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The Geography of Equity Listing: Why Do Companies List Abroad?

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Abstract

This paper documents aggregate trends in the foreign listings of companies, and analyzes their distinctive prelisting characteristics and postlisting performance. In 1986-1997, many European companies listed abroad, mainly on U.S. exchanges, while the number of U.S. companies listed in Europe decreased. European companies that cross-list tend to be large and recently privatized firms, and expand their foreign sales after listing abroad. They differ sharply depending on where they cross-list: The U.S. exchanges attract high-tech and export-oriented companies that expand rapidly without significant leveraging. Companies cross-listing within Europe do not grow unusually fast, and increase their leverage after cross-listing.

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Abstract

This paper documents aggregate trends in the foreign listings of companies, and analyzes their distinctive pre-listing characteristics and post-listing performance. In 1986-97, many European companies listed abroad, mainly on U.S. exchanges, while the number of U.S. companies listed in Europe decreased. The characteristics and performance of European companies differ sharply depending on whether they cross-list in the U.S. or within Europe. In the first case, companies tend to be high-tech and export-oriented, and pursue a strategy of rapid expansion with no significant leveraging. In the second case, companies do not grow more than the control group, and increase their leverage after cross-listing. In both cases, cross-listing companies tend to be large and recently privatized firms, and expand their foreign sales after listing abroad.

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* Pagano is from CSEF, University of Salerno and CEPR; Röell is from Princeton University and CEPR; Zechner is from University of Vienna and CEPR. We thank Paul Arlman, Asher Blass, Gilles Chemla, Andrew Karolyi, Stewart Myers, Gideon Saar, George Sofianos, Richard Stehle, Yishay Yafeh, and seminar participants at Aachen, Banque de France, CEPR, Copenhagen, Humboldt (Berlin), Konstanz, LSE, MIT, New York Federal Reserve, NYSE, Tel-Aviv, the Barcelona CEPR-IAE Workshop on Banking and Financial Markets, the 2001 INQUIRE Joint Spring Seminar, and the 2001 WFA meetings for helpful comments. Larissa Lube, Michael Halling and Otto Randl have provided outstanding research assistance. This research has been supported by grants awarded by INQUIRE, the Fondation Banque de France, and the Italian Ministry of University and Scientific and Technological Research (MURST). This paper is produced as part of a CEPR research network on The Industrial Organization of Banking and Financial Markets in Europe, funded by the European Commission under the TMR Programme (contract No ERBFMRXCT980222).

Foreign listings are becoming an increasingly important strategic issue for companies and stock exchanges alike. As companies become global in their product market and investment strategies, direct access to foreign capital markets via an equity listing can yield important benefits. At the same time, the international integration of capital markets has led to unprecedented levels of competition among stock exchanges. In this competitive struggle, the winners are the exchanges that manage to attract more foreign listings and the attendant trading volume and business opportunities.

Despite the importance of these issues, still little is known about which exchanges succeed in capturing more listings from abroad and why. This question is intimately related with a second issue, namely which advantages companies expect to get from a foreign listing: securing cheap equity capital for new investment, allowing controlling shareholders to divest on a liquid market, preparing for foreign acquisitions, or simply enhancing the company's reputation. The evidence presented in this paper is relevant for both issues – the determinants of exchanges' success and the microeconomic motives for listing abroad.

We start by providing a broad picture of the geography of cross-listings by European and U.S. companies, and of its changes in recent years. This aggregate picture shows that European companies have become more "footloose" in recent years, and that most of their cross-listings have been directed towards the U.S. exchanges, while U.S. companies have reduced their cross-listings in Europe. Correspondingly, the ability of European exchanges to attract listings from the rest of the world has declined, while the reverse has happened to U.S. exchanges. Interestingly, the European markets with the highest trading costs, lowest accounting standards and worst shareholder protection have also fared worst in attracting or retaining foreign listings, and companies from those countries have been comparatively eager in seeking foreign listings.

We then turn to microeconomic data to gain a better understanding of these shifts in the geography of cross-listings, by linking companies' decision to list abroad to their ex ante characteristics (e.g., size or foreign sales) and their ex post behavior (e.g., their growth rate after listing abroad). We investigate these relationships by using company-level data for non-financial European companies in 1986-98, drawn from the Global Vantage and Worldscope databases.

We find that the European companies that list on other European exchanges and those that list in the U.S. have only few common features: they are larger and more likely to be recently privatized than firms that do not cross-list. Instead, the differences between the two groups are numerous and striking. European companies that cross-list in the U.S. pursue a strategy of rapid, equity-funded expansion. They rely heavily on export markets both before and after the listing, and tend to belong to high-tech industries. Companies that cross-list elsewhere in Europe, instead, have a higher return on assets before cross-listing, do not grow more than the control group, and increase their leverage after the cross-listing. Also, they do not rely on foreign sales to the same extent as firms cross-listing in the U.S., and generally do not belong to high-tech sectors.

Thus, cross-listing in the U.S. appears to be driven by the need to fund growth and foreign sales expansion, generally in high-tech sectors. These motives are less common for European companies that cross-list on other European exchanges. Therefore, the changing geography of cross-listings across the Atlantic is associated with a difference in the type of companies that cross-list in the two continents. U.S. exchanges appear to be especially suited to the needs of high-growth, export-oriented and high-tech European companies.

The plan of the paper is as follows. In Section 2 we outline the main reasons why companies may wish to list abroad and draw testable predictions from each hypothesis. In Section 3 we analyze the overall pattern of cross-listings, studying the geographical origin and destination of firms that went public on the world's major equity exchanges in 1986-97. In Section 4 we perform a first exploration of company-level data using descriptive statistics centered on the year of cross-listing. Section 5 presents an econometric analysis of the variables that affect the choice to list abroad for the first time, as well as the choice between listing in the U.S. or in Europe. In Section 6 we try to gauge if listing abroad affects the subsequent performance of companies relative to our control sample, and how this differential performance hinges on cross-listing in the U.S. as opposed to Europe. Finally, Section 7 summarizes the results of the paper, compares them with those of related studies, and discusses their implications for the comparison between U.S. and European exchanges.

II Hypotheses and Related Literature

In this section we outline the reasons why companies may want to list on an exchange outside their country of incorporation, either as their first port of entry into the public equity market or after having already listed on their domestic exchange.[1]

First of all, companies may list abroad for financial reasons: funding abroad may be cheaper or more easily available. This can happen for various reasons, detailed below in Section 2.1 jointly with their empirical implications. Second, a cross-listing may strengthen the competitive position of the company in its industry, by enhancing its reputation with suppliers, employees and customers, as explained in Section 2.2. On the other side of the ledger, the costs of listing abroad may deter certain companies, as discussed in Section 2.3. Table I summarizes the testable implications of the various reasons for cross-listing, relating them both to (i) the company characteristics and to (ii) its likely effect on subsequent performance.

[INSERT **TABLE I** APPROXIMATELY HERE]

A Financial benefits of cross-listing

By listing abroad firms may improve the terms on which they can raise capital or on which their shareholders can sell existing securities. This motive is strongest if the firm or its shareholders need to raise capital and if financial constraints in the home market are significant. Some empirical predictions have to do with the reason why capital is needed, and others have to do with why cross-listing makes it cheaper.

The salient reason why a company may need equity funding is to carry out new investment programs. The required funding is likely to be especially large for fast-growing companies, and for companies that have already exhausted their debt capacity. Therefore, companies that cross-list to raise capital should have high investment, growth rate and leverage before cross-listing, other things being equal,[2] and engage in a primary equity offering at the time of the cross-listing or shortly afterwards. Moreover, such companies would be more likely to cross-list on a deep stock market. Since higher

expected growth should translate into higher price-earning ratios (P/E), one would also expect them to have higher P/E ratios than comparable domestic companies.

Rather than via organic growth, a company may choose to expand by a merger or acquisition involving a foreign company. The acquisition of a target company is facilitated by using the bidder's shares as a medium of exchange, but the latter are an acceptable "currency" only if the two companies are listed on the same exchange.[3]

Even if the firm has no need to finance new investment, its current shareholders may want to sell out, and listing abroad can increase the market value of their stake. Privatizations are an important special case, where the government is the divesting shareholder. Therefore, newly privatized companies should be more likely to cross-list than other comparable companies. A more direct test would look at whether, in general, the main shareholders sell out at the time of cross-listing or shortly afterwards. An imperfect proxy for such divestment can be an abnormally high turnover.

We now turn to the reasons why listing abroad can raise a company's stock value.

A.1 Reducing barriers for foreign investors

Widening the clientele for a firm's shares improves risk sharing and thus lowers the cost of capital, as shown by Stulz (1999), Martin and Rey (2000) and Lombardo and Pagano (1999). The evidence surveyed by Karolyi (1998) on stock price behavior around cross-listings is mixed: the effect differs across companies and, even when initially positive, it often dissipates in the year after the cross-listing. On balance, non-U.S. companies listing in the U.S. earn positive cumulative excess returns (Foerster and Karolyi, (1999)) and experience a reduction in the home market beta and thereby in the cost of capital (Karolyi, (1998)). In principle, the cost-of-capital benefit should be larger for riskier firms, which therefore should have greater inducement to cross-list.[4]

Listing abroad can mitigate market segmentation by reducing barriers to foreign investors, arising from regulation (for example, pension funds' ceiling on assets invested in foreign-listed stocks), transaction costs (for instance, the cost of converting dividends of foreign shares into domestic currency), or from lack of information. The latter ranges from total ignorance of foreign investment opportunities as in Merton's "awareness hypothesis",[5] to an informational disadvantage in trading foreign stocks, as in Gehrig

(1993), Kang and Stulz (1994) and Brennan and Cao (1997).[6] A foreign listing may reduce such frictions, supplying local investors with more abundant, timely and transparent information.[7]

Foerster and Karolyi (1999) provide the most direct evidence connecting Merton's "awareness hypothesis" to the drop in the cost of capital at the time of cross-listing: they show that the prices of cross-listing companies rise more when they are accompanied by a greater expansion of the shareholder base. Kadlec and McConnell (1994) report related evidence for over-the-counter shares that listed in the New York Stock Exchange (NYSE): they find that the listing is accompanied by a 5 percent abnormal return, by an increased number of shareholders and a reduction of the bid-ask spread. Similarly, Miller (1999) shows that the price reaction to a cross-listing is positively correlated both with the increase in the shareholder base and with the barriers to capital flows.[8] Also consistently with the "awareness hypothesis", cross-listing in New York and London is associated with increased analyst coverage and media attention (Baker, Nofsinger and Weaver, (1999)), and managers of cross-listed firms report increased prestige and visibility and growth in shareholders as the main benefits of cross-listing (Bancel and Mittoo, (2001)).

A.2 Relying on foreign expertise

The exchange where a company lists may be determined by the location of analysts with superior technological knowledge of the industry. Especially in high-tech sectors, the availability of such skills may substantially affect the availability of equity finance and the terms at which it is available, by reducing informational asymmetries in the primary market. This hypothesis predicts, for example, that high-tech companies may be more likely to list in the U.S. where the corresponding industries are well developed. Blass and Yafeh (2000) in fact show that Israeli and Dutch firms which list in the U.S. (bypassing their respective home markets) are relatively high-tech and fast growing.

A.3 Committing to disclosure and corporate governance standards

The listing location may also be affected by differences in regulation. By selecting a tightly regulated foreign exchange, a firm precommits to adhere to high standards of

corporate governance and/or disclosure. Exchanges compete to attract listings by designing a regulatory environment that is expected to lower the cost of capital of their companies. Huddart, Hughes and Brunnermeier (1999) show that exchanges competing for trading volume engage in a "race to the top" regarding disclosure requirements.[9] Cantale (1996) and Fuerst (1998) argue that firms signal quality by listing on strictly regulated markets. Similarly, according to Stulz (1999), companies from countries with poor legal standards can secure a lower cost of capital by subjecting themselves to tighter standards, thus reducing the agency cost of external finance.

These models suggest that companies located in countries with particularly inadequate supervision and disclosure standards should be more likely to cross-list abroad. The evidence on this point is at best mixed. Ashbaugh (1997) documents that non-U.S. firms voluntarily adopt the tighter U.S. accounting standards. Instead, Biddle and Saudagaran (1989) and Saudagaran and Biddle (1992) find that stringent disclosure requirements deter the listing of foreign companies. Similarly, Reese and Weisbach (2001) find that firms from countries that give weak protection to minority shareholders are less likely to list in the U.S. than firms from other countries, once one controls for other factors such as firm size. They interpret this as evidence that, in deciding about cross-listing, the managers of companies from low-protection countries give more weight to the reduction of their private benefits than to the public value of their shares. However, Reese and Weisbach also report some evidence that the firms from weak-protection countries that do cross-list in the U.S. issue more equity after the listing.

The signaling models by Cantale and Fuerst also predict that the post-listing profitability of companies cross-listing on a more demanding exchange should be better than that of companies cross-listing on other exchanges. This should be reflected in a positive stock price reaction to the cross-listing announcement. This prediction is consistent with several studies surveyed in Karolyi (1998) that report a significant price reaction for non-U.S. companies listing in the U.S., which has the tightest disclosure standards, and a negligible price reaction otherwise.

Of course, if exchanges compete for new listings by adjusting their regulatory standards, this motive for cross-listing may diminish over time. For example, Fanto and Karmel (1997) suggest that current improvements in European regulatory standards are attracting U.S. institutional investors to stocks exclusively listed in Europe.

A.4 Liquidity

Some markets may be better than others in the production of liquidity, for instance because of a superior microstructure. The competitive pressure from another exchange and the greater turnover associated with a wider shareholder base can also narrow the spreads on the domestic market and raise its trading activity, as found by Kadlec and McConnell (1994), Noronha, Sarin and Saudagaran (1996), Foerster and Karolyi (1998), and Smith and Sofianos (1997).

However, cross-listing may not always enhance liquidity, due to the potentially offsetting impact of market fragmentation, as in the models by Pagano (1989), Chowdry and Nanda (1991) and Madhavan (1995). Domowitz, Glen and Madhavan (1998) show that liquidity may suffer in both the domestic and the foreign market if intermarket information linkages are poor, and support this point with evidence concerning Mexican companies issuing American Depository Receipts (ADRs).

To test if the competition or the fragmentation effect prevails, one can analyze indicators of home market liquidity after cross-listing, such as turnover volume, turnover ratios or bid-ask spreads on the domestic market. Additional insights can come from considering the same statistics for the foreign market.[10]

A.5 Relative mispricing

Firms may decide to list abroad to take advantage of a temporarily high price for their shares abroad relative to their home market, due either to an overvaluation in the foreign market or to an undervaluation in the domestic market. This hypothesis can be tested by including the price indices of the two exchanges (or the relevant sectoral indices) in regressions explaining the probability of a foreign listing.

A.6 Capitalizing on product market reputation

Companies that sell popular brands abroad may find it easier to place their shares in foreign markets because local investors already trust them as consumers. A simple strategy to test this hypothesis is to look at indicators of the degree of sales

internationalization for companies which cross-list. One would expect a larger fraction of revenue coming from abroad to encourage eventual cross-listing. Saudagaran (1988) shows that 104 companies already listed abroad in 1981 had a higher proportion of foreign sales than a control sample. This however begs the question of which came first: the outward orientation of these companies or the cross-listing. Only in the former case these companies may have cross-listed to capitalize on their product market reputation.

B Product and Labor Market Spillovers

In the hypothesis laid out in the previous paragraph, foreign market presence improves the firm's ability to access foreign capital markets via a cross-listing. But the reverse can also be true. A cross-listing can be an advertisement for the firm's products and thereby increase its foreign sales, by raising consumer demand and improving relationships with suppliers and employees.[11] In the model by Stoughton, Wong and Zechner (2001), a company lists to signal its high product quality to consumers, and as a result captures a larger market share and increases its profits. In this case, a listing is not associated with the need to raise capital or with the shareholders' plan to sell out.

The importance of this motive is underscored by anecdotal evidence[12] as well as by the results of the survey by Bancel and Mittoo (2001): 16 percent of European cross-listed companies rate easier implementation of global marketing and production as a motive for cross-listing.

The product market spillover hypothesis predicts that cross-listed companies increase their fraction of foreign sales. It is also consistent with higher overall sales growth and profits after the cross-listing.[13] Furthermore, it should be relevant only for industries where product market reputation is particularly important, such as producers of retail goods. An additional twist to this hypothesis is the prediction that companies in a particular industry should cross-list on the same exchange, if indeed being listed on that exchange confers a competitive advantage. Therefore, a company's probability of cross-listing on a given exchange should be positively related to the number of other companies in the same industry already cross-listed on that exchange.

C Cost of Listing Abroad

Listing abroad also involves a variety of costs. There are direct costs, such as listing charges and fees for professional advice. But the main costs cited in survey evidence regarding potential cross-listings in the U.S. (see Fanto and Karmel (1997)) are the cost of complying with U.S. GAAP accounting standards and the risk of lawsuits. Presumably, shareholders' power to interfere in managerial decisions increases with a U.S. listing. This survey evidence agrees with the results of the above-quoted studies by Biddle and Saudagaran (1989) and Saudagaran and Biddle (1992).

Since the costs of cross-listing include a large fixed cost element, they bear most heavily on small companies. Thus, we expect larger companies to be more likely to cross-list. This prediction is borne out by Saudagaran's (1988) study.

III The Changing Geography of Equity Listings

This section describes the cross-listing behavior of European and U.S. companies in the last decade. First, we document the "geography" of cross-listings, by gauging regional clusters in cross-listing behavior. Second, we inquire if these patterns have changed over time, and how. In particular, we investigate if there have been substantial changes in "transatlantic listings", that is, in the tendency of European companies to list in the U.S. and of U.S. corporations to list in Europe. Third, we try to relate these changes to characteristics of the exchanges concerned. The sources of the cross-listing data used in the tables and figures of this section are described in Appendix A.

A Geographical Pattern of Cross-Listings

Table II summarizes the pattern of foreign listings in 1986-97 on the following stock exchanges: Amsterdam, Brussels, Frankfurt, London, Madrid, Milan, Paris, Stockholm, Vienna, Easdaq, Amex, Nasdaq and NYSE.[14] Since until November 1998 European companies could not list their shares directly on U.S. exchanges, all the cross-listings on U.S. markets in our sample were effected via American Depository Receipts (ADRs).[15]

ADRs are issued by a U.S. depository bank and represent shares held overseas. They confer to their holders the same income and voting rights as the underlying shares, and trade in the U.S. like other securities, although a small fee per share must be paid to the depository bank for each trade and when dividends are cashed.

Panel A displays a matrix of foreign listings, with the country of incorporation appearing in the columns and the destination stock exchange along the rows. Each cell of the table contains three values: the top one refers to 1986, the middle to 1991, and the bottom one to 1997. For each stock exchange, the table displays only the foreign listings originating in the countries of our sample: Netherlands, Belgium, Germany, Italy, U.K., Spain, France, Sweden, Austria (henceforth shortened to EU9 countries) and U.S. For instance, Japanese, Australian or Canadian companies are excluded (evidence on these is deferred to Panel C of Table II).

The column of a given country shows where the companies originating from that country have cross-listed, and the column EU9 in which exchanges European (EU9) companies have cross-listed. The last column shows how cross-listing companies from the EU9 and U.S. area have distributed themselves within the area. Looking instead at each row across columns, one gauges each country's contribution to the total number of foreign listings in a given market.

The table suggests that common language and similar institutions foster cross-listings. For example, the Vienna stock exchange is the single largest destination for German companies and vice versa. The same is true for the U.S. and the U.K.. This "clustering" indicates that companies tend to cross-list in countries geographically or culturally close to their country of incorporation, presumably for informational reasons. For a U.S. investor, for instance, the accounting data and the performance of a British company are easier to decipher than those of a French or Spanish company. This parallels the findings by Portes and Rey (1999) and by Tesar and Werner (1995) that geographical proximity and cultural homogeneity (especially language) enhance cross-border securities transaction flows.

[INSERT **TABLE II** APPROXIMATELY HERE]

B Changes in the Geography of Cross-Listings

The information in Panel A of Table II also gives a picture of how the geography of European and U.S. cross-listings has changed between 1986 and 1997. The two bottom lines give an overall view of the change in the cross-listings pattern. The row "Total Listings" displays the number of *listings* that companies from a given country have in the foreign exchanges included in our sample. The bottom row "Total Companies" eliminates double counting by reporting the number of *companies* from a given country with at least one foreign listing. The number of foreign listings originating in a given country is greater than (or at least equal to) the corresponding number of companies listed abroad, because the same company can be listed in several foreign exchanges.

The numbers in these two rows reveal that European companies have become more outward looking in their search for investors: the number of EU9 companies listed abroad doubled (from 177 to 337) and the total number of their foreign listings increased by 61 percent (from 320 to 516).

In contrast to European companies, European stock exchanges do not appear to have become equally outward oriented. Foreign listings on most European exchanges exhibit an inverse U-shaped time pattern over time. In the European exchanges as a whole, the total number of foreign listings increased very slightly from 732 in 1986 to 757 in 1991, and then declined to 625 in 1997 (see the last cell in the row "European exchanges"). So these exchanges lost over one hundred foreign listings in a decade.

The opposite picture emerges when one considers American companies and exchanges. U.S. companies have become less eager to list in Europe, with their number decreasing from 284 to 184. In contrast, U.S. exchanges (especially the Nasdaq and the NYSE) have captured an increasing share of foreign listings by European companies. The listings of EU9 companies in the U.S. went from 53 in 1986 to 207 in 1997, while in the same interval their listings within Europe went from 267 to 309.

The contrast between these two opposite flows of "transatlantic listings" emerges very clearly in panel B of Table II. While European listings in the U.S. almost quadrupled (from 53 to 207) the number of U.S. companies listed in Europe fell by over a third (from 284 to 184). In 1986 the U.S. firms listed in Europe were more than five times as many as the European firms listed in the U.S.. In 1997, the latter outnumber the

former. This suggests that the relative attractiveness of European equity markets declined in this time window.

Panels A and B of Table II do not account fully for the outward orientation of each exchange, because they neglect the listings originating outside our sample of countries. Panel C completes the picture, by reporting cross-listings originating from the rest of the world. Canadian, Latin American and Israeli companies are major sources of listings in U.S. exchanges, while they list much less frequently in Europe. In contrast, South African and Asian companies list predominantly in London - with the exception of Japanese corporations, which gravitate primarily towards Frankfurt. Considering instead how the overall pattern changed over time, one sees again that the U.S. exchanges have captured the lion's share of the increase in cross-listings from the rest of the world, especially those from Australia, Canada, Latin America and Israel. In contrast, in most cases, European exchanges have lost cross-listings originating from these regions.

The data in Table II raise three questions. First, is the decline of foreign listings on European exchanges part of a general decline in their ability to attract new listings, including domestic ones? Second, are the three data points reported in Table II representative of the history of cross-listings between 1986 and 1997? Third, how did the foreign listings of the various markets considered evolve before 1996?

Figure 1a (on the left) addresses the first question. It displays the time pattern of domestic and foreign companies listed on each exchange, as well as their total number. The European exchanges' inability to attract new listings appears not to be confined to foreign listings alone. Most of them have not attracted a large number of new domestic listings either, especially in the 1990s, with the exception of Frankfurt and, to some extent, of London. The opposite is true of U.S. exchanges, where both domestic and foreign listings increased over the sample period: domestic listings rose from 6,168 in 1986 to 7,950 in 1997 (a 29% increase), while foreign listings increased from 350 to 873 (a staggering 150% increment, mostly accounted for by the NYSE).

[INSERT **FIGURES 1A-1B** APPROXIMATELY HERE]

Figure 1b (on the right) shows how cross-listings from our EU9 countries and the U.S. evolved in each exchange. It is based on the same data as Table II, except that it

reports figures for all the years of our sample. The dotted line is the number of foreign companies (from the rest of EU9 and the U.S.) listed on a given domestic exchange, whereas the solid line is the number of domestic companies listed in other EU9 and U.S. exchanges. For almost all the European exchanges, the dotted lines are declining and the solid lines are rising, especially toward the end of the sample period, whereas the opposite is true for U.S. exchanges. This confirms the findings of Table II.

Finally, we present some evidence to check if the trends documented so far are recent or have been present already for a long time. Figure 2 displays the time series of the total number of foreign listings on the NYSE and the subtotal of these NYSE listings originating in the EU9 countries. The two series feature very modest growth from 1956 to the mid-1980s, and accelerate sharply in the last 15 years. Table III provides comparable data for European exchanges in 1975, 1980 and 1985. The resulting picture is somewhat heterogeneous, but on the whole it is not as negative as in later years. London and Frankfurt experienced a large increase in the number of foreign listings. Vienna and Stockholm had large proportional increases, though starting from a small base. Paris, Brussels, Milan and Madrid featured very little change, as they do after 1985. Only foreign listings in Amsterdam decreased sharply, in line with their post-1985 downward trend.

[INSERT **FIGURE 2 AND TABLE III** APPROXIMATELY HERE]

Therefore, the growing internationalization of U.S. exchanges and the decreasing attractiveness of European ones are recent phenomena, which largely occur in the interval covered in the present study. The mid-1980s mark a sharp break from a period in which U.S. stock exchanges were insular, some European exchanges substantially expanded their foreign listings, and companies were less footloose.

C Relationship with Characteristics of Stock Exchanges

The changes in the geography of equity listings documented so far raise the question if they are related to some characteristics of the exchanges and countries concerned. Table IV provides some information on market characteristics, based on the hypotheses

outlined in Section 2 and summarized in the last column of Table I: accounting standards, degree of investor protection, market index performance, market capitalization, and trading costs.

In the first three columns we report information on the gross and net change in cross-listings of each exchange, based on the same data used for Table II, Panel A. In accord with the results so far illustrated, most EU9 markets are net losers of listings (Sweden being the only exception), while the U.S. market experiences a net gain. The normalized net change in the fourth column of the table indicates that the net loss has been particularly large in the Netherlands, followed by Great Britain, Austria and Belgium (in this order).

[INSERT **TABLE IV** APPROXIMATELY HERE]

Of all the market characteristics measured in Table IV, trading costs is the indicator that appears to have the closest correlation with the normalized net change in cross-listings. The two markets with the highest trading costs – Great Britain and Austria – both feature a large net outflow of cross-listings.[16] By contrast, U.S. exchanges, which attract most cross-listings, have the lowest trading costs. Also investor protection and accounting standards appear to be positively correlated with the net change in cross-listings, with the glaring exception of Great Britain. The relationships between the net change in cross-listings and other market characteristics are less clear-cut.

To shed further light on these relationships one must go beyond correlations between aggregate data such as those reported in Table IV. Pagano, Randl, Röell and Zechner (2001) take a first step in this direction, by computing correlations between companies' cross-listing decisions and the differential characteristics of their destination and origin exchange (or country). Their evidence confirms that companies tend to cross-list in markets more liquid than their own, as suggested by the descriptive statistics in Table IV, as well as larger markets. They also prefer exchanges where several companies from their industry are already cross-listed, and countries with better investor protection.

While market and country attributes may shed some light on where companies cross-list, the very decision to list abroad is likely to depend mainly on company-specific characteristics, as highlighted by the theories discussed in Section 2. In the rest of the

paper, therefore, we turn to the analysis of company-level data. We also explore whether companies with different characteristics tend to cross-list on European or U.S. exchanges, since these two sets of exchanges differ significantly in several potentially relevant dimensions, as shown in Table IV.

IV Company-Level Data: Descriptive Statistics

In the rest of this paper, we investigate the characteristics and performance of the companies that cross-list, using companies that do not as our control sample. The sample includes all the companies listed domestically in the main segment of our nine European exchanges at any time in 1986-97, and for which balance sheet information is available in the Global Vantage data base (at least partly) for the 1986-98 interval. We exclude from the sample financial companies and investment funds, as well as companies not listed in their country of incorporation.[17] Appendix B contains the definitions of the variables.

Summary statistics for the entire sample are provided in the Panel A of Table V. The total number of companies is 2,322. The median company has assets of U.S. $ 350 million, sales of U.S. $ 380 million and 2,760 employees. The median growth rate is 7.46 percent for assets, 6.55 percent for property plant and equipment, and 7.40 percent for sales. The median company has leverage of 9.30 percent, market to book ratio of 2.11 and earns about one third of its revenue from foreign sales.

[INSERT **TABLE V** APPROXIMATELY HERE]

There is huge variation in the values of some variables, even though we eliminated economically meaningless outliers, such as negative sales figures (see the appendix for details). For instance, total assets range from U.S. $ 174 thousand to 159 billion, and the growth rate of plant property and equipment ranges from –100 percent to over 1.88 million percent. This points to the need for robust statistical analysis in our tests.

R&D data is only provided for a very small proportion of the companies in the sample. The median company spends 1.77 percent of its revenue on R&D.[18] To remedy the paucity of observations on R&D, we construct an alternative "high-tech intensity" indicator, based on the company's SIC 4-digit classification code (see the appendix for details). This dummy classifies 11 percent of the sample as high-tech companies.

Panel B of Table V illustrates the composition of the sample in terms of country of incorporation and proportion of companies cross-listed, distinguishing those that were already cross-listed in 1986 from those that cross-listed during the sample period. For all countries of origin only a small proportion of sample companies, about 11 per cent, list abroad at all. In terms of the country composition of our sample, the United Kingdom is heavily represented: nearly half of all companies studied, and over half of the companies that first list abroad in our sample period, are British. Nevertheless, the composition by country reflects closely the relative stock market capitalizations of European exchanges, as reflected for instance in Jorion and Goetzmann (1999), Table 5.[19] In the last two columns of Panel B we provide some information about delistings. In our sample period, 28 companies delist from all foreign markets while staying listed on their home market, and 33 more delist even from their own exchange.[20]

We now turn to a first comparison of the companies that list abroad with those that do not, mainly focusing on balance sheet variables (such as total assets and sales) and ratios (such as leverage and market to book value). Panel A of Table VI reports the difference between the median values of these variables for the cross-listed companies and the companies listed only domestically, controlling for calendar year and country of incorporation. More precisely, the values reported in the table are obtained by estimating a Least Absolute Value (LAV) regression on a constant, a cross-listing dummy variable as well as control dummies for calendar year and country.[21] There are eight cross-listing dummy variables: each one represents a particular year relative to the year of cross-listing, ranging from year –3 (three years before) to year 3 (three years after) and a "permanent" dummy (4 or more years after).

[INSERT **TABLE VI** APPROXIMATELY HERE]

The table shows that cross-listing companies are significantly larger than companies that are only listed domestically. This is the case for all the years relative to the listing period and for every size measure considered: total assets, market value of common stock, revenue and number of employees. The relatively large size of cross-listed companies agrees with the presence of economies of scale in cross-listing, reflecting fixed costs combined with benefits that increase with company size.

Turning to the relationship between cross-listing and company growth, the table displays growth in total assets, sales and plant-and-equipment. For all these variables, there is a marked peak in growth in the three years surrounding the cross-listing date. In that period, the growth rates for cross-listing firms exceed the growth rates of the control sample by about four to six percent, peaking in year zero and reverting to normal two years later: strikingly, the growth differential is not sustained in the long run. The higher growth of cross-listing firms is also mirrored in their significantly higher market-to-book ratios. That cross listing is associated with a period of exceptional growth, is consistent with the notion that new capital needs to be raised.

As an indicator of international orientation, the table includes foreign sales as a proportion of total sales. This variable is significantly larger for the cross-listing companies in all the years considered, but particularly so after the cross-listing date. So the data suggest that a foreign listing is more likely to be pursued by export-oriented companies and at the same time is part of a strategy of expansion on foreign markets.

The relatively high leverage of cross-listing firms decreases upon cross-listing. Before, leverage is about five percent above that of the control group, but the difference becomes insignificantly different from zero in the year after cross-listing and reverts to about 3 percent in the long run.

There is also some weak evidence that cross-listing firms are R&D-intensive (the ratio of R&D expense per employee is larger from year -2 onwards). They also pay significantly higher average wages in all the years around the cross-listing date. Thus, they seem to be skill-intensive firms.

Trading activity on the home exchange – as measured by the number of common shares traded divided by their total number outstanding – is larger for companies which cross-list, both before and after the cross-listing date. This is consistent with the fact that these are large companies in their home market, with accordingly high turnover

ratios. Based on these data, cross-listing appears to correlate neither with enhanced liquidity on the home market nor with trade diversion away from it.

Finally, the return on assets (ROA) of cross-listing companies does not differ significantly from that of the control group, except for a marginally significant increase around the time of cross listing followed by a drop starting three years after.

In Panel B of Table VI we repeat the comparison separately for companies which cross-list for the first time in the U.S. and for those that do so within Europe. Compared with the control group, the companies that cross-list in Europe tend to be larger than those that cross-list in the U.S. in terms of total assets and number of employees, both before and after the cross-listing date. But the most visible differences between the two groups concern R&D intensity and market-to-book ratio relative to the control group. First, the companies that cross-list in the U.S. spend more on R&D than the control sample, using the three measures of Table VI, whereas this is not true of the companies that cross-list within Europe. The high-tech nature of the companies listing in the U.S. is also mirrored by their higher labor cost per employee. Second, the companies that cross-list in the U.S. appear to have a larger market-to-book ratio, compared to those that cross-list in Europe, and a correspondingly higher long-run growth rate.

V Predicting Cross-Listing from Company Characteristics

The descriptive statistics discussed in the previous section provide some exploratory evidence concerning the reasons why European companies list abroad. However, to compare the explanatory power of the competing hypotheses and filter out spurious correlations, we must turn to regression analysis. In this section, we use duration analysis to investigate which company characteristics predict listing abroad, and multinomial logit analysis to predict where they cross-list.

In Table VII we analyze the determinants of the cross-listing decision using a Cox proportional hazard model. This method is particularly suited to the prediction of discrete events in a panel setting. It relates the hazard rate $h(t)$ (that is, the probability of listing at time t conditional on not having listed yet) to a set of observable variables X:

$$h(t) = h_0(t)\exp(X'\beta) \qquad (1)$$

where $h_0(t)$ is the baseline hazard rate at time *t* for the covariate vector set at 0 and β is a vector of coefficients. This semiparametric estimator assumes that the hazard ratio $h(t)/h_0(t)$ is constant over time and requires no assumptions about the baseline hazard. Table VII reports the estimates as exponentiated coefficients ($\exp(\beta_1)$, $\exp(\beta_2)$,…) rather than as coefficients (β_1, β_2, …), because exponentiated coefficients can be immediately interpreted as the effect of a unit change in the explanatory variable on the hazard ratio $h(t)/h_0(t)$. For instance, a coefficient of 1.023 implies that a unit change of the dependent variable increases the relative hazard by 2.3 percent.

The set of determinants *X* includes the previous year's values of the leverage ratio, the proportion of sales abroad, the market-to-book ratio of the company, total asset growth, the return on assets (ROA), the logarithm of total assets, and the average of the three highest foreign market-to-book ratios minus the domestic exchange's market-to-book ratio.[22] The regression also includes a lagged privatization dummy[23], the "high-tech" dummy defined above, calendar year dummies and regional origin dummies for each company: South (France, Italy and Spain), East (Austria and Germany), North (Sweden, Belgium and Netherlands) and the default (United Kingdom). Standard errors and *p*-values are adjusted for clustering on companies, that is, take into account that the errors for the same company are not independent.

[INSERT **TABLE VII** APPROXIMATELY HERE]

The variables that have the largest impact on the decision to list abroad are the proportion of sales abroad and the size of the company (as measured by the log of total assets). To interpret the economic magnitude of their effect, we multiply the logarithm of the hazard ratios in Table VII by one standard deviation of the relevant variable. A 1-standard-deviation increase in the proportion of sales abroad (26.8) increases the (relative) probability of observing a first cross-listing over a 10 year period by 84 percent (that is from 2.9 to 5.3 percent)[24]. This suggests that listing abroad is partly a means of capitalizing on the reputation acquired through a presence on foreign output markets. Conversely, companies that depend on foreign sales value the positive publicity associated with a foreign listing – as suggested by Stoughton, Wong and

Zechner (2001). Size also raises the probability of listing abroad: a 1-standard-deviation increase in the logarithm of total assets (1.47) raises the probability of observing a first cross-listing over a 10 year period by 148 percent (that is from 2.9 to 7.0 percent). The fact that the probability of listing abroad increases with company size suggests that there are substantial fixed costs involved and that benefits are increasing in size: for instance, a large company places larger demands on equity markets, thus benefiting more from a wider shareholder base.

Several other variables are significant at the 1 percent level: the privatization dummy, the asset growth rate and the company's own market-to-book value ratio.

The 1-year probability of cross-listing increases from a baseline 0.3 percent per year if the privatization dummy is set equal to zero (and all other variables at their average values) to 5.7 percent if the privatization dummy is set equal to one. Therefore, privatization raises the chances of a first cross-listing in the subsequent year by over 5 percentage points. Privatization issues tend to be very large, so that the depth of the international equity market is likely to be needed to obtain a good price.

There is also support for the view that companies list abroad after experiencing a spurt in growth and investment, as found for domestic Italian initial public offerings (IPOs) by Pagano, Panetta and Zingales (1998). Past growth of assets plays a significant role in the regression: a 1-standard-deviation increase in the growth rate (60.9) is associated with a 13 percent increase in the probability of a cross-listing in the subsequent 10 years. Also the company's own market-to-book ratio, an indicator of the company's future growth, has a positive effect. A 1-standard-deviation increase in the market-to-book ratio (11.8) has approximately the same quantitative effect (16 percent) as the corresponding change in past growth.

The high-tech dummy is significant at the 5 percent level. The 10-year probability of cross-listing, rises from 2.7 percent for traditional companies to 6.0 percent for high-tech companies. This agrees with the idea that high-tech companies turn to foreign equity markets for capital because foreign investors and intermediaries know more about the company's business than their domestic counterparts, and thus can better evaluate its stock.

The difference between foreign and domestic price-to-book ratio has a small negative impact on the cross-listing probability (a 1-standard-deviation change of 0.40

decreases the probability over 10 years by 1.4 percentage points). So we do not find evidence of companies trying to exploit "windows of opportunity" in the pricing of foreign stock markets relative to their own country stock market. On the contrary, a booming domestic stock market seems to encourage its companies to cross-list.

Finally, the coefficients of leverage, profitability and of the regional origin dummies are imprecisely estimated.

We next investigate where companies cross-list for the first time. We wish to predict whether a company is more likely to cross-list in Europe, in the U.S. or not at all. This is done in the multinomial regression shown in Table VIII. As before, all the regressors are lagged. Standard errors are adjusted to allow for dependence within clusters of data concerning the same company.

[INSERT **TABLE VIII** APPROXIMATELY HERE]

The estimates confirm that large and recently privatized companies are more likely to cross-list – be it in the U.S. or in Europe. But the similarities between the two groups end here. High growth and large market-to-book ratio, large foreign sales and high-tech industry classification are significant predictors of a cross listing in the U.S., but not in Europe. Instead, high past profitability is a significant predictor only for Europe.

Therefore, the overall picture is that a U.S. listing is a more natural choice for high-growth and high-tech companies. European stock exchanges have instead been chosen more often by companies with a stronger record of past profitability, but this may reflect the tighter listing requirements of European exchanges (regarding a track record of accounting profits) compared to Nasdaq.[25]

The choice of cross-listing location also differs considerably by country of origin, other factors being equal. British companies (the default regional dummy) are more likely to cross-list in the U.S. and less likely to cross-list within Europe than Continental European companies. This agrees with the greater tendency of British companies to list in the U.S. noted in the aggregate statistics of Section 3.

So far, we only focussed on the first cross-listing in either continent and did not analyze how cross-listing in one continent affects the probability of a subsequent cross-

listing in the other. To investigate this issue, we estimate two separate Cox regressions predicting cross-listing in the U.S. or within Europe respectively, where one of the explanatory variables is a dummy for previous cross-listings in the other continent. We find that a previous listing in Europe significantly encourages a company to list in the U.S. as well, but the converse is not true.[26] We do not report the full estimation results for brevity. The decision to access equity markets appears to be a one-way trip, which accords with the growing imbalance in transatlantic cross-listings noted in Section 3.

VI Ex Post Evidence on Cross-Listed Companies

In this section we assess the effects of listing abroad on the subsequent performance of companies. In the model to be estimated each variable y_{it} (e.g., the logarithm of total assets of company *i* at time *t*) is modeled as depending on fixed effects and a set of cross-listing dummies (first introduced in Table V):

$$\begin{aligned} y_{it} = \alpha_0 + \alpha_1 f_i + \beta_1 d_{it}^{0,EU} + \beta_2 d_{it}^{1-3,EU} + \beta_3 d_{it}^{p,EU} \\ + \gamma_1 d_{it}^{0,US} + \gamma_2 d_{it}^{1-3,US} + \gamma_3 d_{it}^{p,US} + \varepsilon_{it}, \end{aligned} \tag{2}$$

where f_i denotes a company fixed effect, $d_{it}^{0,EU}$ ($d_{it}^{0,US}$) is a dummy intended to capture the impact effect of the *first* cross-listing of company *i* in Europe (U.S.), $d_{it}^{1-3,EU}$ ($d_{it}^{1-3,US}$) is a dummy corresponding to the three years after listing in Europe (U.S.), and $d_{it}^{p,EU}$ ($d_{it}^{p,US}$) captures the permanent shift in the dependent variable after cross-listing. To limit the effect of influential observations, we estimate least absolute value (LAV) regressions, and to eliminate fixed effects we difference both sides of the equation, so that the specification becomes:

$$\begin{aligned} \Delta y_{it} = \beta_1 \Delta d_{it}^{0,EU} + \beta_2 \Delta d_{it}^{1-3,EU} + \beta_3 \Delta d_{it}^{p,EU} \\ + \gamma_1 \Delta d_{it}^{0,US} + \gamma_2 \Delta d_{it}^{1-3,US} + \gamma_3 \Delta d_{it}^{p,US} + \eta_{it}, \end{aligned} \tag{3}$$

where $\eta_{it} \equiv \Delta \varepsilon_{it}$. Table IX reports the estimation results of the differenced model.

[INSERT **TABLE IX** APPROXIMATELY HERE]

After a foreign listing, some variables appear to change irrespective of the listing's location. First, companies become more export-oriented, an effect somewhat stronger for companies cross-listing in the U.S. than for those cross-listing within Europe. Second, home market liquidity decreases: the turnover ratio on the home market drops significantly, in contrast with the findings of Noronha, Sarin and Saudagaran (1996) and Foerster and Karolyi (1998). The drop is larger after a cross-listing in Europe, consistently with the "time zone" hypothesis proposed by Pulatkonak and Sofianos (1999), who show that NYSE trading in non-U.S. stocks decreases with the time zone difference.[27] Third, companies become more R&D-intensive throughout the post-listing period. On a per-employee basis and as a percentage of sales, R&D spending increases more after European cross-listings, whereas as a percentage of total labor expenses it rises more after U.S. listings.

For other variables, the location of the cross listing seems to play an important role. The companies that cross-list in the U.S. experience a 5 percent permanent increase in total assets. In contrast, companies that cross-list within Europe end up with a 3 percent permanent reduction of total assets and a 5 percent long-run decrease in the growth rate of sales, relative to the control sample.

The estimates for the leverage ratios show that the expansion of total assets for the companies which cross-list in the U.S. is funded by an increased amount of equity and no significant leveraging. In contrast, there is a significant permanent increase in the leverage of companies cross-listing within Europe. These different developments in the capital structures of the two types of companies are also mirrored in the opposing time patterns of the market value of their outstanding stock after the cross-listing.

Overall, cross-listings in the U.S. appear to be prompted by the need to fuel rapid expansion via new equity issues, while those within Europe are at best used to increase the debt capacity of the company and are hardly followed by rapid growth. This striking difference is consistent with the results of Table VIII, where cross-listings in the U.S. – but not in Europe – are shown to follow rapid expansion of the asset base.

VII Conclusions

We can now bring together the results in the two parts of this paper: the account of the aggregate trends in the geography of listings in Europe and the U.S. in 1986-97 and the analysis of European company-level in the same time interval. In particular, it is worthwhile asking if our findings about the individual cross-listing decisions help us explain the changes in the geography of equity listings.

Our aggregate figures show that the number of European companies cross-listing their shares increased considerably, but most of the increase went to U.S. exchanges (of which the NYSE absorbed more than half). At the same time, the number of U.S. companies cross-listing in Europe fell by a third. The end result has been a decline of foreign listings in Europe and a large increase in European listings in the U.S..

The decline of foreign listings on European exchanges appears to be part of a more general decline in their ability to attract new listings. Most of them have not attracted a large number of new domestic listings either, especially in the 1990s, with the exception of Frankfurt and, to some extent, of London. The opposite is true of U.S. exchanges, where both domestic and foreign listings increased over the sample period.

Interestingly, the European countries whose companies have been more eager to seek foreign listings and whose exchanges have been least able to attract or retain foreign listings are those with the highest trading costs and - with the exception of the U.K. - with the lowest accounting standards and worst shareholder protection. Conversely, the U.S. offers lower trading costs, tighter accounting standards and better shareholder protection than most European countries.

The microeconomic analysis of the characteristics and behavior of European companies helps to shed light on the motives of their cross-listing decisions, and thus the reasons behind the one-way flow of cross-listings from Europe to the U.S.. Apart from a few common features, European companies that cross-list in Europe and in the U.S. appear to have sharply different characteristics and performances.

The single major common feature is size. The importance of size suggests that the cross-listing decision involves non-negligible fixed costs and economies of scale, consistently with the findings of studies of the decision to list in domestic market such as Pagano, Panetta and Zingales (1998). In addition to size, being a newly privatized

company also increases the probability of cross-listing both in Europe and in the U.S. This is consistent with the hypothesis that cross-listing is particularly advantageous for firms which need to sell a large number of their shares. Apart from these common features, European companies that cross-list in the United States differ considerably from those which do so within Europe. In the first case, companies pursue a strategy of rapid, equity-funded expansion after the listing. They feature significant reliance on export markets before the listing, and tend to belong to high-tech industries. Companies which cross-list in Europe, instead, have a higher return on assets in the years before the cross-listing, do not grow more than the control group, and increase their leverage in the long run. Moreover, they do not rely on foreign sales to the same extent as firms cross-listing in the U.S., and generally do not belong to high-tech sectors. Therefore, on the whole a U.S. listing appears to be motivated by the need for an equity infusion by rapidly expanding companies that expand their sales internationally and/or belong to high-tech industries. The latter finding is consistent with Blass and Yafeh (2000), who report that Israeli and Dutch firms which choose Nasdaq for the first listing are overwhelmingly high-tech oriented. The motivations for cross-listing within Europe are not equally clear, but the companies that take this route are definitely less dynamic, less outward-oriented and in more mature sectors than those of the other group.

The contrast between these two groups is reminiscent of the contrast between European and U.S. companies' domestic IPOs, documented by Pagano, Panetta and Zingales (1998), Planell (1995), Rydqvist and Högholm (1995) and Mikkelson, Partch and Shah (1997). These studies, respectively conducted on Italian, Spanish, Swedish and U.S. panel data, investigate the characteristics and behavior that distinguish companies listing for the first time (on their domestic market) from those that decide to stay private. In Italy, Spain and Sweden, domestic IPOs do not appear to finance subsequent investment and growth while in the U.S. they feature phenomenal growth. Moreover, European IPOs are on average much older then their U.S. counterparts.

These studies on domestic IPOs therefore suggest that in European countries the stock market mainly caters to large, mature companies with little need to finance investment, while the opposite is true of the United States. In the present paper we find that this applies equally to cross-listing decisions: when it comes to cross-listing, the most dynamic and outward-oriented European companies self-select in U.S. exchanges.

The main remaining puzzle is why European exchanges are judged to be less attractive by this group of companies. Probably the answer has several pieces to itself.

First, the high-tech nature of the European companies listing in the U.S. suggests that a key advantage of the U.S. market is the presence of skilled analysts and institutional investors specializing in evaluating these companies. This agrees with the finding by Baker, Nofsinger and Weaver (1999) that listing on the NYSE induces higher analyst coverage than listing in London. This comparative advantage of the U.S. market may partly reflect its sheer size, combined with the fixed costs of expertise in high-tech industries. The costly investments in human capital required to evaluate high-tech companies are worthwhile only if many such companies are already listed, and this is true of a large continental market such as the U.S., but not of European markets.

Second, as already stated, American exchanges are more liquid than most European exchanges, and the U.S. has better accounting standards and shareholder rights' protection than most European countries. Insofar as these comparative advantages translate in a lower cost of equity capital, they may be particularly important to companies who need to raise large amounts of fresh equity.

Last, but not least, the U.S. economy has not only a large capital market but also a huge product market – and one that has grown at a consistently higher pace than European markets in the last decade. Therefore, it has been the natural springboard for foreign companies with a strong export orientation, since it has allowed them to capitalize on their product market reputation and expand their foreign sales rapidly, possibly via acquisitions in the U.S.

If these are the main factors of comparative advantage of U.S. exchanges relative to European ones, they may attenuate gradually as the process of integration of European capital markets proceeds. The removal of capital controls and the more homogeneous regulatory framework of European directives is likely to lead to the birth of a truly continental equity market and to increasing integration of markets for goods and services in Europe. If many of the factors of comparative advantage discussed above depend on sheer market size, European companies may become less interested in cross-listing on U.S. exchanges. But this will not apply to companies from many non-European countries, for which the U.S. market is likely to retain its attraction.

Appendix: Data Sources and Definitions

(A) Market segments used and data sources

Stock exchange	Market segment (foreign companies)	Market segment (domestic companies)	Data sources
Amex	Foreign and Canadian Issues	-	Stock Exchange
Amsterdam	Aandelen Buitenland	Aandelen Binnenland, (excl. parallel market)	Het Financieele Dagblad; Officiele Prijscourant; Stock Exchange
Brussels	Premier Marché	Premier Marché	Stock Exchange
Easdaq	EASDAQ market	-	Financial Times 27. 11. 1997 and FT Information
Frankfurt	Amtlicher Handel	Amtlicher Handel	Amtliches Kursblatt der Frankfurter Wertpapier-börse, 1986-1997
Milan	Listino Ufficiale, including Mercato Ristretto	Listino Ufficiale, including Mercato Ristretto	Stock Exchange
London	Overseas Listings (excl. Ireland) [Official List]	Constituents of the F.T. All Shares Index	Official price list, Financial Times Business Research Centre fact books, LSE Quarterly, LBS Risk Measurement Service, 1986-1997
Madrid	Continuous and Floor	Primero Mercado	Stock Exchange
Nasdaq	International Listings	-	Stock Exchange
NYSE	Non-U.S. corporate issuers	-	Stock Exchange
Paris	Premier and Second Marché	Premier and Second Marché	Stock Exchange
Stockholm	A, O und OTC-list	A, O und OTC-list	Stock Exchange
Vienna	Amtlicher Handel and Geregelter Freiverkehr	Amtlicher Handel and Geregelter Freiverkehr	Stock Exchange

Note: The number of domestic companies used for Figures 1 to 3 are obtained by adjusting FIBV data on main and parallel markets in various ways. First, since the FIBV 1986-88 figures include investment funds, 1986-88 figures are adjusted downwards by the proportion of investment funds in 1989. Second, we had to make a number of market-specific adjustments.

For the Paris Stock Exchange the FIBV numbers before 1997 do not include the Second Marché. We therefore use FIBV data only for 1997, and before 1997 draw our data from the SBF 1997 factbook.

For the Frankfurt Stock Exchange we restrict ourselves to the Amtlicher Handel, and leave out foreign companies traded in the Freiverkehr (which contains an inflated number of foreign companies, since their shares are traded even if they do not apply for a listing). We could not obtain data on the Geregelter Markt, but only very few companies in this segment would qualify for our sample.

For Nasdaq before 1997, the number of domestic firms was provided by Nasdaq, the total number of listings is drawn from the Nasdaq Factbook 1997, and the number of foreign firms is calculated as the difference between the two.

For the Stockholm Stock Exchange, the total number of listings and the number of foreign listings are drawn from the 1997 and 1998 fact books; the number of domestic listings is the difference between the two.

For the Amsterdam Stock Exchange, for 1993 and 1994 the FIBV reports the number of shares, not companies. To obtain a proxy for the number of domestic companies, we multiply the FIBV figures by the ratio of the number of domestic companies (OM) to the number of domestic shares (OM) reported in the 1993 Amsterdam Stock Exchange fact book.

(B) Variable Definitions and Sources

Variable	Source and/or definition	Method used to correct for measurement error
Calendar Year Dummies	The calendar dummy for year *t* equals 1 in year *t* and 0 in all other years, for *t* = 1986,…, 1997.	
Common Shares Outstanding	Global Vantage "issue item": net number of common / ordinary shares outstanding as of the company's fiscal year-end.	Set to "not available" whenever smaller than or equal to zero
Common Shares Traded	Global Vantage "issue item": monthly number of shares traded (in December).	Set to "not available" whenever smaller than zero
Common Shares Traded / Outstanding	Common shares traded divided by common shares outstanding.	
Countries' PBV	Morgan Stanley Capital International; year-end price-to-book ratios for the countries investigated	
Country Dummies	Set to 1 for the country where the company is incorporated or legally registered. The country of incorporation is drawn from Global Vantage.	
Employees (in 1000s)	Global Vantage: number of company workers as reported to shareholders (for some companies, the average number of employees; for others, the number of employees at year-end).	Negative sign on number of employees changed to a positive sign for: Greenall Whitley, 1994; Rugby Cement, 1991; Spring Ram Corp PLC, 1991; Bluebird Toys, 1996. Otherwise, set to "not available" when negative or when employee growth rate below –99%.
Employees Growth (in percent)	Percent change in Employees, year *t*–1 to year *t*.	
Foreign Sales Proportion (in percent)	Worldscope.	Set to "not available" whenever negative or larger than 100 percent.
High-tech Sector Dummy	Set to 1 for the following SIC-codes, 0 otherwise: 2830 drugs 2833 medicinal chemicals, botanical products 2834 pharmaceutical preparations 2835 in vitro, in vivo diagnostics 2836 biological products, ex diagnostics 3570 computer and office equipment 3571 electronic computers 3572 computer storage devices 3575 computer terminals 3576 computer communication equipment 3577 computer peripheral equipment 3651 household audio and video equipment 3660 communication equipment 3661 telephone and telegraph apparatus 3663 radio, tv broadcast, communication equipment 3669 communications equipment 3670 electronic components and accessories 3671 electron tubes 3672 printed circuit boards 3674 semiconductor and related device 3760-3761 guided missiles, space vehicles	

(continues overleaf)

Variable	Source and/or definition	Method used to correct for measurement error
High-tech Sector Dummy (continued)	3764 guided missiles, space vehicles propulsion 3769 guided missiles, space vehicles parts 3810-3812 search, detection, naval, guided, aero systems 3820 laboratory apparatus, optical, measure, control instruments 3821 laboratory apparatus and furniture 3822 automatic regulating controls 3823 industrial measurement instruments 3826 laboratory analytical instruments 3840-3841 surgical, medical, dental instruments 4800 communications 4810 telephone communications 4812 radiotelephone communications 4813 phone comm. excl. radiotelephone 4820-4822 telegraph and other communication 4830-4832-4833 radio, tv broadcasting stations 4840-4841 cable and other pay tv services 4890-4899 communication services 7370 cmp programming, data processing 7371 computer programming service 7372 prepackaged software 7373 component integrated system design	
Issue Market to Book Ratio	Global Vantage "issue item": December closing price multiplied by common shares outstanding and divided by book value of common/ordinary equity. If the current figure for common shares outstanding is not available, the previous year's value is used.	Set to "not available" whenever smaller than or equal to zero, and/or if total shareholders' equity is smaller than zero.
Market Value (in billion USD)	December closing price multiplied by common shares outstanding. If the current figure for common shares outstanding is not available, the previous year's value is used.	Set to "not available" whenever smaller than or equal to zero.
Labor & Related Expense (in million USD)	Global Vantage: direct payments to, and indirect payments on behalf of, all employees.	Set to "not available" whenever smaller than zero.
Labor Cost / Employee (in 1000 USD)	Labor and related expense divided by employees	
Leverage (in percent)	Total debt divided by (Total Assets minus Book Value of Common Stock plus the Market Value of Common Stock), multiplied by 100. The Book Value of Common Stock includes any common shareholders' interest and any reserves in the Shareholders' Equity section. It excludes participation right certificates and preferred stock.	
Privatisation Dummy	Data kindly provided by Bernardo Bortolotti, Fondazione ENI Enrico Mattei: dummy set to 1 in the year of a privatisation (or seasoned offering) and 0 in other years.	
Property Plant Equipment (Net)	Global Vantage: net cost or valuation of tangible fixed property used in the production of revenue. Calculated by Global Vantage as: Total Fixed Assets (gross) less Depreciation, Depletion, Amortisation (Accumulated), less Investment Grants and Other Deductions.	Set to "not available" whenever negative.
Property Plant Equipment Growth	Percent change in Property Plant Equipment (Net), year t–1 to year t.	

Variable	Source and/or definition	Method used to correct for measurement error
Regional Dummy North	Set to 1 if country of incorporation is Netherlands, Sweden or Belgium, 0 otherwise.	
Regional Dummy East	Set to 1 if country of incorporation is Germany or Austria, 0 otherwise.	
Regional Dummy South	Set to 1 if country of incorporation is France, Italy or Spain, 0 otherwise.	
Regional Dummy U.K.	Set to 1 if country of incorporation is Great Britain, 0 otherwise.	
Research / Labor Expense	Research and Development Expenses divided by labor and related expense.	
Research / Revenue (in percent)	Research and Development Expenses divided by Total Revenue, divided by 10 to yield percentage.	
Research and Development Expenses (in million USD)	Global Vantage: all costs incurred to develop new products or services.	Set to "not available" whenever smaller than zero
Research per Employee (in 1000 USD)	Research and development expenses divided by employees	
Return on Assets (in percent)	Global Vantage: income before extraordinary items divided by the average of the most recent two years of Total Assets multiplied by 100	Set to "not available" whenever return on assets is below –100%.
SIC Codes	Global Vantage: 4-digit Standard Industry Classification code	
Total Assets (in billion USD)	Global Vantage: total value of assets reported on the balance sheet.	Set to "not available" whenever total assets is zero or negative, or total assets growth is below –95 %.
Total Assets Growth (in percent)	Percent change in Total Assets, year *t*–1 to year *t*.	
Total Debt (in billion USD)	Global Vantage: sum of Long Term Debt (Total) and Current Liabilities.	Set to "not available" whenever negative.
Total Revenue (in billion USD)	Global Vantage; represents Sales/Turnover (Net)	Set to "not available" whenever negative.
Total Revenue Growth (in percent)	Global Vantage: percent change in Total Revenue, year *t*–1 to year *t*.	Set to "not available" if below –99 %
Total Shareholders Equity	Global Vantage; common/ordinary and preferred/preference shareholders' interest in the company plus any reserves reported in the Shareholders' Equity section.	
Variables concerning Foreign Listings	Based on data sources described in Appendix A. Definitions of these variables are reported in the legends of the tables where they appear.	

Note: Derived variables are constructed from data corrected for measurement error. The variables marked "issue item" concern only a selected class of securities issued by the company. Where available, we select common/ordinary shares; otherwise, we select an issue as close as possible to common shares.

Additional adjustments:

- Several variables for Fiat 1988, DAF 1989, 1992, Heidelberger 1989 and ENI 1986-88 are set to "not available" due to unrealistic values in those years.
- If Total Revenue is zero or the ratio of Total Revenue to Total Assets is below 0.01, the company is assumed to be a holding company. All accounting variables are set to "not available" for these companies.

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Endnotes

[1] The decision to list on a foreign exchange is related to the more general issue of why firms go public, recently explored by Bolton and von Thadden (1998), Pagano and Röell (1998), Chemmanur and Fulghieri (1999), Mello and Parsons (1998), Pagano (1993), Röell (1996), Stoughton, Wong and Zechner (2001), and Subrahmanyam and Titman (1999).

[2] Since debt capacity depends on the firm's growth prospects and the nature of its assets, in relating the probability of cross-listing to leverage, we shall control for growth and various firm characteristics.

[3] Listing abroad may also enhance future growth by creating the necessary contacts and reputation in the local financial community and by facilitating the identification of potential target companies.

[4] No study so far has examined if cross-listing companies have lower betas with the destination market and higher home market betas than comparable domestic companies. Consistently with Merton's (1987) model, such firms would reap the highest risk sharing gains from listing abroad.

[5] Merton (1987) derives a simple model of market equilibrium with incomplete information. Listing in a foreign market can be easily incorporated in his framework by assuming that it involves a cost but broadens the firm's investor base. Risk characteristics should then determine which firms are most likely to incur the cost of broadening their shareholder base by listing in a foreign market.

[6] The "home bias" induced by informational frictions may take the form of overconfidence about domestic shares relative to foreign ones, as shown by Kilka and Weber's (1997) experimental study. The publicity associated with a cross-listing could change this perception.

[7] Cross-listed firms may gain access to cheaper capital not only in the stock market but also in bond and credit markets, because more information is available about the company.

[8] Also the long-run returns for non-U.S. firms raising equity in the U.S. are related to the magnitude of investment barriers that segment their home markets from world markets (Foerster and Karolyi, 2000).

[9] On this point see also Chemmanur and Fulghieri (1998).

[10] A related issue is whether foreign trading volume of cross-listed stocks tends to remain permanently high after the foreign listing or gravitates back towards the home market over time ("flowback").

[11] It may also improve the quality of its managerial decisions since, after the foreign listing, its stock price incorporates information which otherwise managers may have overlooked.

[12] For instance, a prominent corporate lawyer explains Glaxo's cross-listing as follows: "When we helped Glaxo into the U.S. markets for the first time, they weren't interested in raising funds; they were just interested in increasing their name recognition and market following here in the United States. Believe it or not, at that time, hardly anybody had ever heard of Glaxo in the United States, and now it's pretty much a household name" (Decker, 1994). On the same score, the NYSE features regular advertising events for listed firms on its premises or at the opening bell, which is the most televised daily event in the world. For instance, on 24 April 2000 Honda Motor Company announced at the opening bell the next day's official groundbreaking of a new $ 400-million plant in Alabama.

[13] As far as profitability is concerned, caution is in order because this effect is also consistent with other hypotheses. Moreover, the corresponding test may be biased because companies may choose to list when their earnings performance is abnormally good, and may even manipulate their accounts (as found by Teoh, Welch and Wong, 1998a, 1998b).

[14] The figures in the table refer to the stock of foreign listings on a given market, not the flow of new listings in a given year. Moreover, the figures do not include shares traded in foreign markets without a cross-listing, such as those traded on SEAQ-International in London or in the German "third market". The inception of such trading activity does not require any involvement

of the company concerned. In addition, it does not confer most of the benefits of a listing (such as the ability to raise equity capital or the added reputation) nor does it entail the corresponding costs.

[15] Some Dutch companies issue "New York shares", which are very similar to ADRs.

[16] The only other country with a high net outflow of listings – the Netherlands – has high trading costs only if measured to include market impact.

[17] Within the data base, we select only the companies in the Global Vantage sections named "industrial active" or "industrial research" and listed on their home-country stock exchange. To exclude financial companies, all companies with SIC-codes starting with 6 have been dropped. We scrutinized companies whose name (or, in the case of UK companies, SEDOL codes) changed during the sample period to identify cases where mergers occurred: when a merger was identified and the merged company listed on any foreign market, the new merged company was treated as a new listing.

[18] One may wonder if, besides being sparse, our data for R&D may not be affected by self-selection. In many countries such data are not mandatorily disclosed, so companies may report them only after a cross-listing in a market with more stringent disclosure requirements. Indeed, the number of companies reporting R&D expenses in our sample increases steeply around the cross-listing date. However, we also find that, if anything, this introduces a bias against our result that R&D expenses increase around the cross-listing date (see Table IX). Average R&D expenses rise much more if they are computed for the subsample of companies that already reported them before the cross-listing than if they are computed including in the sample all companies for which R&D is reported at any date.

[19] We computed the stock market capitalization of all the companies of each country in our sample in 1995 and compared the resulting weights with the corresponding weights in Table 5, p. 973, of Jorion and Goetzmann (1999), which also refer to 1995 (rescaling them to take into account only European exchanges). The average absolute deviation of the two sets of weights is 2.2 percent. British companies are only slightly overweighted in our sample: they account for 38.2 percent of total capitalization of the companies in our sample, whereas the corresponding figure using the data in Jorion and Goetzmann (1999) would be 40 percent. Only French companies are considerably overweighted in our sample.

[20] We have estimated logit regressions (not reported) to understand why companies delist within our sample. Companies that delist from some but not all foreign markets have lower asset growth before delisting. Those that delist from all foreign markets have low size, as measured by total assets and other scale variables. Companies that delist from all markets, including their own, feature low size and high leverage. This suggests that many such delistings occur when companies are experiencing financial problems or are involved as targets in mergers or acquisitions.

[21] Being based on the minimization of the sum of absolute deviations, the LAV estimator assigns a lower weight to outliers than the OLS estimator.

[22] The foreign sales variable in our data set is missing for roughly one third of all companies. We impute these missing values via regressions which generate predicted values of the percentage of foreign sales based on the following regressors: the company mean value of the fraction of foreign sales (for the companies where at least one data point is available), the logarithm of total assets, the growth rates of total assets and sales, dummies for SIC codes at the 1-digit level, country of incorporation, calendar year, and the high-tech dummy. The regression results reported in Tables VI and VII use the data obtained with this imputation method. Since a regional breakdown of sales may be missing more frequently for companies with no foreign sales, we perform a robustness check via an alternative imputation method whereby the percentage of foreign sales is set equal to zero wherever it is missing. The estimates of the coefficients in Table VI and VII are practically unaffected, and so are their estimated standard errors.

[23] This dummy equals 1 when the government makes a public offering of shares in the company.

[24] The base probability of a sample firm cross-listing over a 10 year period is 2.9 percent, evaluated at the sample means of the explanatory variables. The hazard ratio of a one standard deviation change in variable i, σ_i, is $\exp(\sigma_i\beta_i)$. This calculation yields 1.84 for the proportion of foreign sales. Multiplication with the base probability of 2.9 gives 5.3 percent, which is the probability of a sample firm cross-listing over a 10 year period, after increasing foreign sales by one standard deviation and holding all other variables at their sample means.

[25] The market-wide price-to-book ratios are mostly insignificant, with the exception of the difference between the U.S. and the domestic price-to-book ratio, which has a negative impact on the probability of cross-listing within Europe.

[26] In our sample, two thirds of the companies that cross-listed in the U.S. had not previously cross-listed elsewhere in Europe. 88 firms that cross-listed in the U.S. had no prior EU cross-listing, 17 had one, 9 had two, 7 had three, 4 had four and 7 had five cross-listings in Europe prior to listing in the U.S..

[27] In Table 9 (p. 47) of their study they show that for European, non-UK stocks the share of NYSE trading is considerably lower than that of London trading: for the cross-listed stocks of the Netherlands, Spain, Germany, Italy, France, and Sweden, the NYSE share of total trading is on average 12 percent, while the UK share is 28 percent. Being effected on a closer marketplace, a cross-listing within Europe tends to "eat" into domestic turnover much more than a listing effected in the U.S.

Table I:

Motives for Cross-Listing and Their Empirical Implications

Hypothesis about motive for cross-listing	Predicting cross-listing (ex ante evidence)	Consequences of cross-listing (ex post evidence)	Stock market characteristics that attract cross-listings
1. Raising capital for investment	High leverage High growth, P/E and real investment	High growth, P/E and real investment	Deep and liquid stock market
2. Stock sales by existing shareholders	Newly privatized firms	High share turnover	Deep and liquid stock market
3. Broadening shareholders' base	High risk firms	More foreign investors and high foreign turnover	Large stock market
4. Foreign expertise	High-tech sector, large R&D spending		Knowledgeable investors and analysts
5. Commitment to disclosure and governance standards	Low domestic regulatory standards	Higher profitability than other companies	High regulatory standards
6. Liquidity		Higher share turnover	Stock market with low spreads, low brokerage fees and high volume
7. Relative mispricing	Low domestic E/P ratio relative to foreign E/P ratio		Recent bull market
8. Capitalizing on product market reputation	High fraction of foreign sales, especially in consumer products		Stock market located where company's foreign sales are high
9. Strengthen the company's output market	Product market competitors already cross-listed in the same exchange	Higher foreign sales and profits, without necessarily raising more capital	Market located where company's foreign sales have large growth potential
10. Listing costs are low relative to benefits	Large size		Low listing fees and disclosure requirements

Table II:

Number of Cross-Listings in 1986, 1991 and 1997 (End-of-Year Values)

Panel A: EU9-USA Cross-Listings Matrix

Country of origin

Stock Exchange	Nether-lands	Belgium	Germany	Italy	U.K.	Spain	France	Sweden	Austria	EU9	USA	Total Comp.
Amsterdam Stock Exchange		7 8 7	12 11 10	3 3 1	14 20 11		 2 2	2		38 44 31	129 108 83	167 152 114
Brussels Stock Exchange	15 15 14		10 9 8	5 4 2	14 17 11		8 13 12	2 1 1	 1 1	54 60 49	36 36 34	90 96 83
Frankfurt Stock Exchange	12 16 19	2 4 4		4 6 5	14 21 13	6 4 4	5 10 8	3 4 4	2 9 8	48 74 65	51 58 42	99 132 107
Italian Stock Exchange			2 3				 1			2 4		2 4
London Stock Exchange	7 10 11	2 1 2	8 11 11	1 1		4 4 4	4 7 5	15 13 14		41 47 47	193 159 111	234 206 158
Madrid Stock Exchange			3 3				 1			3 4		3 4
Paris Stock Exchange	10 9 8	12 11 9	12 15 13	6 6 3	14 24 17	5 5 4		5 5 5	 1 2	64 76 61	52 52 37	116 128 98
Stockholm Stock Exchange	 1		 1 1				 2 2			0 3 4	1 1 5	1 4 9
Vienna Stock Exchange	4 5 5		17 21 20	 3 1	1 1					22 30 26	3 4 2	25 34 28
Easdaq		6		2	3		5		2	18	2	20
European exchanges (EU9 &	48 55 58	23 24 28	59 73 69	19 23 14	57 83 55	15 13 12	17 34 36	27 23 24	2 11 13	267 339 309	465 418 316	732 757 625
Amex					3 4 4		 1			3 5 4	 	3 5 4
Nasdaq	6 5 17	 3	1 1 1	 2	18 25 55		2 2 8	7 6 10		34 39 96	 	34 39 96
NYSE	4 6 16	 1	 7	 4 11	11 26 46	1 7 9	 3 14	 3		16 46 107	 	16 46 107
Total Listings	58 66 91	23 24 32	60 74 77	19 27 27	89 138 160	16 20 21	19 40 58	34 29 37	2 11 13	320 429 516	465 418 316	785 847 832
Total Companies	27 32 48	17 15 24	26 29 31	10 11 19	54 89 130	8 9 10	15 22 43	18 15 21	2 9 11	177 231 337	284 234 184	461 465 521

[Table II, continued]

Panel B: Summary of Transatlantic Listings

Country of origin

Stock Exchange	EU9-Countries		U.S.	
	Foreign Listings	**Foreign Companies**	**Foreign Listings**	**Foreign Companies**
EU9 Exchanges	267	147	465	284
	339	182	418	234
	309	180	316	184
U.S. Exchanges	53	52		
	90	89		
	207	206		

[Table II, continued]

Panel C: Listings on EU9-USA Exchanges from the Rest of World, by Country or Region of Origin

Stock Exchange	*Country of origin* Australia, New Guinea, New	Canada	Central and Eastern Europe	Central and South Americ	Israel	Japan	Rest of Africa	Rest of Europe	Rest of Asia	South Africa	West Indies
Amsterdam Stock Exchange	2 5	13 8 4				23 24 21	1 1	4 5 3	1 2 2	2 1 1	
Brussels Stock Exchange	1	9 11 9		1 1		6 6 5	6 6 4	7 9 6		16 16 18	1
Frankfurt Stock Exchange	6 3	2 4 2		1		57 60 56		12 23 18		5 5 6	
Italian Stock Exchange											
London Stock Exchange	18 19 14	25 29 22	1 1 14	7 16 19	3 3 2	8 27 29	8 7 6	14 24 18	22 15 50	90 94 55	4 15 5
Madrid Stock Exchange											
Paris Stock Exchange	1 3 1	15 13 7	1 1	3 4 3		16 37 32	11 12 10	8 8 8	 2 1	22 22 17	1 1 1
Stockholm Stock Exchange		1 1						6 7 4	1		
Vienna Stock Exchange			2 2					1 5 2			
Easdaq		1						2			
Amex	1	34 44 40		1 1 4	5 5 5			2	3 8 4	1 1 1	1 2 3
Nasdaq	12 10 22	119 125 165		11 8 26	16 23 71	16 15 16		8 6 23	2 1 14	17 17 15	9 9 8
NYSE	1 9 15	21 27 65	2	3 4 93	1 1 6	8 9 11		2 3 21	2 3 32	1 1 1	4 4 13
Total Listings	34 53 56	238 262 316	2 4 18	25 35 146	25 32 84	134 178 170	26 26 20	62 92 105	30 32 103	154 157 114	19 32 30
Total Companies	32 36 47	198 221 285	1 3 18	21 26 139	23 31 84	81 99 100	24 24 19	44 63 78	30 32 101	102 105 67	16 29 28

Table III:

Foreign Listings on European Exchanges, 1975-85

This table reports the total number of foreign listings on European exchanges, end-of-year values. The figures are not fully comparable to those of Table II, because they include investment trusts and for Paris do not include the listings of the Second Marché. The data for the Frankfurt Stock Exchange are drawn from the Stock Exchange Statistics of Frankfurter Wertpapierboerse, 1988 issue. All other data were provided by the Federation International de Bourses de Valeurs (FIBV).

	Year		
Stock Exchange	**1975**	**1980**	**1985**
Amsterdam Stock Exchange	323	294	242
Brussels Stock Exchange	149	152	144
German Stock Exchange	129	173	177
Italian Stock Exchange	1	0	0
London Stock Exchange	370	482	572
Madrid Stock Exchange	3	0	0
Paris Stock Exchange	160	162	189
Stockholm Stock Exchange	0	0	7
Vienna Stock Exchange	27	35	38

Table IV:

Foreign Listings, Market and Country Characteristics

This table merges information on cross-listings within the EU9 and U.S. area with market and country characteristics. Change in Cross-Listings into Market is the change in the number of cross-listings of EU9 and U.S. companies on a given market between 1986 and 1997. Change in Cross-Listings Out of Market is the change in the number of listings by domestic companies on other EU9 and U.S. markets between 1986 and 1997. Net Change is the difference between Change in Cross-Listings into Market and Change in Cross Listings Out of Market. Normalized Net Change is the ratio of Net Change to the total number of EU9 and U.S. companies listed in 1991 on the relevant market, multiplied by 100. Accounting Standards is the rating reported by La Porta et al. (1998) on the basis of 1990 accounting information. Investor Protection is the Antidirector Rights Index from LaPorta et al. (1998). Yearly Market Return is the percent annual change in the corresponding MSCI market return index in U.S. dollars, with dividend reinvested, between 1986 and 1997, year-end values. Capitalization is measured in billions of U.S. dollars in 1991 (source: International Federation of Stock Exchanges). Trading Cost is measured in basis points as of the 3rd quarter of 1998. It is the average sum of commission and fees (with market impact added in on the second line of each cell) in a given market based on global trading data from 135 institutional investors (source: Elkins/McSherry Co., Inc.).

Market	Change in Cross-Listings into Market	Change in Cross-Listings out of Market	Net Change	Normal-ized Net Change	Account-ing Stand-ards	Investor Protection	Yearly Market Return	Market Capital-ization	Trading Costs (including Market Impact)
Netherlands	-53	+33	-86	-24.2	64	2	18.68	135.98	23.01 (34.56)
Great Britain	-76	+71	-147	-6.6	78	5	15.73	986.11	41.20 (51.88)
Austria	+3	+11	-8	-5.8	54	2	7.31	26.04	32.44 (51.29)
Belgium	-7	+9	-16	-5.7	61	0	15.10	71.11	24.28 (33.21)
Germany	+8	+17	-9	-2.2	62	1	10.13	392.47	24.23 (29.70)
France	-18	+39	-21	-2.2	69	3	11.07	373.36	22.84 (27.63)
Italy	+4	+8	-4	-1.6	62	1	4.14	158.81	24.40 (29.84)
Spain	+4	+5	-1	-0.2	64	4	13.81	127.30	26.80 (37.99)
Sweden	+8	+3	+5	+2.3	83	3	16.85	97.06	24.66 (32.26)
Amex	+1	-149	+303	+4.6	71	5	17.02	124.45	N.A.
Nasdaq	+62							490.68	3.51 (30.64)
NYSE	+91							3484.34	13.40 (24.57)

Table V:

Company Data: the Sample

The sample includes all the companies listed domestically in the main segment of our nine European exchanges at any time in 1986-97, and for which balance sheet information is available in the Global Vantage data base (at least partly) for the 1986-98 interval. Financial companies and investment funds, as well as companies not listed in their country of incorporation, are excluded. Appendix B contains the definitions of the variables.

Panel A: Summary Statistics

	Mean	Std. Dev.	Min	Max	Median	No. of Obs.	No. of comp.
Total Assets	2.01	6.13	0.00	158.61	0.35	18066	2312
Total Assets Growth	23.13	1078.48	-92.24	134846.02	7.46	15676	2287
Com. Shares Traded / Outst.	3624.40	134872.78	0.00	9167796.00	29.96	14112	1802
Employees Growth	40.37	1751.64	-98.76	136633.34	1.45	14209	2190
Employees	11.62	29.54	0.00	1017.00	2.76	16644	2246
Foreign Sales Percentage	34.13	29.50	0.00	100.00	31.71	12672	1576
Leverage	13.37	13.72	0.00	90.47	9.30	14434	2159
Issue Market to Book Ratio	4.36	18.92	0.00	1130.94	2.11	21274	1858
Market Value	1.58	7.02	0.00	316.55	0.27	15170	2203
Prop. Plant Equipm. Growth	226.56	17619.38	-100.00	1881866.63	6.55	15649	2283
Research per Employee	14.21	127.00	0.01	3432.75	2.73	3351	621
Research / Revenue	8.19	67.84	0.00	2922.22	1.77	3405	627
Research / Labor Expense	16.37	225.23	0.00	3715.45	0.13	2121	396
Total Revenue	1.88	5.11	0.00	146.84	0.38	18038	2311
Total Revenue Growth	29.83	1081.61	-98.57	128384.62	7.40	15638	2279
Labor Cost / Employee	73.18	1193.60	0.00	33976.00	17.36	7917	1108
High Tech Dummy	0.11	0.32	0.00	1.00	0.00	30186	2322
Return on Assets	4.66	11.70	-95.18	949.00	4.66	15652	2288

Panel B: Number of Companies by Country of Incorporation

Country of incorporation	**Total number of companies**	**Number of companies already cross-listed in 1986**	**Number of companies that cross-list in 1987-1997**	**Fraction of companies cross-listed in any year between 1986 and 1997**	**Number of companies delisting from all foreign markets in 1986-97 and keeping their home listing**	**Number of companies delisting from all markets (including domestic exchange) in 1986-97**
Austria	86	2	7	0.11	0	1
Belgium	84	9	2	0.13	2	2
Germany	256	17	11	0.11	3	2
Spain	98	1	2	0.03	0	0
France	417	14	14	0.07	2	3
United Kingdom	947	29	76	0.11	14	18
Italy	124	6	6	0.10	3	0
Netherlands	154	17	17	0.22	3	2
Sweden	156	16	6	0.14	1	5
Total	2322	111	141	0.11	28	33

Table VI:

Cross-Listing Companies versus Domestic Companies: Descriptive Statistics
Panel A: Difference of Medians around Date of First Cross-Listing

This table reports the differences in medians between companies that cross-list and those that do not. Columns give the differences in medians in the years -3, -2, etc. relative to the year of cross-listing. The control sample consists of companies that are not cross-listed during the whole sample period. The differences are computed by a Least Absolute Value (LAV) regression, where the variable of interest (e.g. total assets) is regressed on a relative-listing-year dummy, controlling for calendar year and country of incorporation. The sample includes observations from 1986 to 1998. The relative-listing-year dummy for year +*n* (-*n*) takes the value 1 for observations taken *n* years after (before) the year in which the company is first cross-listed abroad. A separate LAV regression is run for each cell in the table. The value reported is the coefficient of the relative-listing-year dummy. Significance at the 1% level is indicated by ***, 5% by **, and 10% by *.

	-3	**-2**	**-1**	**0**	**1**	**2**	**3**	**>3**
Total Assets	1.88***	1.54***	1.17***	1.33***	1.62***	1.98***	2.17***	4.97***
Total Assets Growth	5.57*	2.98	5.07**	5.30**	4.89**	2.47	-0.84	-1.04*
Com. Shares Traded / Outst.	45.77***	35.34***	31.84***	30.46***	19.27***	34.84***	33.53***	29.13***
Employees Growth	-1.80	3.89**	-0.08	4.01***	2.63**	0.84	-1.46	-1.60***
Employees	7.32***	6.62***	6.43***	5.62***	8.26***	8.38***	9.74***	25.03***
Foreign Sales Percentage	24.03***	23.86***	25.04***	24.06***	27.59***	34.41***	36.85***	31.24***
Leverage	5.38**	6.49***	4.71**	4.59***	2.13	4.39***	4.13**	2.80***
Issue Market to Book Ratio	0.40*	0.42*	0.65***	0.74***	0.66***	0.56**	0.60**	0.33***
Issue Market Value	1.24***	1.13***	1.12***	1.56***	1.53***	1.73***	1.33***	3.21***
Prop. Plant Equipm. Growth	1.19	1.26	3.49	6.69***	3.80*	3.79*	-0.46	-0.85
Research per Employee	0.48	0.92*	1.31**	2.10***	1.29***	1.62***	1.92***	1.69***
Research / Revenue	-0.36	0.20	0.07	0.11	0.27	0.19	0.57	0.04
Research / Labor Expense	0.03	0.03	0.11***	0.08***	0.08***	0.26***	0.17***	0.07***
Total Revenue	1.48***	1.14***	1.26***	1.29***	1.53***	1.73***	2.43***	4.62***
Total Revenue Growth	-0.78	3.37	4.06**	5.52***	3.60**	0.11	1.37	-1.69***
Labor Cost / Employee	5.76***	6.54***	5.24***	3.61***	3.72***	4.27***	6.86***	2.20***
Return on Assets	0.77	-0.08	0.91	0.91*	0.85*	-0.57	-0.96*	-0.34**

[Table VI, continued]

Panel B: Difference of Medians around Date of First Cross-Listing, by Continent of First Cross-Listing

This table reports differences in medians of companies that cross-list in the U.S. relative to the control sample, and of companies that cross-list within EU9 relative to the control sample. We consider companies that cross-list for the first time, divided into two groups depending on whether this cross-listing takes place in the U.S. or in Europe. Companies that cross-list in the same year in the U.S. and in EU9 are excluded, and so are companies already cross-listed in both continents before 1986. For columns -3 to +3, subsequent cross-listings in the other geographical area are ignored. The sample period is from 1986 to 1998. Calculation is in the form of a Least Absolute Value (LAV) regression. The dependent variable is regressed on a U.S.-relative-listing-year dummy and a EU9-relative-listing-year dummy, controlling for country of incorporation and calendar year effects. The coefficients of the relative-listing-year dummies are the differences in medians. This method assumes that the country and calendar year effects are the same for the whole sample and allows a simple test for equality of the medians for the U.S. and EU9 subsamples. Companies that cross-list for the first time simultaneously in European and U.S. exchanges are not included in the sample. Because of different samples, this table cannot be compared directly to Panel A of Table V; in particular the >3 column, where a relatively large number of observations is excluded. Significance at the 1% level is indicated by ***, 5% by **, and 10% by *.

U.S.	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**	**>3**
Total Assets	1.77 ***	1.46 ***	0.88 ***	1.09 ***	1.42 ***	1.50 ***	1.47 ***	3.31 ***
Total Assets Growth	5.19	3.34	0.54	15.03 ***	5.19 **	1.53	-1.38	2.35 *
Com. Shares Traded / Outst.	53.83 ***	36.19 ***	30.33 ***	18.48 ***	16.18 ***	35.34 ***	38.95 ***	35.80 ***
Employees Growth	0.44	3.89 *	0.36	5.09 ***	3.80 **	-0.29	-2.76	0.10
Employees	5.51 ***	3.47 ***	2.30 ***	2.53 ***	3.38 ***	4.35 ***	6.83 ***	17.09 ***
Foreign Sales Percentage	25.08 ***	24.12 ***	21.51 ***	24.98 ***	35.56 ***	38.24 ***	44.20 ***	34.38 ***
Leverage	7.06 **	6.52 **	4.57 *	2.70	1.09	1.46	-2.07	1.13
Issue Market to Book Ratio	1.31 ***	0.83 ***	1.20 ***	1.34 ***	1.18 ***	0.96 ***	1.27 ***	1.09 ***
Issue Market Value	1.20 ***	0.89 ***	0.960 ***	1.56 ***	2.03 ***	2.19 ***	1.82 ***	4.45 ***
Prop. Plant Equipm. Growth	0.64	1.95	2.58	6.72 **	4.40	3.79	-3.62	1.00
Research per Employee	1.83 ***	2.87 ***	1.92 ***	3.01 ***	1.59 ***	1.62 ***	4.17 ***	2.00 ***
Research / Revenue	1.56 **	2.52 ***	0.40	0.51	0.32	0.08	0.57	0.43 **
Research / Labor Expense	0.20 ***	0.11 **	0.20 ***	0.11 ***	0.09 ***	0.26 ***	0.11 **	0.11 ***
Total Revenue	1.74 ***	0.66 ***	0.77 ***	0.78 ***	1.16 ***	1.31 ***	1.80 ***	3.84 ***
Total Revenue Growth	1.76	-0.85	3.86	2.73	6.37 ***	0.51	1.78	-0.74
Labor Cost / Employee	8.46 ***	6.80 ***	5.74 ***	3.39 ***	3.73 ***	5.16 ***	16.20 ***	7.65 ***
Return on Assets	0.77	-0.31	-0.06	-0.12	1.14 *	-0.57	-0.40	-0.05
EU9	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**	**>3**
Total Assets	2.70 ***	1.54 ***	1.58 ***	1.94 ***	2.01 ***	2.76 ***	3.23 ***	4.52 ***
Total Assets Growth	5.62	0.76	8.01 **	5.30	4.44	3.36	1.07	-1.43 **
Com. Shares Traded / Outst.	40.78 ***	34.72 ***	32.40 ***	54.98 ***	19.80 ***	26.71 ***	30.71 ***	26.47 ***
Employees Growth	-5.34	1.40	-0.55	1.08	0.10	1.83	-1.12	-1.68 ***
Employees	14.13 ***	10.04 ***	10.23 ***	14.69 ***	11.23 ***	10.35 ***	10.84 ***	21.95 ***
Foreign Sales Percentage	21.41 **	21.09 **	31.72 ***	24.06 ***	22.09 ***	29.09 ***	30.02 ***	27.62 ***
Leverage	5.41	7.38 **	5.47 *	5.58 **	8.62 ***	11.16 ***	14.95 ***	2.86 ***
Issue Market to Book Ratio	-0.17	0.20	-0.06	0.10	0.38	0.38	0.28	0.14 *
Issue Market Value	2.35 ***	1.46 ***	1.69 ***	1.66 ***	1.00 ***	1.35 ***	1.30 ***	2.47 ***
Prop. Plant Equipm. Growth	1.34	0.75	3.92	4.12	3.05	4.74	0.94	-0.99
Research per Employee	-0.11	-0.54	0.05	-0.30	-0.37	0.57	0.31	0.16
Research / Revenue	-0.65	-1.16	-0.67	-0.75	-0.77	0.07	-0.11	-0.23 *
Research / Labor Expense	-0.03 **	-0.04	-0.03	-0.04	-0.04	-0.05	*No obs.*	0.02
Total Revenue	1.32 ***	1.19 ***	1.30 ***	1.72 ***	1.78 ***	2.34 ***	2.66 ***	4.06 ***
Total Revenue Growth	-7.81 *	5.08	4.18	5.68 **	1.74	0.17	2.50	-1.92 ***
Labor Cost / Employee	2.07	4.70 **	2.48	5.91 ***	3.17 **	0.00	-0.68	0.58
Return on Assets	0.44	-0.12	1.13	0.91	0.05	-0.55	-1.20	-0.25

Table VII:

Predicting the First Cross-Listing by Cox Regression

This table reports the Cox estimates of the hazard ratio of foreign listing. The dependent variable takes the value one in the year of the first foreign listing in the EU9 countries or in the U.S., and zero otherwise. After the first cross listing, observations are excluded from the estimation. The sample includes observations on the dependent variable from 1987 to 1997. Standard errors and resulting *p*-values are adjusted for clustering on companies. All explanatory variables are lagged, with the exception of the High-tech dummy. The Mean of 3 Highest Countries' PBV is the arithmetic mean of the three highest values of the Price-to-Book-Value ratio in each year within the countries of our sample.

No. of subjects: 1276 No. of failures: 42 Time at risk: 7727		Log likelihood χ^2 (12) Prob > χ^2	-222.39 264.87 0.00
	Hazard Ratio	Z	P>|z|
Leverage	1.009	0.57	0.57
Foreign Sales Percentage	1.023	3.53	0.00
Issue Market to Book Ratio	1.013	5.59	0.00
Total Assets Growth	1.002	9.21	0.00
Privatization dummy	19.919	4.03	0.00
Return on Assets	0.959	-1.66	0.10
Log of Total Assets	1.855	4.34	0.00
High Tech Dummy	2.290	2.01	0.05
Mean of 3 Highest Foreign PBV - Domestic PBV	0.199	-2.12	0.03
Regional dummy (North)	1.374	0.66	0.51
Regional dummy (South)	0.626	-0.75	0.45
Regional dummy (East)	0.510	-1.33	0.19

Table VIII:

Predicting the Location of Cross-Listing by Multinomial Logit

This table reports multinomial logit estimates of the probability of the first cross-listing taking place in the U.S. or in Europe. The possible outcomes are: no cross-listing in either continent, first cross-listing in the U.S., and first cross-listing in Europe. The first group (companies with no cross-listing) is the comparison group. One company, whose first cross-listing occurred simultaneously in Europe and the U.S., is included in both the second and third group. The sample includes observations on the dependent variable from 1987 to 1997. All explanatory variables are lagged, with the exception of the High-tech dummy. The Mean of 3 Highest EU PBV – Domestic PBV is the difference between the arithmetic mean of the 3 highest EU9 Price to Book Values and the PBV of the domestic market. U.S. PBV – Domestic PBV is the difference between the U.S. and the domestic Price to Book Value. Standard errors and resulting *p*-values are adjusted for clustering on companies.

Log Likelihood: -221.09		Number of obs. Wald χ^2 (28) Prob > χ^2 Pseudo R^2	7732 352.87 0.00 0.25
Region of foreign listing	relative risk ratio	z	P>|z|
U.S.A.			
Leverage	1.032	1.49	0.14
Foreign Sales Percentage	1.025	2.56	0.01
Issue Market to Book Ratio	1.014	4.01	0.00
Total Assets Growth	1.003	3.39	0.00
Privatization dummy	15.708	2.17	0.03
Return on Assets	0.954	-2.15	0.03
Log of Total Assets	1.599	2.64	0.01
High Tech Dummy	4.560	2.54	0.01
U.S. - Domestic PBV	0.785	-0.25	0.80
Mean of 3 Highest EU PBV - Domestic PBV	1.035	0.03	0.98
Domestic PBV	1.128	0.17	0.87
Regional dummy (North)	0.326	-1.08	0.28
Regional dummy (South)	0.200	-1.50	0.14
Regional dummy (East)	0.129	-1.91	0.06
Europe			
Leverage	0.990	-0.55	0.58
Foreign Sales Percentage	1.015	1.48	0.14
Issue Market to Book Ratio	1.009	1.59	0.11
Total Assets Growth	0.994	-0.81	0.42
Privatization dummy	16.513	3.05	0.00
Return on Assets	1.090	3.63	0.00
Log of Total Assets	3.004	4.60	0.00
High Tech Dummy	0.507	-1.08	0.28
U.S. - Domestic PBV	0.107	-2.92	0.00
Mean of 3 Highest EU PBV - Domestic PBV	0.956	-0.04	0.97
Domestic PBV	0.756	-0.42	0.68
Regional dummy (North)	5.969	2.76	0.01
Regional dummy (South)	2.466	0.84	0.40
Regional dummy (East)	2.031	1.16	0.25

Table IX:

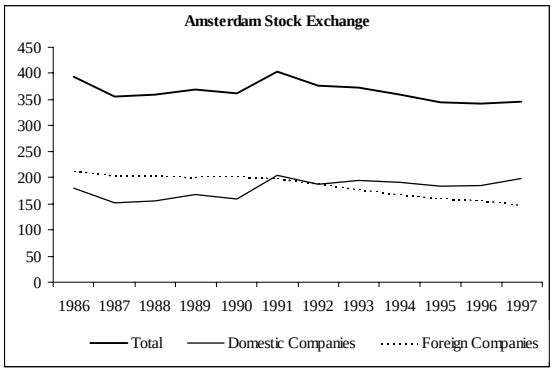
Effect of Listing Location: Ex-Post Regressions Distinguishing Cross-Listings in Europe and U.S.

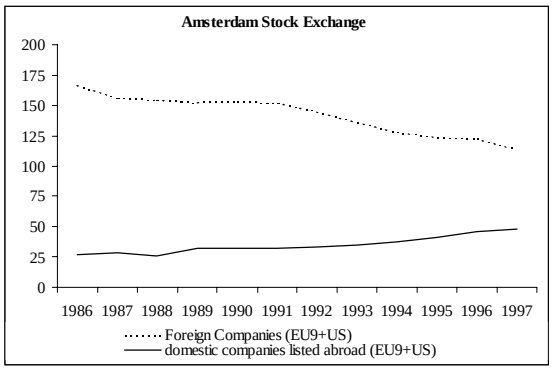
This table reports estimates of the ex-post effects of cross-listing, distinguishing U.S. cross-listings and EU9 cross-listings. Each row in the table gives the results of a LAV regression, for a dependent variable (e.g. Total Assets). The sample includes observations from 1990 to 1998. The explanatory variables are dummies capturing the timing of the first listing in the U.S. and within Europe respectively. For each continent, they are: an impact dummy (1 in the year of cross listing and 0 elsewhere), a three-year dummy (1 in the three years after cross-listing) and a permanent effect dummy (1 after the third year subsequent to cross-listing and later). We take first differences of all variables in order to eliminate fixed effects. The following dependent variables have been used in logarithmic form: total assets, employees, issue market value and total revenue. A constant and additional control dummies are included in non-differenced form: calendar year dummies in all regressions; country of incorporation dummies only in the regressions explaining total assets, employees, issue market value and total revenue. The coefficients of these variables are not reported for brevity. Significance at the 1% level is indicated by ***, 5% by **, and 10% by *.

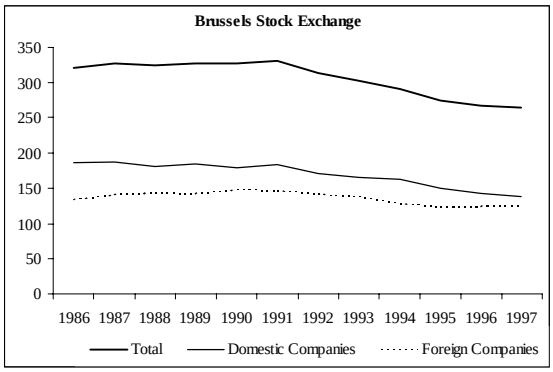
	U.S. impact	U.S. three year effect	U.S. permanent effect	EU9 impact	EU9 three year effect	EU9 permanent effect	Pseudo R^2	No. of obs.
Total Assets	0.03	0.04 *	0.05 *	-0.01	-0.01	-0.03 *	0.12	13540
Total Assets Growth	1.83	-1.53	3.21	3.35	-0.19	-2.23	0.08	12210
Common Shares Traded/Outst.	-1.01	-1.23	-5.32 ***	-1.98	-5.08 ***	-7.23 ***	0.00	10932
Employees Growth	-0.13	0.06	2.04	-0.19	-1.38	-2.40	0.00	11130
Employees	-0.01	0.01	-0.01	0.01	0.01	-0.01	0.01	12591
Foreign Sales Percentage	0.20 ***	0.22 ***	0.22 ***	0.12 ***	-0.14 ***	0.16 ***	0.00	9270
Leverage	-0.08	0.01	-0.10	0.10	0.09	0.52 ***	0.00	11115
Issue Market to Book Ratio	-0.01	-0.03	-0.03	-0.04	0.05 *	0.00	0.02	15437
Issue Market Value	0.08	0.07	0.11 *	0.03	-0.04	-0.08 **	0.04	11793
Property Plant Equipm. Growth	-1.69	0.26	5.53	1.63	2.32	-1.90	0.01	12193
Research per Employee	0.04	0.09	0.19 **	0.67 ***	0.56 ***	0.71 ***	0.01	2517
Research / Revenue	0.01	0.04	-0.04	0.06	0.06	0.06 *	0.00	2559
Research / Labor Expense	0.00	0.02 ***	0.01 **	0.00	-0.01	0.00	0.00	1620
Total Revenue	0.02	0.02	0.01	0.00	0.00	-0.02	0.10	13498
Total Revenue Growth	-1.96	-1.85	0.46	-5.24	-6.53 **	-4.96 *	0.07	12165
Labor Cost / Employee	-0.58 *	-0.82 **	0.35	-3.02 ***	-1.67 ***	-0.99 ***	0.01	6032
Return on Assets	0.52 *	-0.13	0.02	0.14	0.11	0.34	0.01	12129

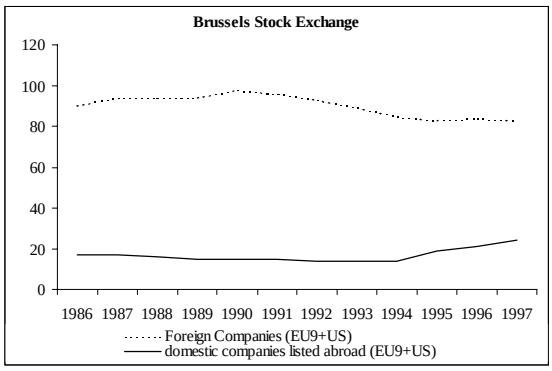
Figure 1a. Number of companies listed on each exchange: domestic, foreign and total.

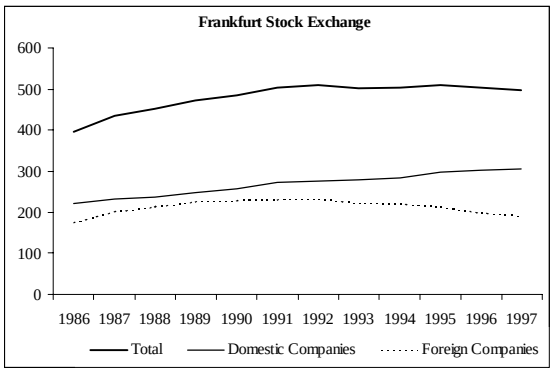
Figure 1b. Number of foreign listings from EU9 and U.S. present on each exchange, and number of domestic companies cross-listed on EU9 and U.S. exchanges.

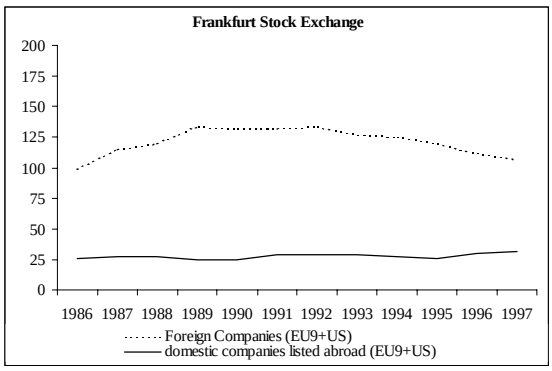


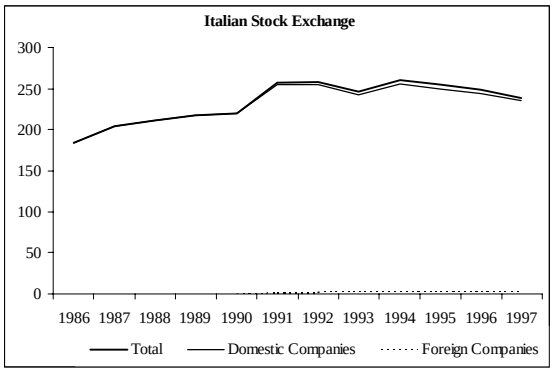












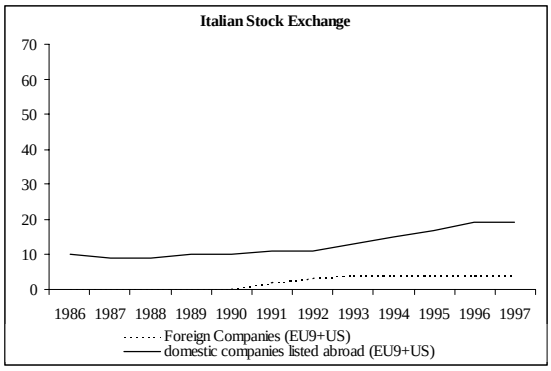
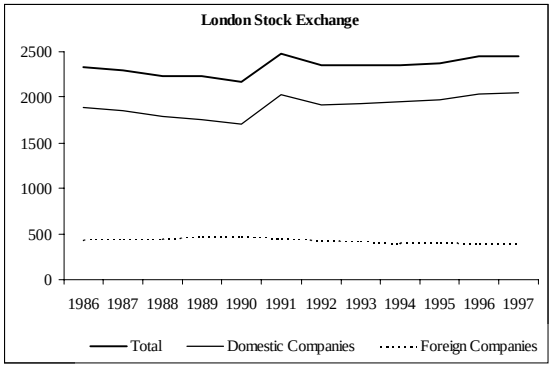
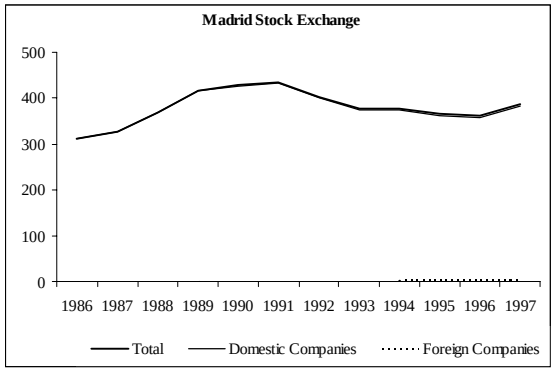
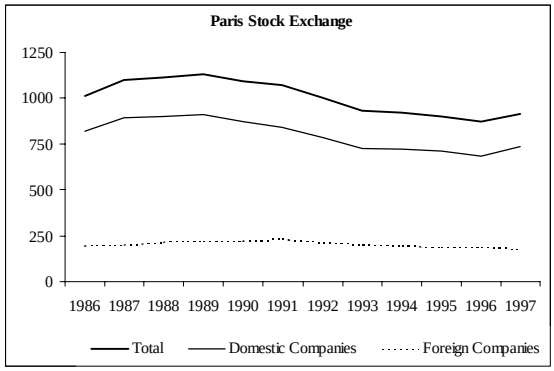


Figure 1a (continued).







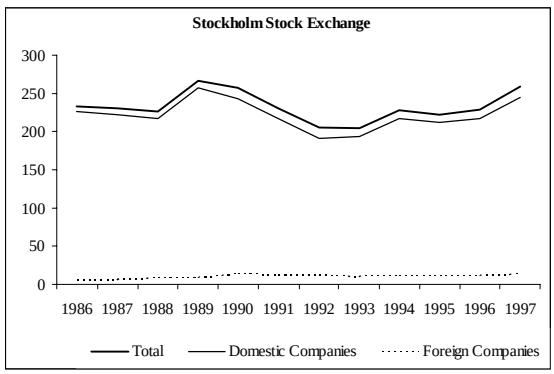
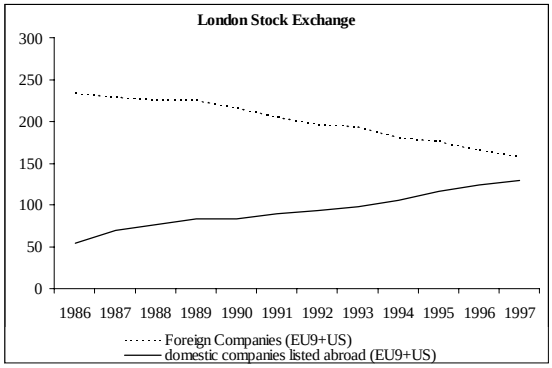
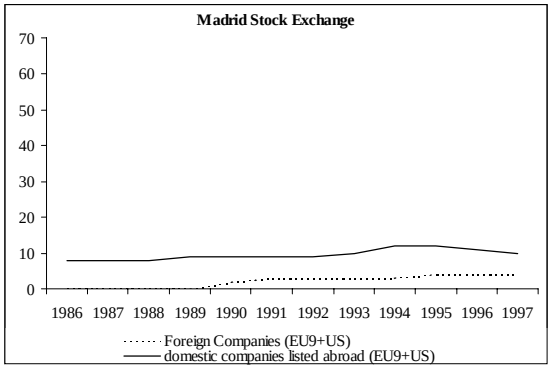
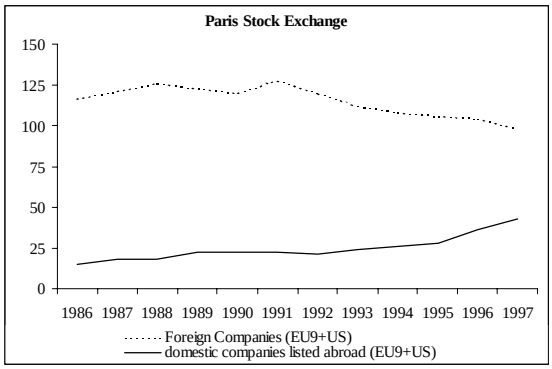


Figure 1b (continued).







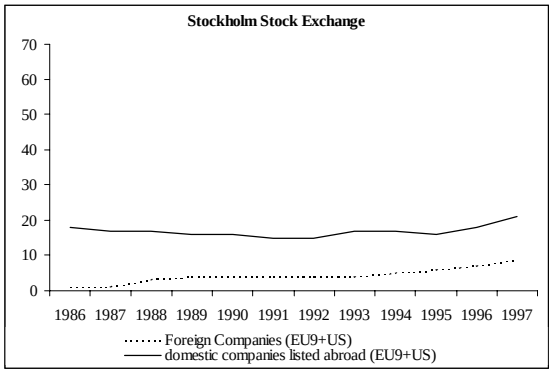
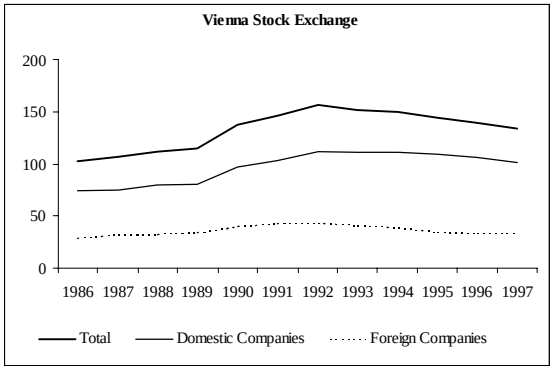


Figure 1a (continued).



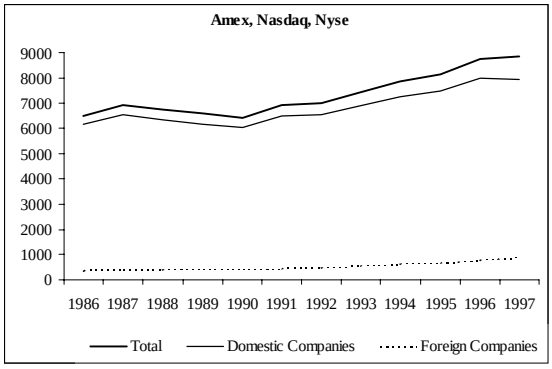
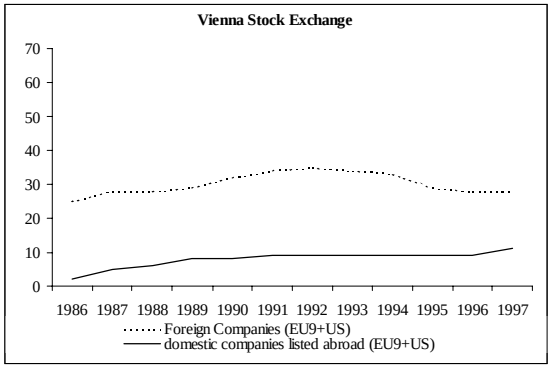


Figure 1b (continued).



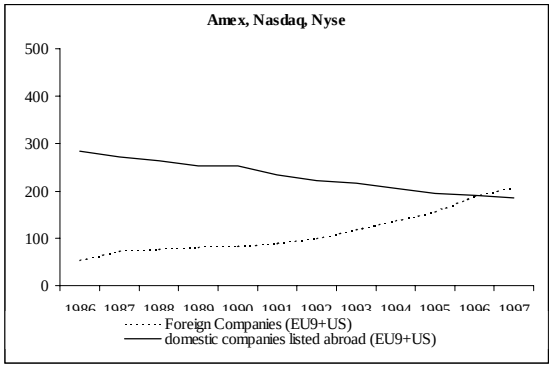


Figure 2: Number of Foreign Listings on the New York Stock Exchange

The top line in the figure is the total number of non-U.S. common and preferred shares listed on the New York Exchange at the end of each year, from 1956 to 1999. The bottom line shows the corresponding figure for the EU9 countries (Austria, Belgium, France, Germany, Italy, Netherlands, Spain, Sweden and U.K.).