, Ireland, France), in the face of a European average figure that sees 56.6% of the authorized intermediaries coming from the domestic market.

The multi-trading data, estimated through the correlation of the yields on shares of the individual markets, highlight a general tendency towards an increase in the correlation, which may be interpreted as an increase in the level of integration of the European market as a whole.

Altogether, the results show that the integration based on the direct initiative of the stock exchanges explains just part of the actual integration of the market. The links among stock exchanges created by the various stakeholders in the listing phase, as well as in trading and membership, move in parallel with the official integration projects.

Even though not insensitive to the official integration stimuli, the non-official links among stock exchanges are a valuable valuational element to estimate the real level of integration of the European securities market. The official integration projects often present themselves as a new awareness of an integration that in fact has already taken place from the operational point of view just on account of the establishment of a series of relations among market participants as those referred to above.

This interpretation of the market permits to detect in the operational links among the markets an anticipatory tool in respect of the future official integration stages. The anticipatory capacity of the links across organizational boundaries is such as to suggest that they might have the nature of leading indicators with respect to the integration of the markets.

Quite naturally, in the process of integration of two markets, the operating links are not the only variable to be considered. The specific stakeholders' interests just as the situation in which the agreements among different stock exchanges take shape are just a few of the additional variables that need to be taken into account. In any event, sharing the same stakeholders and, in general, the presence of strong links from the point of view of operations, represent extremely valuable valuational elements.

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