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**In This Issue: Private Equity and Public Equity**

- |  |            |   |
|--|------------|---|
| <b>Private Equity, Corporate Governance, and the Reinvention of the Market for Corporate Control</b>                   | <b>8</b>   | <i>Karen H. Wruck, Ohio State University</i>  |
| <b>Corporate Cash Policy and How to Manage it with Stock Repurchases</b>   | <b>22</b>  | <i>Amy Dittmar, University of Michigan</i>  |
| <b>The Rise of Accelerated Seasoned Equity Underwritings</b>   | <b>35</b>  | <i>Bernardo Bortolotti, Università di Torino, William Megginson, University of Oklahoma, and Scott B. Smart, Indiana University</i> |
| <b>Re-equitizing Corporate Balance Sheets: Choosing Among the Alternatives</b>   | <b>58</b>  | <i>Jason Draho, Morgan Stanley</i>  |
| <b>SPACs: An Alternative Way to Access the Public Markets</b>  | <b>68</b>  | <i>Robert Berger, Lazard</i>  |
| <b>Competition and Cooperation among Exchanges: Effects on Corporate Cross-Listing Decisions and Listing Standards</b> | <b>76</b>  | <i>Thomas J. Chemmanur and Jie He, Boston College, and Paolo Fulghieri, University of North Carolina</i>                            |
| <b>Callable Bonds: Better Value Than Advertised?</b>   | <b>91</b>  | <i>Andrew Kalotay, Andrew Kalotay Associates</i>  |
| <b>BIG Writing: The Fundamental Discipline of Business Writing</b>   | <b>100</b> | <i>Michael Sheldon, XMedia Communications, and Janice Willett, University of Rochester</i>  |

# Competition and Cooperation among Exchanges: Effects on Corporate Cross-Listing Decisions and Listing Standards

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In recent years a growing number of companies have listed their stocks on exchanges outside their country of origin. Many European companies have listed on the New York Stock Exchange (NYSE), and companies from emerging market countries such as Israel, India, and China have listed not only on the NYSE, but on various other American and European exchanges such as the NASDAQ and the London Stock Exchange (LSE). In addition to public companies seeking “dual listings,” some firms are choosing to go public for the first time on an overseas exchange.

Although a number of studies have examined the stock market response to international listings, little work has been devoted to identifying the underlying forces that drive a company’s choice of market for listing. For example, if an American start-up decides to go public in the U.S., should it list on the NYSE or the NASDAQ? Or if it instead chooses to list in a foreign market, should it go for the LSE or the Frankfurt Stock Exchange? Some exchanges have more prestige than others—and this can have the effect of “certifying” the value of the issuing company’s shares, which can be especially important for less sophisticated (i.e., retail) investors. On the other hand, the more reputable exchanges also tend to charge higher listing fees and impose more demanding disclosure rules or other listing requirements. Prospective issuers can be expected to weigh the relative strengths and weaknesses of the exchanges when making their listing choices.

The mirror image of the corporate listing decision is the competition among exchanges for such listings, both in the U.S. and in Europe. For example, the NYSE and LSE have engaged in vigorous competition to attract listings from companies in other countries, especially those from emerging economies. One question that arises is the effect of such competition on the “listing standards” set by the exchanges.<sup>1</sup> With prospective corporate issuers in mind, the exchanges—particularly those that are publicly traded, like the LSE and NYSE<sup>2</sup>—can be expected to choose the combination of fees

and listing standards that is expected to maximize their own long-run values.

One important factor that will influence the exchanges’ decisions is the competitive landscape of the exchange industry. As more venues become available for corporate listing, stock exchanges that are exposed to more intense competition may be tempted to relax their listing standards, thereby setting off a “race to the bottom” to attract applications from companies in emerging markets as well as developed countries. And such concerns have only deepened as more and more exchanges have become publicly traded entities charged with maximizing the wealth of their own shareholders. But, to determine whether such fears are justified, one has to start by analyzing how exchanges set their listing standards in the first place.

In this article, we explore the main factors in corporate listing decisions as well as the expected effects on listing standards of both the growing competition and the recent wave of cooperative arrangements—alliances and mergers—among exchanges (for a list of recent transactions, see Table 1). And because changes in exchanges’ listing standards will in turn influence corporate listing decisions, our main focus can perhaps best be described as the *strategic interaction* between companies and exchanges, and the effects of this interaction on both corporate decisions and listing standards.

In exploring this interaction between companies and exchanges, we attempt to provide answers to the following seven questions:

- (1) What are the incentives for companies based in one country to list in another?
- (2) What determines an exchange’s choice of listing requirements and how do the chosen listing standards affect the listing companies’ values?
- (3) What are the benefits to a company of dual or multiple listings?
- (4) How does an exchange’s reputation affect its listing standards, and does this effect in turn influence corporate listing choices?

\* This article draws on and summarizes the findings of our previously published paper: Thomas Chemmanur and Paolo Fulghieri, “Competition and Cooperation among Exchanges: A Theory of Cross-listing and Endogenous Listing Standard,” *Journal of Financial Economics* 82 (2006), 445-489. Interested readers should consult this paper for the mathematical analysis and formal proofs supporting the arguments of this article.

1. By “listing standards” we mean not only the initial listing requirements (such as those regarding the profitability record, number of shares (float), and minimum market

capitalization), but also the stringency of their disclosure and other regulations, and the rigor with which these regulations are enforced.

2. For example, the London Stock Exchange (LSE) formally listed its own shares in July 2001. The Chicago Mercantile Exchange (CME) went public in December 2002. The NYSE acquired the electronic-trading company Archipelago Holdings Inc. in March 2006 and turned itself into a public company.

## Recent International IPOs on European and U.S. Exchanges

**A**lthough overall IPO activity for European exchanges in the fourth quarter of 2007 was down from the same period in the previous year, the European markets have continued to attract non-European companies. There were 49 IPOs by non-European companies in the quarter that raised a total of €7.5 billion, an increase from the fourth quarter of 2006 when 33 international IPOs raised €4.7 billion. London and Luxembourg were the primary destinations for such issuers. London's Main Market attracted ten non-European IPOs raising €4.5 billion, including companies from Russia and Kazakhstan. AIM attracted 22 non-European IPOs that raised €644 million, including companies from the U.S., Canada,

Australia, and the Far East. During the same quarter, the U.S. attracted 15 international IPOs that raised a total of €1.7 billion, of which eleven issuing companies were from China, two from Greece, and two from Israel.

During all of 2007, the European exchanges attracted 128 international IPOs that raised €21.5 billion, a decrease in volume but an increase in value compared to 2006, which saw 135 IPOs by international companies raising €19.2 billion. In terms of value, international IPOs represented 27% of total IPOs in Europe in 2007. By comparison, U.S. exchanges had 45 IPOs by non-U.S. companies that raised €9.7 billion, representing 21% of their total IPOs by value.<sup>4</sup>

(5) How do exchanges compete for corporate listings, and what is the effect on listing standards of competition and cooperation (mergers or alliances) among exchanges?

(6) What is the optimal regulatory structure for exchanges?

(7) What are the long-run expected effects of the passage of the Sarbanes-Oxley Act of 2002 (SOX) on the ability of U.S. exchanges to attract cross-listings by foreign companies?

These questions have assumed greater significance with the increasing global integration of financial markets as well as the growth in alliances and mergers of exchanges just noted. In addressing these questions, we begin by presenting the outlines of a theoretical framework that we developed in an article published recently in the *Journal of Financial Economics*.<sup>3</sup> We then use this framework to shed light on the advantages and disadvantages of such arrangements, and to identify the key characteristics of those exchanges that are likely to emerge as “winners” in this competition.

Our framework begins by assuming an equity market that is characterized by *asymmetric information*—that is to say, a market in which corporate “insiders” such as owner/entrepreneurs and venture capitalists have private information about firm value. “Outside” investors, while not privy to this information, are assumed to have the ability to reduce their informational disadvantage (though not eliminate it entirely) by producing information at a cost. Our framework also assumes that there are two basic kinds of outside investors: those with a cost advantage in producing (“noisy,”

or not completely reliable) information about the true firm value (hereafter referred to as “low-cost investors”) and those with no such advantage (“high-cost investors”). As a practical matter, one can think of low-cost investors as financial analysts, portfolio managers, or other professional investors knowledgeable about a given industry or firm, and who therefore have special expertise in valuing the firm.

There are five important factors that drive our analysis in this setting. First, from the point of view of any given company, the number of low-cost information producers (who have a cost advantage in evaluating that firm) can vary from one exchange to another. Second, different exchanges have different listing and disclosure requirements, which affect not only the kinds of companies that are listed, but also the ongoing policing of corporate disclosures and hence the reliability of the information available to outsiders.<sup>5</sup> Third, the rigor with which the listing and disclosure policies of an exchange are carried out can change without outsiders being immediately aware of such changes. Over time, however, outsiders are able to assess the actual rigor of an exchange's listing procedure by studying the performance of companies listed in prior years—and this performance ends up affecting the “reputation” of the exchange. Fourth, since these listing and disclosure requirements can be altered by the exchange without immediate detection by investors, the possibility of gaining or losing reputation is assumed to affect the exchange's original choice of listing standards.<sup>6</sup> Fifth and last, exchanges are assumed to consider the possibility of changing their listing standards to compete more

3. See Chemmanur and Fulghieri (2006) cited earlier.

4. Source: PricewaterhouseCoopers, 2008, “IPO Watch Europe Survey Q4 2007 (October-December).”

5. For example, non-U.S. companies listed on U.S. exchanges are required to register and report continuously under the Exchange Act. Their annual reports must conform either to U.S. GAAP or to the accounting standards of their own country, but with partial

reconciliation to U.S. GAAP. Even in the latter case, the disclosure required is much more than in most foreign market listings. Further, the financial statements of a foreign company conducting its first public offering in the U.S. must either follow U.S. GAAP or provide a full reconciliation to U.S. GAAP.

6. An example is provided by Germany's Neuer Markt, which was forced to tighten its listing standards after a period of poor performance by the companies listed on it.

Table 1 **Examples of Alliances, Mergers, and Attempted Mergers and Alliances**

<b>(I) Strategic Alliances and Attempted Alliances</b>		
<b>Date Initiated</b>	<b>Exchanges</b>	<b>Description</b>
January, 1998	Copenhagen Stock Exchange and Stockholm Stock Exchange (Norex)	They signed an agreement to use a common trading system starting from 1999. The deal connected the two exchanges technically, meaning Danish stocks would be available in the Swedish system without being cross-listed. The Copenhagen bourse paid the Stockholm exchange for running the technical system. Later the Oslo Stock Exchange and the Iceland Stock Exchange also joined this strategic alliance.
July, 1998	London Stock Exchange and Frankfurt Stock Exchange	According to the agreement, members of the London and Frankfurt markets would be able to trade on either exchange starting from January 4, 1999, gaining access to the largest British and German shares. There would be just one share price for each leading equity, changing the situation of separate listing prices for international stocks on these exchanges.
November, 2000	Vienna Stock Exchange and Deutsche Borse (Newex)	They planned to launch a Vienna-based joint venture, Newex, on November 3, 2000, which would focus exclusively on central and eastern European companies. Newex would use the Xetra electronic trading system that linked 430 members in 17 countries and would waive any fees for the first three months of trading.
May, 2004	Budapest Stock Exchange and Wiener Börse AG (Vienna Stock Exchange)	A consortium, consisting of the Wiener Börse AG and Austrian banks, bought 68 percent equity of the Budapest Stock Exchange (BET) to establish an ownership structure that aimed to guarantee the long-term growth of the BET. The consortium also planned to draw other regional exchanges into the alliance, in particular Warsaw and Ljubljana.
January, 2007	NYSE Euronext and Tokyo Stock Exchange (TSE)	Under the agreement, the NYSE Group and the TSE would establish formal working groups that would meet regularly to engage in ongoing dialogue and development activities on specific areas of mutual interest, and would examine cooperation in the listing process to enable issuers who are listed on only one exchange to have improved access to investors in the other. They would also explore global strategic trends affecting each party's respective business and might exchange personnel if necessary.
January, 2008	Tokyo Stock Exchange and Abu Dhabi Securities Market	This was Tokyo's first agreement with a Middle Eastern market, with the aim of fostering cross-border investment. Under the memorandum of understanding, the two markets would study areas of cooperation to expand trade at both bourses, in particular the possibility of developing financial products to be listed on each other's markets.

Table 1 *continued*

<b>(II) Mergers and Attempted Mergers</b>		
<b>Date Initiated</b>	<b>Exchanges</b>	<b>Description</b>
May, 2000	London Stock Exchange and Deutsche Boerse	On May 3, 2000, London Stock Exchange and Deutsche Boerse announced their plans for a merger to create a new company, to be called iX. The London Stock Exchange Shareholders would receive shares amounting to 50 percent of iX's issued share capital and Deutsche Boerse would receive the rest. The electronic trading platform for all iX cash markets would be Xetra. In September, 2000, however, the LSE withdrew this merger plan to concentrate on its defense against a hostile takeover bid by Swedish technology group OM Gruppen.
December, 2005	Euronext and Deutsche Boerse AG	In December, 2005, executives from stock-exchange operator Deutsche Boerse AG and Euronext NV held preliminary discussions on the possibility of a merger between the two companies. Shareholders who invested in both exchanges, especially hedge funds, urged the two parties to arrive at a deal. On May 23, 2006, however, the shareholders of Euronext NV voted to reject the AGM motion to declare a "merger with equals" with the German exchange because they deemed the deal to violate shareholders' best interests. Euronext thought that Deutsche Boerse's offer valued Euronext at only 58 eur per share, while a concurrent bid from the NYSE valued the company at 68 eur per share. Although Deutsche Boerse came up with a new takeover proposal soon after the rejection, the Euronext considered the proposal as "nothing new" because the modified plan left financial terms unchanged. As a result, Euronext turned down Deutsche Boerse's offer once more.
May, 2006	NYSE and Euronext	On May 22, 2006, the New York Stock Exchange (NYSE) formally announced its \$10.2 billion cash and stock bid for Euronext. The two groups committed to a \$14 billion tie-up in June, 2006. Despite opposition by some Euronext stakeholders, the majority shareholders of both sides approved the plan in December, 2006. By the end of March, 2007, the NYSE Group Inc. had acquired 91.4 percent of Euronext NV shares as a result of its tender offer, and the NYSE Euronext made its market debut on April 4, 2007, completing the last step in a year-long attempt to create the first transatlantic exchange.
June, 2007	London Stock Exchange and Borsa Italiana	The London Stock Exchange initiated talks with Milan's Borsa Italiana over a possible merger in June, 2007, and completed its \$2.3 billion acquisition of the latter in October, 2007. The deal paved the way for the LSE to enter into the FTSE 100 Index for the first time in its history, and enhanced the trading platform of the combined exchange.
January, 2008	NYSE Euronext and American Stock Exchange (AMEX)	NYSE Euronext Inc. agreed on January 17, 2008 to buy its smaller rival, American Stock Exchange LLC, for \$260 million in stock. The purpose of the deal was to bolster the NYSE Euronext's fast-growing options and fund trading business. Members of the 165-year-old AMEX would receive shares of NYSE Euronext as well as proceeds of the sale of the AMEX building in Manhattan. The deal would make the NYSE Euronext the third largest in the U.S. options market and the No. 1 listing venue of exchange-traded funds.

effectively with other exchanges for listing candidates, taking into account the effect of such changes on their reputations—and as discussed later, changes in listing standards may also be contemplated in the context of an alliance or merger with another exchange.

### Why Do Companies List Abroad? An Analytical Framework

Since the ultimate motivation for a company to list on a stock exchange is to gain access to the public capital market and raise funding, one of the main reasons to pursue an international rather than a domestic listing is to reduce its cost of raising capital. Consider the listing choice of a company doing an IPO for the first time. In general, the cost of raising capital in the offering comes in three main forms. First, the newly issued shares will dilute the equity holdings of existing shareholders (entrepreneurs, venture capitalists, etc.); and, to the extent the new shares are sold below the true value, such dilution represents a reduction of their wealth. If listing on a foreign exchange somehow reduces the likelihood or extent of such undervaluation, the issuer may prefer an international listing.

Second, the company has to pay listing fees to the stock exchange (which are “direct costs”) and abide by any listing requirements imposed by it, such as disclosure rules (giving rise to “indirect costs”). If the foreign exchange has lower total (direct and indirect) listing costs, the company might want to “cross list” on it rather than on a domestic exchange. Instead of fixed listing fees (direct costs), which are easy to analyze, the focus of our analysis here is the second source of costs—namely, the stringency of listing standards. Though perhaps reducing reported profits, corporate expenditures on compliance with stricter standards are assumed to be capable, at least in certain circumstances, of increasing a company’s value by reducing information asymmetry.

Third, issuing companies must also pay underwriting fees (usually 7% of the gross proceeds from the IPO) and may also incur underpricing costs (“leaving money on the table”) when setting the offer price. But since these costs are not directly related to stock exchanges and their actions, we ignore them in this discussion.

Now we outline the analytical framework that will help us to understand how a firm chooses its listing venues based on its calculation of the first two sources of issuing costs.

#### The Model

As stated earlier, we assume an equity market where corporate insiders such as entrepreneurs and venture capitalists have private information about their company’s true value.<sup>7</sup> And outside investors are assumed to have the ability to reduce

(though not eliminate) this information gap by producing information at a cost. For example, they can devote resources to analyzing company financial reports in greater depth, acquiring industry-specific information by studying companies with the same line of business, or by visiting corporate headquarters and factories. And, as already noted, we assume that there are two kinds of investors: “low-cost” and “high-cost.”

Now let’s consider the decision of an entrepreneur whose privately owned company has access to a positive-NPV project. The project requires a certain amount of investment, which the entrepreneur wishes to raise from outside investors through an initial public offering (IPO) of equity. He or she can obtain this capital by listing his company’s shares either on exchange X (the domestic market) alone, on exchange Y (a foreign market) alone, or through dual listing (on both X and Y).

The future cash flow from the project is assumed to depend on the “quality” of the company (in terms of productivity, management expertise, competitiveness of products, and so forth), and the entrepreneur is assumed to know more than outsiders about this quality. For simplicity, we assume that all companies are one of two kinds, “good” or “bad.” Though good companies are assumed to generate higher cash flows and be more valuable than their bad counterparts, the cash flow of all companies, bad as well as good, are assumed to depend not only on their quality, but on their ability to invest in their projects immediately after the IPO. And before undertaking any investment, the entrepreneur must make a number of decisions—where to list his firm’s shares, how many shares to sell, and at what price per share—that will affect the total amount of external financing raised and invested. These decisions are assumed to be made with the aim of maximizing the expected value of future cash flow accruing to the entrepreneur.

Outside investors, when offered equity in one of these companies, do not know for sure whether the company approaching them for capital is good or bad. But they are assumed to have the option to reduce their informational disadvantage by spending additional time and money producing more information about the firm.

And the cost to outside investors of making such evaluations is assumed to vary significantly with a number of factors. First is the amount of public information about the firm and its management that is already available in the market where the firm is listed. For example, an established software company like MicroSoft, with a long track record of successfully developing products, is likely to be easier to evaluate than a start-up software firm with great potential but no track record. A second factor is the familiarity of investors in a given market with the company, its products,

7. By private information we mean information unavailable to outside investors through ordinary disclosure channels.

or its management. For example, Chinese investors may find it easier than European investors to evaluate a Chinese manufacturing firm that has not done any business in the Europe. Third, outsiders' evaluation costs could depend on the firm's industry. Companies in certain industries may be intrinsically more complex and difficult to evaluate than firms in other industries. Finally, even for a given industry and in a given equity market, different investors may differ in their capabilities and experience. For instance, a technology analyst working for a top U.S. investment bank may have a lower cost of evaluating an Indian software company than most retail investors in the U.S.

We also assume, as noted earlier, that for any given company, the number of low-cost information producers can vary significantly from exchange to exchange. For example, investors with expertise in evaluating technology companies may dominate trading on the NASDAQ, but be relatively scarce at other exchanges. Moreover, investors who normally trade on NASDAQ may have to incur significant additional costs to trade on, say, the Shanghai Stock Exchange because of their lack of familiarity with the local language and accounting rules, higher transactions costs, or the costs of setting up additional trading operations and working with unfamiliar intermediaries in the new market. This implies that the number of low-cost information producers trading on a particular exchange is limited, and that many investors who trade as low-cost information producers on one market may end up as high-cost information producers on another.

When faced with a company making an equity offering on a given exchange, investors who trade on that exchange are assumed to have three choices: ignore the IPO altogether; engage in uninformed bidding for shares in the IPO; or conduct a costly evaluation of the firm and, if their evaluation suggests the firm is "good," bid for the shares. The number of investors in any market who are willing to undertake such valuations is assumed to depend on three variables: the price set by the firm in the equity offering; investors' estimate of the firm's true value; and the cost and precision of the evaluation technology available to each kind of investor. Furthermore, the particular exchange where the firm is listed and the listing standards of that exchange are assumed to convey information to investors and thus affect the pricing of the equity offering.

When a company applies for listing, the exchange carries out an investigation of the firm, requiring it to supply various kinds of information and to recast its financial statements and other disclosures in the format prescribed by the exchange. The rigor of such requirements and the resulting "transparency" of the firm's disclosures depend on the listing standards set by the exchange. In general, as an exchange's listing standards become more demanding, a smaller fraction of

the companies applying for listing are accepted; but, perhaps more important for the exchange, the financial disclosures by companies listed at that exchange become more transparent—and more credible. As a result, the higher the listing standard, the better the average quality of companies listed on the exchange and the lower the valuation costs for outsiders attempting to reduce information asymmetry.

On the other hand, given the difficulty of observing the extent to which an exchange's listing requirements are policed and enforced, our model also assumes that the listing standards chosen by an exchange are not known with complete certainty. Instead they are inferred over time through observation of the exchange's existing track record—that is, from the performance of the companies listed on it.

For our purposes, the costs to a company of listing on an exchange are assumed to consist of two components: the listing fee and any costs, direct or otherwise, associated with compliance with the exchange's transparency requirements. (For simplicity, we lump these items together and refer to them as the "listing costs.") In general, listing costs are higher for exchanges with higher listing standards (due partly to the higher compliance cost). For example, a 1997 study that compared the costs of a foreign company to list on the NYSE and the LSE reported that both the direct listing costs and the indirect reporting and compliance costs were significantly higher for the NYSE. While the indirect costs of listing on the NYSE were greater due to the more stringent SEC requirements, the direct costs of listing on the NYSE at that time consisted of \$100,000 initial listing fees (with annual fees ranging from \$16,000 to \$30,000) as compared to an initial listing fee of only \$6,000 on the LSE (with a \$3,000 annual fee).<sup>8</sup>

### Which Companies Choose to Cross-List?

A company's listing decision involves the choice of an exchange and, if the exchange accepts the firm's request for listing, the terms of the equity offering—that is, the price at which the shares are offered and the number of shares. The main decisions of the exchange are the stringency of its listing standards and, in response to the firm's request for a listing, whether or not to list its equity. And outside investors, after the offering is announced to the equity markets, must decide whether to participate in the IPO and, if the answer is yes, whether to produce information about the firm's value.

Assuming that each of these decisions is made "rationally," our analysis predicts that the good companies always set high prices in their IPOs since they are confident about their ability to raise the full amount of money required for investment (because, according to our model, all investors who choose to produce information about the firm will recog-

8. See Fanto and Karmel (1997). Full citations of all articles referred to are provided in the References section at the end.

## Cross-listing of New Oriental on the New York Stock Exchange

In September, 2006, New Oriental Education & Technology Group, the largest English test training provider in China, conducted an initial public offering (IPO) that raised \$112.5 million at the main board of the New York Stock Exchange. The privately owned New Oriental offered 7.5 million American Depository Shares, representing 21% of its total equity, and so became the 17th Chinese company to debut at a main board in the U.S. equity market.

New Oriental, which began operating in 1993, offers English classes for Chinese children and adults, and provides preparation for U.S. college and graduate school admission tests, such as TOEFL, GRE, and GMAT. It has been expanding rapidly in China, where English language skills are considered increasingly valuable. But despite China's booming economy, the high issue prices for recent equity offerings, and Chinese investors' familiarity with New Oriental, the company chose to list its shares on the NYSE.

In the past, most such companies from China with venture capital backing have chosen either the NASDAQ or the Stock Exchange of Hong Kong when they decided

to go for an international IPO. In fact, both the NASDAQ and NYSE competed vigorously for the Chinese market by planning to set up a Beijing Office, advertising heavily, and offering favorable terms and discounts on listing fees for small- and medium-sized firms.

New Oriental first considered listing itself on the NASDAQ, but finally went for the NYSE. In an interview with Chinese media, the education firm's founder and CEO, Minhong Yu, said that New Oriental chose a U.S. stock exchange over Hong Kong and the NYSE over NASDAQ because the management team believed in NYSE's high listing standards and strict disclosure requirements. He also noted that, although the firm was backed by venture capital, it was not technical in nature so that NYSE investors would be at a disadvantage relative to NASDAQ investors valuing the firm. The company's CFO, Ping Wei, commented that she favored the NYSE for its strong "brand effect," adding that listing on the largest stock exchange in the U.S. would help the company establish and maintain a good reputation and further its plan to expand into North America.

nize its quality and be willing to invest). But the decision is more complicated for the bad firms. On the one hand, such a company might want to set a high price for its equity, thereby behaving as if it were a good firm. The advantage of this strategy is that, if successful, it would allow the firm to sell overvalued equity. The disadvantage, however, is that only a fraction of the informed (both high- and low-cost) investors are assumed to place a (mistakenly) high value on such firms, while the remaining fraction (correctly) assign a low value and do not bid for shares. The *expected* outcome of this process is thus weak demand for the firm's shares, forcing the firm to scale back its valuable investment project and sacrifice value.

To avoid this outcome, the bad company could instead choose to set a lower price that reflects its true fundamental value. In this case, the firm is expected to be able to sell as many shares as it would like, thereby raising the full amount needed to fund its investment project.

Based on our framework and analysis, then, a certain proportion of bad companies are expected to choose to imitate the good firms. They will attempt to sell overvalued equity; and, to the extent their efforts are unsuccessful, they will be forced to cut back their investment.

But the proportion of companies that make this choice is in turn likely to depend on how many investors in the

market are expected to choose to become informed, which in turn depends on the cost of acquiring information. Outside investors are assumed to be indifferent between buying shares as uninformed investors and spending the resources necessary to become informed. The benefit to investors from becoming informed is their greater ability to distinguish good from bad companies. This implies that the larger the fraction of investors that are expected to become informed, the lower the fraction of bad firms that will choose to imitate the good ones. And the lower the fraction of bad firms imitating good ones, the higher the price at which the good firms can sell equity.

The bottom line of this analysis, then, is that good companies benefit from the presence of low-cost investors because the ability of such investors to become informed at a lower cost allows such firms to sell their shares at a higher price.

But how does this affect corporate decisions to list overseas? When companies are limited to listing on their domestic exchanges, they have no choice but to accept the prices that are effectively determined by the composition of the domestic exchange's investor base (and its proportion of low-cost investors). But this situation changes when a company can choose to list on a foreign exchange. If the domestic and foreign exchanges are the same in every respect except that the domestic exchange has a materially larger pool

of low-cost investors trading,<sup>9</sup> companies will choose to list only on the domestic exchange.

But what happens if we assume that the listing standard set by the foreign exchange is higher than that set by the domestic exchange. In that case, the foreign exchange is likely to have greater “transparency” than the domestic exchange. And assuming that the listing fees charged by the two exchanges are the same, then if the foreign exchange also has a larger low-cost investor base, our analysis predicts that both good and bad companies would be better off listing on the foreign exchange since their issue prices per share will be higher. But if the domestic exchange has the advantage of having a larger base of low-cost investors, while the foreign exchange has the advantage of greater transparency, the choice of exchange will be determined by trading off the value of greater transparency against the benefit of issuing shares where low-cost investors predominate (i.e., are the marginal pricers).<sup>10</sup> The cross-listing of New Oriental, a Chinese education firm (see Box 2), on the NYSE provides a nice illustration of a company that chose to trade off a larger low-cost investor base in China for the greater transparency that comes with NYSE’s higher listing requirements.

### Implications of Our Analysis for Cross-Listing

Our analysis implies that companies will list only on a foreign exchange when most of the investors with a comparative advantage in evaluating their firm trade on the foreign rather than the domestic exchange, and the foreign exchange has at least a comparable degree of transparency. A representative case is the tendency of some high-tech firms from Israel to list (or, in some cases, go public) on the NASDAQ.<sup>11</sup>

Our analysis also predicts a positive market reaction to the announcement of such decisions when the foreign exchange has either a higher listing standard than the domestic exchange, or a larger base of investors with a comparative advantage in evaluating the firm. Consistent with this argument, most studies of non-U.S. firms listing on the U.S. market have reported that the announcement of the listing is associated with a positive market reaction.<sup>12</sup> In contrast, as our analysis would also suggest, studies of overseas listings by U.S. companies have reported either negative or insignificant market responses.<sup>13</sup>

9. Enough such investors that the “marginal” investor for the firm is a low-cost one. But even if the marginal investor on the domestic exchange is a high-cost and not a low-cost producer, the issue price for the “good” firm increases as the transparency of the exchange goes up. This occurs because, as the transparency of the exchange increases, the precision of the information produced by outsiders increases, thereby increasing the cost to the “bad” firm of imitating the “good” one (by having to scale back its positive NPV project to a greater extent). This, in turn, leads to less imitation of good firms by bad ones as the exchange’s transparency increases, increasing the share price at which the “good” firms can issue equity.

10. In fact, several outcomes are possible in this situation. If low-cost investors are the marginal information producers domestically but not on the foreign exchange, then some issuers will choose to be listed on the less transparent domestic exchange X. Otherwise, companies continue to prefer the foreign exchange if its advantage in transparency is large enough to overcome the disadvantage of having high-cost investors as the marginal information producers. Further, even without such an overwhelming advantage

Another testable implication of our analysis is that cross-listing by foreign companies on, say, the NYSE should be followed by increased analyst coverage (since increased information production and increased transparency from higher listing standards are the two factors motivating firms to cross-list in our analysis). In support of this prediction, a 1999 study by Baker, Nofsinger, and Weaver showed that companies cross-listing on either the NYSE or the LSE experienced significant increases in analyst following.<sup>14</sup>

### Analysis of Dual Listing

Besides choosing either a domestic or a foreign exchange, companies can choose to list on both exchanges simultaneously. Such *dual listing* has two expected effects: First, it broadens the base of low-cost investors since the relevant number is now the *sum* of such investors trading on both exchanges. But the more interesting effect of dual-listing is on transparency. The reliability and precision of the information available to investors on *both* exchanges is expected to increase under dual listing, since the additional regulations on disclosure imposed by the exchange with the more stringent listing standards should give *all* investors (i.e., those trading on any exchange) access to better quality information. But these advantages of dual listing in terms of investor base and transparency must be weighed against the additional listing costs charged by the second exchange and the additional costs of complying with new regulations.

Our analysis suggests that dual listing is likely to be chosen under two sets of circumstances. The first (and simpler) case is the one where the foreign exchange has both greater transparency and a larger low-cost investor-base than the domestic exchange (so that, if dual listing were not possible, companies would always prefer to list on the foreign exchange rather than on the domestic exchange alone). In this case, dual listing enlarges a firm’s low-cost investor base, but has no effect on the precision of the information available to investors since, in the absence of dual listing, the company would have listed on the more transparent foreign exchange. In this case, companies choose dual listing if listing on the domestic exchange in addition to the foreign exchange broadens the investor base to such an extent that the low-cost (rather than high-cost) investors become the marginal infor-

in transparency, companies may prefer to list on the foreign exchange if the number of low-cost investors in that exchange, while smaller than that in the domestic exchange, is large enough to ensure that low-cost investors are the marginal information producers.

11. Evidence supporting this implication is provided by Blass and Yafeh (2000) who find that high-tech firms from Israel are more likely to be listed on the NASDAQ rather than on the Tel Aviv exchange, despite the fact that it would be cheaper (in terms of listing fees) for these firms to list on the Tel Aviv exchange. Additional anecdotal evidence supporting this implication is provided by high-tech firms from other countries (e.g., France) listing on the NASDAQ without listing on any exchange in their home country.

12. See, for example, Jayaraman, Shastri, and Tandon (1993), Forester and Karolyi (1993), Alexander, Eun, and Janakiraman (1991).

13. See, for example, Howe and Kelm (1987), Lee (1991), or Lau, Diltz and Apilado (1994).

14. Baker, Nofsinger, and Weaver (1999).

## Dual Listing of IncrediMail

On November 22, 2007, a NASDAQ-traded company called IncrediMail dual-listed its shares on the Tel Aviv Stock Exchange (TASE). IncrediMail is an Internet content and media company whose products include e-mail facilities, desktops, screen savers, and, more recently, instant messaging, web 2.0, and social networking applications. Since the offering, the company has continued to be subject to all rules and regulations of the NASDAQ and the U.S. Securities and Exchange Commission (SEC).

According to Yaron Adler, CEO of IncrediMail, the company conducted the dual listing “after identifying an increased interest in IncrediMail from Israeli investors which we believe to be a result of our performance since the beginning of the year.” He further commented that, “Given the current direction of the company, we believe

that this is the right time to dual list our shares. We anticipate that the TASE listing will expand and diversify our investor base and result in an increase in the total daily trading volume and liquidity of our shares.”

IncrediMail is among the more than 50 companies worldwide that have dual-listed their shares on the TASE to take advantage of longer trading hours and lower trading expenses for Israeli investors. This is consistent with our study’s argument that one important reason for firms to engage in dual listing is to expand their low-cost investor base. The general interest in Internet companies in Israel, together with the longer trading hours and lower trading fees, makes it easier for investors on the TASE to produce information about IncrediMail than for investors elsewhere.

mation producers, and the fees and compliance costs of listing on the additional exchange are not so large that they swamp these additional benefits.

The second, and more complicated, case arises when the domestic exchange has the advantage of having a larger low-cost investor base than the foreign exchange. And let’s begin with the assumption that neither the domestic nor the foreign exchange has a pool of low-cost investors that is large enough to make low-cost investors marginal investors when listing on either exchange alone. In this event, dual listing not only increases the size of the low-cost investor base, but also ensures that the transparency of trading will be equivalent to that of the exchange with the higher listing standard (in this case, the foreign exchange). Dual listing will be the choice in this case if enlarging the investor base makes the low-cost investors the marginal information producers, provided these benefits outweigh the additional listing fees and compliance costs.

### Implications of Our Analysis for Dual Listing

As the above example suggests, companies are expected to dual-list when they have a significant base of low-cost information producers in their own country, but would like to enlarge that base by listing on the foreign exchange, or take advantage of the higher transparency of the foreign exchange, or both. Our analysis predicts that the kinds of companies

that will be likely to take advantage of dual-listing will be those about which foreign investors, for various reasons, have a significant amount of information available to them (so that a substantial number of investors with a cost advantage in evaluating the firm are present in the foreign market). Consistent with this implication, a 2002 study by Pagano, Roell, and Zechner found that European companies that choose to obtain an additional listing on the NYSE tend to be one of two kinds: (1) high-tech companies or (2) large export-oriented companies that have become familiar to American investors as customers for the listing firm’s products or services.<sup>15</sup>

### How Does an Exchange’s Reputation Affect Its Listing Standards?

Having analyzed corporate listing decisions, let’s now shift our perspective to that of the exchanges, particularly when setting their listing standards. We begin by considering a simple scenario in which a single exchange with a monopoly in its own country is setting listing standards to maximize its long-run expected cash flows.

In a world where information is costly and the potential for private information leads to undervaluation, reputable intermediaries like exchanges play a key role in facilitating corporate capital-raising. In accomplishing their role as self-

15. See Pagano, Roell, and Zechner (2002). Additional evidence supporting this implication is provided by Saudagaran and Biddle (1995) and Saudagaran (1988), who find a strong association between the foreign listing location of a given firm and the level of its exports to that country. While such evidence can also be interpreted as a foreign listing helping the firm in the product markets in that country (rather than a presence in the product market motivating a foreign listing), anecdotal evidence seems to indicate that the motivation goes both ways. For example, consider the following quote (WSJ, October 5, 1993) from one of the officers of Daimler-Benz, the German auto-maker,

about its decision to list on the NYSE: ‘We have 300,000 Mercedes drivers in the U.S., and about two-thirds of them are certainly wealthy,’ says Mr. Liener, suggesting that the company’s image will help it tap the U.S. financial markets.” Also, the listing of the German software firm SAP on the NYSE was motivated, at least in part, by the presence in the U.S. of a large number of software and other high-technology professionals and investors with considerable familiarity with evaluating and investing in technology firms (Economist, August 14, 1998).

regulatory organizations, stock exchanges—particularly those facing no competition in their own countries—have significant leeway in choosing both their listing standards and their enforcement policies. Ultimately, however, the ability of the exchanges to charge high listing fees and win new business derives from their perceived capabilities and credibility—in short, from their reputation.

Reputation is critical because, as we have noted, one of the principal goals of a company's listing on an exchange is to reduce the asymmetry of information between company insiders and outsiders. By ensuring the initial and ongoing compliance of listed companies with their listing requirements, the exchanges play a "certifying" role to outside investors, providing them with some assurance that the information provided by the company in its financial statements and other disclosures is credible.

And because stock exchanges clearly understand the certification value of listing standards, they are likely to use the choice of standards as a competitive tool for attracting companies and investors. Some exchanges, to be sure, will be tempted to lower their listing standards to attract more listings. But such opportunistic behavior is likely to be costly in the long run. The certification value to issuers will be lower if the exchange is known to set lower listing standards. And such value will virtually disappear if it becomes known that almost all companies applying to list on an exchange can get a listing, and can continue to be listed regardless of any irregularities committed by the firm.

Exchanges, then, are long-term players on the capital markets who care about the revenues not only from listing the current batch of applicants (and charging listing fees), but also from attracting more companies. They want to establish a good reputation for allowing good firms to go public, while at the same time maximize the sum of their current and future profits.

Hence, the listing standard chosen by the value-maximizing exchange emerges from the following dynamic trade-off:

On the one hand, value-maximizing exchanges are subject to moral hazard, having an incentive to lower their listing standards to maximize their current profits. Adding further to this temptation, the insistence on higher standards could not only reduce their listing fees (at least in the short run) by limiting the pool of eligible listing companies, but would likely result in greater verification and regulatory costs. On the other hand, lower listing standards will likely mean a higher probability of poor future performance by listed companies, which would damage the exchange's reputation. A decline in reputation would in turn reduce the prices of issues

commanded by the listing firms, deterring future applicants and cutting down the exchange's long-term cash flows from listing fees.

In sum, an exchange's reputation for setting and enforcing high listing standards can be a key source of competitive advantage: it can enable the exchange to commit to both investors and companies that it will not lower its standards excessively to attract a larger volume of firms to list on it, or to reduce verification costs. But how a given exchange evaluates this trade-off will also depend on its current reputation. Our analysis implies that the greater the current reputation of an exchange, the more it has to lose from lowering or failing to enforce its higher standards.

### How Does Competition among Exchanges Affect Their Listing Standards?

We now consider how competition among exchanges interacts with concerns about reputation in determining the listing standards chosen by various exchanges.

Let's return to our earlier case of two exchanges, one domestic (and let's refer to it again as X) and one foreign (Y), and introduce the possibility that they can compete for companies that want to list their stocks. Let's also introduce the possibility that a company rejected by one exchange may apply for listing to the other. And as before, assume that the foreign exchange Y is the more reputable of the two.

Under these assumptions, in the event Y has at least as many low-cost investors as X, and the two exchanges compete only through listing standards (and this applies equally to two exchanges competing in the same country), the foreign exchange Y has an advantage in that it can use its reputation to "bond" its commitment to outsiders that its listing standards are higher, and will likely remain higher, than those of X. This is because, as we demonstrate shortly, the listing standard that would be set by each exchange as a monopolist serves as an upper bound for the listing standard set by the same exchange in a setting with competition. Moreover, as just argued, the listing standard chosen when each exchange acts as a monopolist is an increasing function of its current reputation. Under these circumstances, all companies would apply first to exchange Y to take advantage of the greater transparency associated with its higher listing standards—and they would then apply to the lower-reputation exchange X only if rejected by Y.<sup>16</sup>

We now analyze how competition interacts with considerations of building and maintaining reputation in determining exchanges' listing standards. If the two exchanges have a similar number of low-cost investors and compete only through listing standards, then the higher-reputation

16. In practice, we may not explicitly observe firms applying to a given exchange, being rejected, and then applying to another exchange. However, we do read about firms being in negotiations with several exchanges about the feasibility of obtaining a listing, and then announcing that they have obtained a listing on one of these exchanges (which

may not be the most reputable among the group of exchanges it has been in negotiations with). In many of these instances, a firm ends up obtaining a listing on a less reputable exchange only because it has been privately informed by more reputable exchanges that it did not meet their listing standards.

## Competition Between the New York and London Stock Exchanges

In 2006, for the first time since 2000, the London Stock Exchange (LSE) beat the New York Stock Exchange (NYSE) in terms of initial public offerings, both in the number of issuers and the amount of money raised. The LSE's Main Market and AIM (the Alternative Investment Market) raised a record £27.9 billion in IPOs, which was almost £10 billion more than the NYSE and the NASDAQ put together. And a total of 346 companies listed on the London exchanges, more than the NASDAQ, the NYSE, and the Hong Kong Stock Exchange combined.

The funds raised by companies conducting international IPOs during 2007 reconfirm the LSE's position as the world's most international equity market. During 2007, the LSE attracted 86 international IPOs by companies from 22 countries (other than the U.K.), and raised £14.5 billion. This was more than double the £7.0 billion worth of offerings by the 33 non-US firms that conducted IPOs on the NYSE during that year, and more than the £9.0 billion worth of international IPOs on the NYSE and the NASDAQ together.<sup>17</sup>

A number of U.S. observers have attributed the LSE's success to its "lower listing standards." Unlike the NYSE and other U.S. exchanges, the LSE does not require the filing of offering circulars by the U.K. Listing Authority

either at IPO or in connection with follow-on fund raisings (provided that there is no offer of transferable securities to the public), which significantly accelerates transactions and reduces listing costs. Furthermore, the LSE has fewer trading record, market capitalization, or minimum free-float requirements than the NYSE and NASDAQ.

The merger of the Euronext and the NYSE proposed in June of 2006 signaled the NYSE's intention to compete actively with the LSE. John Thain, then chief executive of the NYSE Group Inc., announced the joint firm's plan to launch a new stock market in London and even take over the LSE, despite the latter's objections. In the meantime, the LSE rejected a hostile takeover bid by the NASDAQ in late 2006, showing its confidence in competing with the joint NYSE-Euronext. The two exchanges have adopted other strategic plans to enhance their competitiveness. For example, the LSE warded off competition to buy the Borsa Italiana from the NYSE Euronext in June, 2007, despite the latter group's higher offer price. Both the NYSE and the NASDAQ opened offices in Beijing in December, 2007, which triggered the LSE's similar move in mid January, 2008. And in the same month, the NYSE Euronext made a \$260 million stock bid to acquire the American Stock Exchange (Amex).

exchange will set higher listing standards. Even when facing competition from exchange X, exchange Y will have an applicant pool of the same volume and quality as it would have if it were a monopolist (since, again, all firms apply first to Y and go to X only if rejected). And this means that, even under competitive conditions, the higher-reputation Y's listing standard is therefore the same as when it's a monopolist. The lower-reputation X, on the other hand, now faces a reduction in the size and quality of the pool of applicant firms compared to the case when it is a monopolist (since only firms rejected by Y now apply for listing). In this situation, X will (rationally and optimally) set a lower listing standard under competition than under monopoly.

If exchange X has a much larger investor base than the more reputable exchange Y, the low-cost investors will be the marginal information producers if the company is listed on exchange X alone. But what happens if we also assume that high-cost investors are the marginal information producers

if the firm lists only on Y? The interesting question here is whether this disadvantage of exchange Y in terms of low-cost investor base can be overcome by its greater reputation relative to exchange X. This will be the case if the reputation of Y is overwhelmingly larger than that of X. In this case, Y acts like a monopolist, setting the same listing standard under competition that it would set as a monopolist. And all companies, in response to this behavior, would first approach it for a listing, going to X only if rejected. And the listing standard set by X would accordingly be lowered (relative to the case when it is a monopolist) to adjust for its smaller, lower-quality applicant pool.

On the other hand, if the reputation levels of the two exchanges are close enough that the advantage enjoyed by X in terms of its larger base of low-cost investors cannot be overcome by Y even by setting the same high, monopolist-level listing standard, then it is X that will act like a monopolist. In this case, Y will face the lower-quality appli-

17. The fierce competition faced by the NYSE and other American exchanges is also reflected in two related facts. First, the delisting of foreign companies from U.S. markets leapt in 2007 to almost 60, up from 30 in 2006 and 12 ten years ago. Second, an increasing number of U.S. companies went public outside the U.S. in 2007. (*Wall Street Journal*, December 10, 2007)

## The Merger of the NYSE and Euronext

In June of 2006, the New York Stock Exchange (NYSE) agreed to acquire Euronext, the pan-European stock exchange operator, for \$14 billion after Euronext declined a competing offer by the Deutsche Boerse. The NYSE Euronext made its market debut on April 4, 2007, the last step in a year-long attempt to create the world's largest bourse and the first transatlantic exchange, with 4,000 listed companies worth \$28.5 trillion in market capitalization.

As a result of the merger, the NYSE Euronext now has 80 of the world's 100 largest companies listed on its markets. The NYSE will be bolted on to Euronext's

existing federal cash market system, in accordance with which its four bourses—in Paris, Amsterdam, Brussels and Lisbon—are regulated by the national authorities of their own countries. This arrangement allows companies to be listed on more than one Euronext market. At the same time, the NYSE Euronext as a group will not have regulated exchange status, and its shares will be listed in dollars in New York and euros at the European end. This federal approach means that companies will continue to be able to float on Euronext markets without complying with the Sarbanes-Oxley rules imposed by the U.S. government.

cant pool and reduce its listing standards to maximize its long-term profit.

### Implications of Our Analysis

In sum, when two exchanges compete, the effect of this competition on listing standards depends, among other things, on the reputations of the exchanges and the base of low-cost investors trading on each. If the low-cost investor base is the same for both exchanges, the higher-reputation exchange will dominate, and competition may not affect its listing standards at all. In contrast, the lower-reputation exchange will set significantly lower standards (compared to the case where it does not face any competition).

One example that comes to mind is the competition between the NYSE and the American Stock Exchange (AMEX), which have the same investor base. Given the NYSE's clear superiority in both reputation and higher listing standards, competition between the exchanges does not appear to have affected NYSE listing standards in any significant way—and the AMEX seems to be struggling to attract firms.

But, as we also saw, if the investor base of the two exchanges is different, and the higher-reputation exchange has a significantly smaller base of low-cost investors than the lower-reputation exchange, our analysis shows that the higher-reputation exchange will end up lowering its listing standards. Take the case of the competition for listing firms from emerging market countries between the LSE and the NYSE, with the latter usually regarded as having a better reputation and higher listing standards than the LSE. Assuming that the two exchanges have comparably low-cost investor bases for evaluating firms from emerging economies, our analysis predicts that the NYSE would not lower its listing standards in the presence of competition from the LSE. But the LSE, when faced with this challenge, may well decide to

lower its listing standards.

But now let's consider efforts by the NYSE to attract listings from firms based in the U.K. In this case, the LSE can be expected to have a considerable advantage in terms of its low-cost investor base capable of evaluating British companies, which may be large enough to overcome the advantage of the NYSE in terms of greater reputation and listing standards. If this is so, competition from the NYSE is not likely to induce the LSE to lower its listing standards for British firms (though the NYSE may well be forced to lower its listing standards to attract British listings).

As these examples suggest, then, a "race to the bottom" in listing standards need not materialize as a result of competition between exchanges. In fact, our analysis implies that exchanges with different listing standards and reputations can and do co-exist.

### How Do Mergers and Alliances among Exchanges Affect their Listing Standards?

There has been a recently accelerating trend of mergers or alliances between exchanges in a bid to improve their competitive position against other exchanges. In applying our analysis to these developments, we begin by assuming that there are three exchanges: X, Y, and Z. We study the effects of a merger of exchanges X and Z—and the subsequent competition between the combined exchange (XZ) and the stand-alone exchange Y—on the behavior of both the exchanges and of companies planning to list on one of these exchanges.

A merger of X and Z means, first of all, that all investors who previously traded on either of them can now trade in a common marketplace. Further, stocks that were previously listed on either X or Z are now listed on the combined exchange XZ. Thus, one effect of the merger is that the pool of low-cost investors available to trade in these stocks now

increases. And this expanded pool of low-cost investors may in turn lead to two other effects—one on the listing behavior of companies, and one on the listing standards chosen by the exchanges.

To begin with the case where a merger between exchanges is likely to affect corporate listing choices and exchange listing standards most dramatically, let's assume that, before the merger, exchange Y has a greater reputation than either X or Z, and that it has also the largest number of low-cost investors. These two assumptions together imply that, prior to the merger of X and Z, Y dominates these two exchanges (in the sense that all companies would prefer to be listed on this exchange rather than on the other two). In this situation, the stand-alone Y will dominate even after the merger of X and Z if the number of low-cost investors in that exchange is more than that in the combined exchange XZ, so that all companies continue to prefer to be listed on Y. Furthermore, if Y has a greater reputation than the combined XZ, the value-maximizing listing standard for Y will also continue to be higher than that of XZ (since even after the merger, Y will continue to receive the initial listing applications for all companies).

But now let's consider the possibility that, thanks to the merger, the number of low-cost investors in XZ is sufficiently greater than in Y that listing companies will trade off the advantage provided Y's higher listing standard against the benefit of XZ's larger base of low-cost investors. In that case, the advantage of XZ's low-cost investor base could conceivably dominate the effect of Y's higher listing to the point where all companies prefer to be listed on the merged exchange. And in this case, Y will attract only a lower-quality pool of applicant firms, forcing it to lower its listing standards.

Finally, as a third possibility, consider a scenario in which XZ's reputation, though less than Y's, is strong enough that the listing standard set by this exchange will be *higher* than that set by either X or Z before merging. This increase in listing standards is a likely response to the increase in the pool of applicant firms that results from the merger of X and Z's investor bases.

As our analysis suggests, then, two smaller exchanges can improve their competitive position against a third, larger exchange by pooling their low-cost investor bases. And in response to the often-expressed fear that listing standards will fall to the "lowest common denominator," our analysis indicates that this fear is misplaced. In fact, to the extent that the exchange that results from the merger is strengthened by the combination, and the individual exchanges have reason-

ably strong reputations to begin with, our analysis suggests that the listing standard of the new exchange may well be *higher* than that of *either* of the exchanges before the merger or alliance.

An illustration of this was provided by the merger, in September of 2000, of the Amsterdam, Brussels, and Paris stock exchanges to form Euronext. One of the stated goals of the management of Euronext was to raise the disclosure requirements on companies listing on the combined exchange after the merger.

### Implications for Regulation of Exchanges

Our analysis has a direct bearing on the ongoing debate about the optimal regulation of exchanges after they go public and become value-maximizing corporations. Some observers, including former SEC Chairman Arthur Levitt, have argued that such exchanges should be stripped of their self-regulatory authority after going public, with all such authority resting in a centralized regulatory authority common to exchanges.<sup>18</sup>

Our analysis implies that such a centralized regulatory authority for exchanges would be inappropriate for a number of reasons. First of all, our analysis suggests that even when exchanges act as value-maximizing entities, they have strong incentives to set appropriately high listing standards to protect their reputations and thus maximize their own long-run profits. But, even more important, our analysis implies that reposing all regulatory authority in a centralized agency and adopting a "one-size fits all" approach would reduce the number of otherwise viable exchanges by preventing them from adjusting their listing standards to meet the demands of their applicant pool. And without such exchanges, there could be a significant drop in the number of companies able to fund growth opportunities from public equity markets.

### Implications for Sarbanes-Oxley and the Competitiveness of U.S. Exchanges

It has been argued that the passage of the Sarbanes-Oxley (SOX) Act in 2002 has made U.S. listings significantly less attractive to foreign companies. More specifically, the argument is that the passage of SOX has imposed significant additional costs on listing companies and their managers through the compliance requirements of Section 404 (which aims to reduce the market impact of accounting "errors" from fraud, inadvertent misstatements, or omissions).

But what evidence we have on this issue is inconclusive. In a 2006 study, Luigi Zingales finds that, from 2000 to 2005, the U.S. equity market's share of global IPOs fell

18. See, for example, "SEC seeks One Market Regulator," *Washington Post*, Sept 22, 1999. As another example, consider the following comments by Jeffrey Garten, Dean of the Yale School of Management, in a *Wall Street Journal* article ("How to Keep NYSE's Stock High," January 11, 2000): "If the exchange goes public, its self-regulating authority would create huge conflicts of interest between the Big Board's legitimate mandate to enrich its shareholders by attracting new listings, and the requirement to regulate many

of those same shareholders as they trade on the exchange's floor. A second conflict would arise in setting listing requirements for new companies, as there would be a temptation to dilute standards or relax surveillance over them in order to sign up more corporate clients....A far better option is to strip the exchanges of most of their regulatory authority and to create one independent national self-regulating body...it could apply uniform standards on all market participants."

dramatically. In particular, while the U.S. capital market attracted 48% of all global IPOs during the 1990s, its share had declined to only 8% in 2006. Zingales attributes this drop in market share partly to increased competition (mostly from European equity markets) but also to the increase in the compliance costs for publicly traded companies due to the passage of SOX.

But in a 2007 study, Craig Doidge, Andrew Karolyi and Rene Stulz argue that the decline in U.S. listings has little to do with SOX or a decline in the competitiveness of U.S. capital markets. In an attempt to evaluate the relative benefits of New York and London exchange listings, this study reports that cross-listings have dropped not only on U.S. exchanges, but also on London exchanges, and that this decline is better explained by changes in the kinds of companies that are going public (newer, smaller, riskier companies) than by changes in the benefits of cross-listings. When these differences in corporate characteristics are controlled for, the study finds that SOX has had no detectable effect of cross-listings.

In an additional attempt to examine the competitiveness of U.S. exchanges, Doidge, Karolyi, and Stulz also investigated changes in the valuation differential (or “cross-listing premium”) between U.S.-listed foreign companies and their locally listed counterparts during the period from 1990 through 2005. They found that there was a significant premium for U.S. exchange-listed companies in each of these years, and that the premium has not fallen significantly in recent years. By contrast, they find that there was no valuation premium in any of these years for non-U.K. companies listing on London’s Main Market.

Our theoretical analysis offers an explanation of the benefits to non-U.S. companies of cross-listing on U.S. exchanges that is consistent with this empirical evidence. Our analysis predicts two main effects of the passage of SOX. On the one hand, the compliance costs (and therefore aggregate listing costs) of companies cross-listing on U.S. exchanges have clearly increased thanks to SOX. At the same time, however, SOX has also improved the transparency of U.S. exchanges.

What are the expected consequences of these two effects? First, the increase in listing costs implies that the number of foreign companies applying for a U.S. listing (instead of applying, say, to the Alternative Investment Market (AIM) in London) will be lower than otherwise. Second, the increase in the transparency of U.S. exchanges should lead to an increase in the average quality of companies qualifying for a listing on a U.S. exchange, which in turn should cause the reputa-

tions of U.S. exchanges to increase over time. Finally, these two effects can be expected to give rise to an *increase* in the “cross-listing premium” experienced by companies listed on U.S. exchanges.

In sum, while the implications of our analysis include a reduction of cross-listings by foreign firms on U.S. exchanges after the passage of SOX (at least in the short run), they are also consistent with the value of a U.S. listing actually increasing over time as a result of SOX.

## Conclusion

We have analyzed both companies’ choice of exchange, and exchanges’ choice of listing standards, in a setting where corporate insiders have private information about firm value and outsiders can become (better) informed at a cost. In our analytical framework, exchanges are populated by two kinds of investors, whose numbers vary across exchanges: sophisticated (low information production cost) investors and ordinary (high-cost) investors.

As long-term value-maximizers, publicly traded exchanges can be expected to devote considerable attention to finding the optimal listing and disclosure standards, and to adjusting them to changes in circumstances. The setting and enforcement of the appropriate listing standards are the main determinant of an exchange’s reputation, which in turn determines the kinds of companies that will choose to list on it. Exchanges with the highest listing standards and reputations are likely to work hard to maintain them, while exchanges with lesser reputations will seek to carve out niches by making opportunistic use of lower (though not too low) listing standards while possibly seeking alliances or mergers.

But if less reputable exchanges can be expected to use lower listing standards (and fees) as a tool in competing for listings with other exchanges, this will not necessarily lead to a “race to the bottom” in listing standards. Moreover, a merger between two exchanges may in fact result, for at least one of the exchanges, in a *higher* listing standard for the combined exchange.

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