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Abstract

This study investigates the valuation impact of a firm's decision to cross-list on a more (or less) prestigious stock exchange relative to its own domestic market. We use network analysis to derive broad market-based measures of prestige for forty-five country or regional stock exchange destinations between 1990 and 2006. We find that firms cross-listing in a more prestigious market enjoy significant valuation gains over the five-year period following the listing. We also document a reverse effect for firms cross-listing in less prestigious markets: These firms experience a significant decline in valuation over the five years following the listing. The reputation of the cross-border listing destinations is therefore a useful signal of a firm's value going forward. Our findings are consistent with the view that cross-listing in a prestigious market enhances a firm's visibility, strengthens corporate governance, and lowers informational frictions and capital costs.

Key words: cross-listings, network analysis

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1. INTRODUCTION

Prior to the financial crisis, one of the most important issues debated in the financial press was whether the United States was still the dominant destination for global financial activity, particularly the public equity markets. For most of the previous twenty years, U.S. equity markets had been routinely attracting the lion's share of global equity activity, especially from markets that were themselves considered relatively important. However, following the dramatic evolution in globalization since at least the early 1990s, an increasing number of alternative destinations have been able to develop and achieve the level of sophistication needed to attract global equity business. This evolution has brought with it potential consequences for the geography of financial activity and has affected the hierarchy of international financial centers. As global financial markets return to a normal mode of operations following the crisis, this issue of global financial competition is likely to regain prominence and receive further impetus as markets attempt to secure more prestigious positions in the rankings by taking advantage of the destabilization associated with the crisis.

Many of these markets have registered increasing volumes from domestic IPO and listing firms that in previous years would have "migrated" to foreign destinations. Simultaneously, there has been an expansion in the set of markets on the receiving end of cross-listing activity, which now host flows diverted away from what had been more attractive destinations. These observed dynamics toward increasing globalization of equity markets are a motivation to analyze the potential effects on companies that implement cross-listing activity around the world.

A company's decision to list on a cross-border stock exchange has attracted great interest in the financial literature. Research analyzing the proliferation of these foreign listings focuses on the underlying motives and cost-benefit calculus of companies listing outside their home market (see Benos and Weisbach 2004; Karolyi 1998, 2006; and Pagano, Röell, and Zechner 2002). Among the benefits, cross listings can reduce market-segmentation problems (Foerster and Karolyi 1999, Miller 1999), enhance firm visibility and lessen informational asymmetries (Baker, Nofsinger, and Weaver 2002), lower the cost of capital and improve liquidity (Domowitz, Glen, and Madhavan 2001) and strengthen investor protection (Coffee 1999, Stulz 1999).[1]

[1] Several studies also underscore the importance of international trade, cultural similarities, and geographical proximity.

Empirical studies have documented that cross listing on U.S. exchanges generates significant valuation gains vis-à-vis firms that do not have a foreign listing (see, for example, Doidge, Karolyi, and Stulz 2004, 2009; Gozzi, Levine, and Schmukler 2008). In light of emerging markets that serve as viable alternatives to the U.S. market, should we expect to find benefits to cross-listing across the globe? Recent papers, such as those by Gozzi, Levine, and Schmukler (2008) and Sarkissian and Schill (2009), analyze broad panels of companies cross listing in different world locations. However, these studies do not find much evidence of future valuation benefits. If anything, cross-listing firms seem to actually experience valuation losses in the years after the listing event (with gains to be found only prior to and in the event year).

In this paper, we look at broad patterns in valuation effects from global cross-listing activity, but we posit that future valuation may be affected by where the cross-listing company *is coming from* and where it is cross listing *to*. More precisely, we conjecture that the importance (or *prestige*, as it is formally defined in the next section) of the destination is a signal that the market uses to update information regarding the future value of the cross-listing firm. This conjecture is consistent with the view that cross-listing activity enhances firm visibility, lowering informational frictions and capital costs. This premise, which is based on the "investor recognition" hypothesis developed in Merton (1987), has been explored by several studies (Baker, Nofsinger, and Weaver 2002; Lang, Lins, and Miller 2003; Ahearne, Griever, and Warnock 2004; Ammer, Holland, Smith, and Warnock 2004).

We expand on this hypothesis by suggesting that this information update should also depend on the company's own market of origin: Listing on a prestigious foreign exchange may boost visibility and ameliorate capital costs, but only if the firm is originally listed in a location that does not offer these types of potential benefits. By the same token, if a firm is originally listed in a relatively prestigious location, and therefore is already exposed to the benefits that listing in such market may bring, cross listing in a location with *lower* prestige may send a negative signal to investors, which could then be reflected *adversely* in the value of the firm.

Using a methodology common in network analysis, we are able to derive a time-varying measure of prestige for forty-five global stock exchanges and test the impact on valuation for companies cross listing between 1990 and 2006. We find evidence that cross listing to a more or a less prestigious market than the market of origin matters for future valuation. Cross listing in markets that in years prior to the event had been more prestigious than the market of origin leads

to significant valuation gains registered over the five years following the listing. At the same time, a foreign listing in markets that had been less prestigious than the market of origin is associated with declining valuations over the following five years. Moreover, we find valuation effects from the future evolution of the destination market: Irrespective of the relative move "upward" or "downward" at the time of the cross-listing event, a firm's valuation also increases if the host market subsequently improves its global status.

Our results are generally consistent with those in the literature highlighted earlier. The results are consistent with findings by Doidge, Karolyi, and Stulz (2004, 2009) of valuation gains from listing on U.S. exchanges over the past two decades. Over this period, U.S. exchanges—as we formally assert later on— have been arguably the most prestigious destination markets from virtually any other location of origin; accordingly, by focusing the analysis on cross listing to the United States, one would virtually impose the conditioning statement of a move "upward."

Likewise, our evidence is not discordant with the results reported by Gozzi, Levine, and Schmukler (2008) and Sarkissian and Schill (2009). These authors were testing theories that produced specific predictions to be looked for and associated with the *unconditional* act of cross listing. Their findings were seen as evidence of market timing in the cross-listing decisions consistent with theories of market segmentation. We are instead testing predictions from conjectures associated with the view that the reputation of a market may reflect upon the visibility of the firm, and this conjecture does not have an obvious prediction regarding the effects of the unconditional cross-listing events. Instead, it calls specifically for the type of conditioning on the relative prestige of markets of origin and destination, hence accounting for the ranking hierarchy among stock exchanges.

Our index of market prestige does not simply measure the ability of an exchange to provide capital for foreign firms but it also, as argued by several papers in the financial literature, reflects its ability to generate information. Subrahmanyam and Titman (1999), for instance, argue that when firms list on an exchange, they generate a positive market externality: The market becomes more liquid, and more information-generating activity takes place. Sarkissian and Schill (2008) make the case that markets at times experience waves of cross-listing activity, rendering them increasingly attractive to prospective cross-listing companies, which may further boost market prestige. To these arguments we would add that the prestige of a certain destination should be especially boosted if it is able to attract companies already trading in prestigious

markets, where there is already a high level of information transparency. The well-established infrastructure of information acquisition technology (analysts, underwriters, etc.) in an already reputable market will concentrate its attention on the new destination, encouraging the development of a local information acquisition infrastructure.

Moreover, the ability to attract companies from prestigious locations also can have a "certification" effect that can boost a market's future ability to attract other foreign companies, thus deepening the size and information externality gains even further. We propose a social network measure of prestige that captures both the externalities from being the destination choice of many firms and the feedback effects associated with the relative prestige of the cross-listing firms' locations of origin.

The rest of the paper proceeds as follows. Section 2 presents the methodology used to assess market prestige. Section 3 describes the data sources and sample construction. Section 4 outlines our model specification, and Section 5 reviews findings analyzing the impact of cross listings on firm valuation.

2. NETWORK ANALYSIS MEASURES OF STOCK MARKET PRESTIGE

As indicated in the introduction, we are conjecturing that the status or prestige of an exchange may reflect upon the visibility of firms cross listing to that location, thus affecting their ex post valuation. How do we measure market prestige? Existing studies have typically based this assessment using standard proxies of market size. In addition to total market value or aggregate trading volumes, refinements have looked at the capacity to attract new listings (see, for example, Pagano, Röell, and Zechner 2002; Zingales 2006; Sarkissian and Schill, 2008 and 2009).

The importance of a market location certainly should be reflected in its overall size. And in special scenarios, where flows are already highly concentrated, a total size measure of prestige will be accurate. However, in environments where multiple locations may be competing for cross-listing companies, assessments of market prestige should require further analysis. To offer a concrete example, we illustrate in Section 3 that, based on the data on global IPO activity, the top destination for foreign IPO activity in 1995—the United States—attracted almost 60 percent of global flows (calculated on the basis of dollar volume of proceeds). Germany and the United Kingdom were a distant second and third, with shares of 17 and 10 percent, respectively. In a

scenario like this, it is quite accurate to claim, as reflected in total size, that the U.S. exchanges were clearly the dominating locations in global equity activity. By 2005, however, the top destination (Germany) attracted only about 33 percent of global flows, the second location (the United States) a close 31 percent, and the third (Hong Kong) another 13 percent. The United Kingdom was a close fourth with 10 percent. Hence, ten years later there is no clearly dominant location, in absolute terms. Now, there are two or even three or four locations that perhaps share similar levels of importance, at least if we base the assessment on the raw aggregate flows.

Interestingly, however, a closer look at the third location based on aggregate flows, Hong Kong, would show that virtually all such flows were from mainland China companies. Practically no companies from any other location chose Hong Kong as the destination for IPO activity. Moreover, further analysis of the data would show that no other foreign companies were choosing China as a market for IPO activity. Hence, the sheer size of IPO flows from mainland China may have contributed more to enhance Hong Kong's status as a star market in a local region.

This example from real data illustrates our original point that, aside from special circumstances, the prestige of market locations should take into account not only total inflows to each destination, but the entire matrix of flows, taking note of where companies are *coming from* and where they are *going to.* To offer another example from the same data set, in 1995 the Deutsche Börse attracted about 17 percent of global IPOs, but the relevant point is that 40 percent of these inflows came from companies originally from the United States, the most attractive market at the time. And that figure actually corresponded to 55 percent of foreign IPO activity by U.S. companies in any market. By the year 2000, inflows to Germany from U.S. companies had grown to three times the size of 1995 levels, and they now represented more than 80 percent of total foreign IPO activity by U.S. companies. That these inflows were from companies originally from a market that was itself highly prestigious during those years should have helped enhance the overall prestige of the German market and its ability to expand further in the following years.

Generally speaking, then, an accurate assessment of the prestige of alternative destination markets for equity activity should benefit from taking a network-based approach, thus expanding the informational content of standard, one-dimensional aggregates to consider the entire matrix of location-to-location flows. Again, taking this approach is all the more justified in an

environment such as that of the past two decades—with global markets growing steadily and with the expansion of many new, more liquid and sophisticated financial centers that adhere to better corporate governance principles and that can rightly compete for global financial activity.

There have been many applications of network-based methodologies to economics. A recent example that seems close to our study is the work on venture capital (VC) financing by Hochberg, Ljungqvist, and Lu (2007). The authors show that the success of a start-up company appears to depend not only on its own characteristics but also on the prestige of the VC firms supplying the funds; that level of prestige is calculated using the same network metrics in our study. The same authors also show in a separate paper that such network characteristics of VC firms have an important impact on the market structure of the venture capital industry, in essence acting as a form of barrier to entry and growth for new firms lacking the prestige and recognition of incumbent firms (Hochberg, Ljungqvist, and Lu 2007).

We render these concepts operational by adopting a specific algorithm developed in network analysis, commonly referred to as *index of rank prestige*, or status. From the data set of global IPO activity illustrated in the data section, we aggregate firm-level data to construct a $(n \times n)$ matrix of IPO flows originated by companies originally from any of the n locations and to any of the same n locations. Hence, the matrix element x_{ij} represents the total volume of IPOs by companies from location i taking place in location j (with domestic IPO activity captured on the main diagonal of this matrix).

We then define the rank prestige of location n_i as:

$$P_r(n_i) = x_{1i}P_r(n_1) + x_{2i}P_r(n_2) + \cdots + x_{Ni}P_r(n_N), \quad (1)$$

where the weights are represented by the flows from each of the locations onto n_i. Extending this concept to the whole network, we have n equations in n unknowns, the individual rank prestige measures. As shown by Katz (1953), this system has a finite solution if one first standardizes the original network matrix to have column sums equal to one. After this standardization, the system of equations becomes a more common matrix-characteristic equation, where the solution (that is, the vector of rank prestige indicators) is the eigenvector associated with the largest eigenvalue of the standardized matrix. A location will thus have high-rank

prestige if it is chosen by a few other but highly prestigious nodes or if it is chosen by many other nodes with lower rank.[2]

It turns out that this methodology is very similar to that used in the PageRank algorithm, the product at the foundation of the Google search engine (Brin and Page 1998). The intuition provided by the founders, in fact, suits our application very well:

"[An] intuitive justification [for the algorithm] is that a page can have a high PageRank if there are many pages that point to it, or if there are some pages that point to it and have a high PageRank. Intuitively, pages that are well cited from many places around the web are worth looking at. Also, pages that have perhaps only one citation from something like the Yahoo! homepage are also generally worth looking at. If a page was not high quality, or was a broken link, it is quite likely that Yahoo's homepage would not link to it. PageRank handles both these cases and everything in between by recursively propagating weights through the link structure of the web (Brin and Page 1998, Section 2.1.2)."

Hence, applying the PageRank example to our case, the prestige of an exchange is boosted more, all else equal, if firms already listed in the Yahoo! of our study, U.S. exchanges—or firms from other locations that have recently experienced a boost in their prestige—decide to cross list there.

This sophisticated criterion by which to judge the importance of each location in a network fully exploits the information contained in the entire network structure. By design, the network prestige measure is *market-based* in the sense that it ranks stock market destinations based on companies' preferences for where to issue equity. The presumption is that by their cross-listing choices, these companies offer their best assessment of where they expect to maximize their firms' value going forward. Moreover, the network prestige index offers a more comprehensive picture of overall market dominance than the simple measures of aggregate volumes traditionally employed for this task.

In the finance literature, there is actually a long tradition of relying on market-based measures of prestige. Carter and Manaster (1990), for example, propose a measure for identifying reputable participating underwriters from their relative positions on the "tombstone" announcement of the offering. This measure has been used extensively in the literature to

[2] See also Wasserman and Faust (1994) for a complete illustration of this and other network methods.

investigate the effect of underwriter reputation on the first-day and long-run performance of IPOs (see, for example, Carter and Manaster 1990 and Carter, Dark, and Singh 1998). These studies find that a company taken public by top-tier underwriters enjoys stronger long-run stock return performance. Our network-based measure of prestige is a more sophisticated variant of these earlier measures used in the IPO literature.

3. DATA

To formally analyze the impact of a cross listing on firm valuation, we use information from Osiris Bureau Van Dijk. This database, which provides comprehensive standardized financial information for publicly traded companies around the world, is the building block for the underlying panel structure for analyzing the relationship between firm performance and cross listings during the period 1990-2006. Over this entire sample period, Osiris tracks around 40,000 firms from roughly 125 countries.

The primary focus of our analysis is the subset of the forty-five larger country and stock exchange combinations that had significant inflows or outflows of IPO issuance over this period and for which we can estimate accurate network-based measures of stock market prestige. In addition, our analysis requires that publicly listed companies in our sample have non-missing information on financials and stock market valuation variables. The final panel with complete financial information, for which we can compute a network prestige ranking, includes roughly 29,000 firms.

As expected, more than 20 percent (or 6,225 companies) of this firm sample is domiciled in United States. However, consistent with most of literature, the core group of interest in the empirical analysis is the remaining 22,775 non-U.S. companies. The non-U.S. panel of firms is distributed across an array of countries representing the largest economies and financial centers (for example, Japan, the United Kingdom, Australia, Canada, China, Taiwan, and France).

The second step in our sample design is to ascertain all cross-listing activities for the firms included in the panel. The task of identifying cross listings is nontrivial because there is no consolidated source of information on these activities. To flag cross listings for each firm in the sample, we bring together listings information from several sources for the period between 1990 and 2006. Ultimately, the goal is to determine whether a company included in the panel had cross listed at some point during 1990-2006.

A broad overview of a firm's cross-listing activity is available from Datastream, which allows us to distinguish and match foreign listings using company ISIN or SEDOL numbers. We also collected information on foreign listings from a variety of other sources. A very good source of information for companies listing on mostly U.S. stock exchanges is provided by the depository receipt service departments of Bank of New York, JPMorgan Chase, Citi, and Deutsche Bank. Collectively, these ADR program lists report Level II and III listings on major U.S. stock exchanges as well as Level I OTC, 144a, and Regulation S foreign issues. To better identify cross-listing activities outside the United States, we also collected information, where available, from some of the large international stock markets (for example, the London Stock Exchange, Deutsche Börse, Euronext, and Hong Kong).

Most of the aforementioned sources of information help identify individual foreign listings outside their home countries. One drawback of pooling information from these various sources is that the database may be fragmented in nature. To consolidate our listings information, we use information from Bloomberg Financial and Capital IQ. Both sources offer a more complete timeline of a firm's listing activity over its entire public life cycle, allowing us not only to verify the presence of a cross listing but also to accurately date and order the sequence of multiple foreign listings. All the company-level searches in Bloomberg and Capital IQ were done manually based on the company's name.

Table 1 summarizes the flow of cross listings across the major regions representing the home countries and their respective stock exchanges. Given the large number of home-country locations—our sample includes forty-five countries or regions—the information is cross tabulated for the largest home-country locations and host-market destinations. The remaining countries or host markets with relatively sparse cross-listing activity are grouped in the "other" category.

Looking at the sample that had available financial information during 1990-2006, we observe that there are over 3,650 foreign listings, including multiple listings by the same firm and Level I issues in United States. This sample of foreign listings is comparable to those compiled by other recent studies analyzing cross listings (see, for example, Fernandes and Giannetti 2008 and Sarkissian and Schill 2009), although their sample periods are different. The table illustrates the dominance of U.S. stock exchanges as the most preferred destination by overseas companies, which is well documented by earlier literature (for example, Doidge,

Karolyi, and Stulz 2004). Table 2 tabulates multiple cross-border listings by the location of the host market. The table excludes Level I OTC listings and private placements. Not surprisingly, most firms have just a single foreign listing, and only about 10 percent of the sample opt for a second foreign listing.

Another important market appearing to attract a large number of foreign issues is the United Kingdom, essentially represented by the London Stock Exchange. Doidge, Karolyi, and Stulz (2009) and Peristiani (2007) note that most of the growth in foreign listings stems from micro-cap companies listing on the Alternative Investment Market (AIM) segment of the London Stock Exchange.[3] The new-listings activity on the London Stock Exchange, excluding these very small AIM firms, is actually substantially lower over this period and is in line with other stock exchanges.

Many of the stock listings in our sample become inactive for a variety of reasons. Firms may simultaneously delist from their home-country exchange and foreign host markets because of corporate reorganization events (such as a merger, bankruptcy, etc). In other instances, a company may voluntarily deregister its foreign-listed security for a variety of reasons or it may be dropped by the host market. We attempted to trace the life cycle of each listing by collecting information on the date it became inactive, using data from Datastream, the various ADR depositary program lists, and certain stock exchanges, where available. This information is at times also provided by Bloomberg Financial and Capital IQ. Admittedly, the exercise of accurately dating the termination of each foreign listing is very difficult because of the large number of possible termination scenarios. More important, it is almost impossible to determine and control for the underlying cause that forced the firm to delist (a merger, reorganization, bankruptcy, etc.).

In addition to tracing the listing activities of each firm in the panel, we used information provided by Osiris to estimate the age of the firm over its public life cycle. Age is an important factor in a company's decision to cross list. The top panel in Table 3 reveals that, for most firms, the decision to cross list is tied closely to their IPOs. More than half of the companies in the

[3]AIM was first launched in 1995 primarily to attract small companies around the world that are often backed by venture capital. Since its inception, AIM has been very successful in attracting more than 2,500 companies that raised about $2.8 billion in new capital. An AIM listing is very appealing to many of these foreign companies because of its simplified regulatory environment specifically designed for the needs of smaller companies. Most of the AIM-listed companies would find it difficult to list on the more established international stock exchanges because of their more rigorous listing requirements.

panel that decided to have a foreign listing at some point chose to do it immediately after their IPO. Moreover, more than 70 percent of cross listings are initiated within four years of going public.

The close proximity between foreign listings and the IPO is not surprising because most firms would prefer financing early in their public life cycle (usually via an international equity offering), when the need for capital to finance growth is greatest. Table 3 summarizes, by geographic regions, the age distribution of firms conditional on the decision to cross list. We observe, for instance, that Asian and European firms prefer to cluster their primary listing (IPO) with secondary foreign listings. In contrast, cross listing for U.S. and Australian companies is less closely linked to the IPO, as the decision to cross list can be made several years after the primary offering.

The lower panel in Table 3 describes the propensity of all firms in the panel to have a foreign listing. We use a nonparametric duration model to correct for the presence of censoring (that is, to fully account for the possibility that a newly created public company may decide to have a foreign listing at some point in the future). In the current framework, a cross listing is considered the "terminal event." The fraction of companies that chose to cross list is therefore measured by one minus the survival function. Looking at the geographic breakdown on the propensity to cross list, we find that although many Asian companies prefer to internationalize in the earlier stages of their public life, they are less inclined to have a foreign listing; in fact, only about 3 percent of them opt to do so after ten years. By comparison, the rate of internationalization is much higher in Europe, where more than 8 percent of the companies in this region chose to cross list over the same ten-year post-IPO period.

3.1 Prestige Rankings

The key goal of our analysis is to investigate the effectiveness of the decision to cross list on a more reputable stock exchange. Using the social network methodology described in Section 2, we constructed measures of stock exchange prestige based on the full matrix of observed volumes of global IPO proceeds. We measure the flow of IPO activity across the different international stock exchange destinations taken from the Thompson Financial *Securities Data Corporation* (SDC) new issues database. The SDC database contains information on domestic and international cross-border equity offers and traces the national origin of the issuing company.

The sample consists of all companies that issued stock in their domestic market and raised capital abroad between 1990 and 2006. One minor shortcoming of the SDC information is that the pattern of issuance is sometimes not fully transparent for companies that choose multiple international listings, so all the cross-listing flows are not always captured. We correct for these missing cross-border flows using information from Bloomberg Financial that traces in greater detail a firm's corporate action calendar.

It is important to note that the prestige measure is compiled based on *equity* cross-border flows. The presumption is that for a company to garner a great deal of the certification benefits of cross listing on a more reputable exchange, it has to be bound by the laws and regulations of the host market. For instance, a foreign listing combined with capital-raising in the United States binds the firm to a Level III program, requiring the cross-listed firm to comply with stricter rules and regulations like those followed by U.S. companies.

All international stock exchanges are consolidated at the country level. In the case of the United Kingdom and Germany, the national equity markets are represented solely by the London Stock Exchange and the Deutsche Börse, respectively. The U.S. national market is represented by a combination of the NYSE, NASDAQ, and AMEX. In the case of multinational exchanges such as Euronext and OMX (Nordic Exchange), we reconstructed the pro forma combination based on the preexisting national markets going back to 1990. For simplicity, we also combined several small country markets into regional destinations (for example, countries such as Hungary, the Czech Republic, Slovakia, and Croatia were consolidated into a formerly Eastern Bloc region). Over the entire 1990–2006 period, our sample included more than 35,000 equity offerings in forty-five country- or region-level equity locations, amounting to roughly $2.1 trillion in proceeds.

The prestige rankings are summarized in Table 4 for the entire panel of equity markets.[4] The stock market prestige indexes used in our subsequent regression analysis are computed over a rolling five-year period. This rolling average measure provides a stable outlook in the historical evolution of the stock market rankings by smoothing out any transient movements. The long lags associated with these prestige measures also reduce any possible regression endogeneity problems.

[4] An extensive discussion of the stock market prestige network measure is provided by Cetorelli and Peristiani (2009).

Table 4 illustrates that, together, the three major U.S. exchanges are the most influential stock market destinations among all competing locations, scoring significantly higher than the rest of the top-tier cluster of competitors such as the London Stock Exchange, the Deutsche Börse, the Hong Kong Stock Exchange, and Euronext. It is noteworthy that, although the prestige score for the U.S. equity markets has dropped significantly—by about a quarter—from the highest levels recorded throughout the 1990s, its lead over other financial centers remains relatively wide. As of the end of 2006, the U.S. stock exchanges had a prestige score almost three times higher than that of the second-ranked location, the London Stock Exchange.

Three main factors contribute to the ability of U.S. exchanges to maintain the highest ranking in global equity activity. The first factor is related to size. The main driver of the massive volume of IPO activity generated by U.S. companies is certainly the size of the U.S. economy. There may be various reasons why most firms continue to issue IPOs domestically (for example, the home-bias hypothesis), but the end result is that they continue to do so even when they could migrate abroad instead. Hence, the sheer size of equity activity continues to make U.S. capital markets very liquid and thus contributes to making U.S. exchanges very attractive to foreign companies.

The second factor is that U.S. exchanges are the destination of choice for companies from most locations. According to the micro data, companies in thirty-three out of our forty-five locations chose U.S. exchanges in 2006, and most of the remaining twelve locations were very minor to begin with. The third factor is that these exchanges are the destination of choice for many companies that originally were from very prestigious locations. In fact, in 2006, more than 83 percent of total IPO activity on U.S. exchanges was generated by companies from the top five most prestigious locations, while only 72 percent of London volumes, and 45 percent of Deutsche Börse volumes, came from the same cluster of locations.

4. SPECIFICATION OF THE FIRM VALUATION MODEL

An approach commonly used for analyzing the aftermarket performance of cross-listing events is to focus on effects in firm value. Consistent with most of the financial literature, we proxy the value of firm (i) in year (t) by Tobin's q ratio, or q_{ti}, where the numerator is defined by (Total Assets-Book Value Equity + Market Value Equity) and the denominator is equal to total assets (all variables are denominated in local currency). The first phase of our analysis looks

at the most straightforward specification primarily designed to analyze firm valuation across many countries. In this framework, a company's q ratio is determined by country- and firm-specific factors. More precisely, the model can be defined as:

$$q_{ti} = \alpha_0 + \alpha_1 I_t + \alpha_2 I_C + \alpha_3 q_I + \gamma z_{tC\bullet} + \beta x_{ti\bullet} + \varepsilon_{ti}. \quad (2)$$

The explanatory variable I_t is a binary indicator capturing time (yearly) variation and I_C controls for country effects. Like many studies in the cross-listing literature that control for industry effects, the regressor q_I represents the average q ratio of the NAICS industry in which the company is classified. The explanatory vector $z_{tC\bullet}$ represents country-specific controls that vary over time (for example, corporate governance scores and macroeconomic variables), and the vector $x_{ti\bullet}$ controls for variation observed across the panel of firms.

The above model can be easily extended to analyze the impact of international listings. Our version of this broader model examining the impact of cross listings is defined by:

$$\begin{aligned} q_{ti} = {} & \alpha_0 + \alpha_1 I_t + \alpha_2 I_C + \alpha_3 q_I + \alpha_4 I_V + \gamma z_{tC\bullet} + \beta x_{ti\bullet} + \\ & \lambda L_{ti} + \lambda_M L_{ti}^M + \lambda_{OTC} L_{ti}^{OTC} + \varepsilon_{ti}. \end{aligned} \quad (3)$$

The explanatory variable L_{ti} is a binary indicator of whether the firm has an *existing* foreign listing in year (t). In addition to this firm-level indicator of a primary cross listing, the variable I_V is an indicator variable that controls for the specific calendar year of a firm's cross listing and therefore intends to capture whatever degree of variability in the data is associated with specific cross-listing "vintages." Some large internationally active companies choose to have multiple international listings. The dummy variable L_{to}^M gauges the importance of these multiple listings.[5] The major U.S. stock exchanges (NYSE, AMEX, and NASDAQ) are the most popular primary cross-listing destinations, though many non-U.S. firms opt for a Tier I listing usually on the OTC Bulletin Board or a 144a private placement (Karolyi 2001 provides an extensive discussion of foreign listings in the United States). While the principal goal of our analysis is to investigate the official cross listings on international exchanges having formal regulations and disclosure rules,

[5] As shown in the descriptive section, most cross-listed companies in the sample typically have a single foreign listing (excluding unofficial listings in Germany, Level I U.S. listings, and private placements).

we also include a dummy variable L_{ti}^{OTC} indicating the presence of these lower tier listings in United States.[6]

We investigate a more dynamic version of the above model by decomposing the aggregate effect of L_{ti} into year dummy variables that capture potential firm valuation benefits of the listing over time and then examine whether these gains are more sustainable. The model specification can be adopted to trace the evolution of Tobin's q K years after the cross listing:

$$q_{ti} = \alpha_0 + \alpha_1 I_t + \alpha_2 I_C + \alpha_3 q_I + \alpha_4 I_V + \gamma z_{tC\bullet} + \beta x_{ti\bullet} + \sum_{j=0}^{K} \lambda_j L_{t+j,i} + \lambda_M L_{ti}^{M} + \lambda_{OTC} L_{ti}^{OTC} + \varepsilon_{ti}. \quad (4)$$

Essentially, this broader model decomposes the explanatory variable L_{ti} into $K+1$ yearly dummy variables tracing the aftermath on firm value at the time of the foreign listing and K years after the event.

As noted earlier, the primary goal of this paper is not only to analyze the impact of the listing action but also to understand the consequences of listing to a more or a less prestigious stock exchange. To achieve this goal, the specification uses two ways to capture the directional efficiency gains from listing in a more prestigious host market. First, we hypothesize that a firm will experience a positive (negative) valuation benefit after cross listing in a more (less) prestigious market. For simplicity, we standardize the time variable for each firm panel to be zero at the year of the cross listing. At $t = 0$, assume that the host market H for firm (i) has a prestige score P_{0i}^{H}, while the prestige score for the domestic market D is P_{0i}^{D}. The gap in prestige between the host and domestic markets is defined as $Gap_{0i}^{H,D} = \left|P_{0i}^{H} - P_{0i}^{D}\right|$ (that is, the absolute value in the difference in the prestige scores between the host and domestic markets). To better capture the directional effects of cross listing on a more reputable stock exchange, we trace the impact after the cross listing by the explanatory variables $MORE_{t+j,i} = L_{t+j,i} \times Gap_{0i}^{H,D} \times I_{0i}^{H,D}$ where $I_{0i}^{H,D} = 1$ if $P_{0i}^{H} - P_{0i}^{D} > 0$; $= 0$ otherwise. Similarly, we define a move to a less prestigious stock exchange as $LESS_{t+j,i} = L_{t+j,i} \times Gap_{0i}^{H,D} \times (1 - I_{0i}^{H,D})$.

[6] While the regression specification controls for the presence of an OTC U.S. listing, it does not track German unofficial listings. During the sample period, there were roughly more than 9,000 foreign listings on the Deutsche Börse and the regional German stock exchanges.

Second, we argue that a company may benefit if it cross lists in a more reputable market abroad and hypothesize that investors might further reward this firm if its host market continues to climb in prominence. We measure the improvement in prestige by

$$\text{IMPROVE}_{ti}^{H} = \sum_{t=1}^{K} P_{ti}^{H} - P_{0i}^{H}.$$

In effect, the variable $\text{IMPROVE}_{t+j,i}^{H}$ measures the evolution in the reputation of the host market after the cross listing ($t = 0$). The current version of this improvement variable calibrates the ex post performance of the host-market destination.[7]

With these additional variables measuring the relative importance between the host and domestic markets, the final regression specification is written as

$$\begin{aligned} q_{ti} = {} & \alpha_0 + \alpha_1 I_t + \alpha_2 I_C + \alpha_3 q_I + \alpha_4 I_V + \gamma z_{tC\bullet} + \beta x_{ti\bullet} + \lambda_M L_{ti}^{M} + \lambda_{OTC} L_{ti}^{OTC} \\ & + \sum_{j=0}^{K} \lambda_{MORE,j} MORE_{t+j,i} + \sum_{j=0}^{K} \lambda_{LESS,j} LESS_{t+j,i} + \lambda_{CIMP}\, IMPROVE_{ti}^{H} + \varepsilon_{ti}. \end{aligned} \tag{5}$$

Given the current specification, our regression analysis aims to test the following hypotheses:

Hypothesis 1: A company will potentially garner significant valuation benefits after it cross lists in a host market with a higher international reputation than its home market. A strong form of this maintained hypothesis asserts that $H_0 : \lambda_{MORE,j} \le 0$ versus the alternative that $H_1 : \lambda_{MORE,j} > 0.$ A weaker version of this premise is defined by $H_0 : \bar{\lambda}_{MORE} \le 0$ versus the alternative that $H_1 : \bar{\lambda}_{MORE} > 0$, such that $\bar{\lambda}_{MORE} = \sum_{0}^{K} \lambda_{MORE,j} \big/ (K+1)$; that is, under the alternative hypothesis, the average valuation gain from cross listing over the post-listing period is positive.

Hypothesis 2: By extension, we argue that a firm with a domestic listing on a prestigious market that opts to have a foreign listing on a less prestigious exchange will not enjoy any

[7] However, it is conceivable that, even before the foreign listing, investors might consider ex ante improvements in the host's prestige based on the historical performance of the host market. To accommodate this possibility, we also considered a version of I_{ti}^{H} where the baseline is shifted from the year of the foreign listing $(t = 0)$ to the first year that the firm had available public data. Overall, our empirical findings were very similar.

valuation benefits and could be adversely affected by this action. This hypothesis can be defined as $H_0 : \lambda_{LESS,j} \geq 0$ versus the alternative that $H_1 : \lambda_{LESS,j} < 0$. Similarly, the weak form of this hypothesis is defined by $H_0 : \bar{\lambda}_{LESS} \geq 0$ versus the alternative that $H_1 : \bar{\lambda}_{LESS} < 0$, where $\bar{\lambda}_{LESS} = \sum_0^K \lambda_{LESS,j} \big/ (K+1)$.

In addition to these direct gains of cross listing, we argue that a company may profit from listing on a host stock exchange that rises in prestige throughout the post-listing period.

Hypothesis 3: A company with a foreign listing on a stock exchange that rises in prominence is likely to experience a boost in firm valuation. The null hypothesis of no improvement is defined by $H_0 : \lambda_{IMPROVE} \leq 0$ versus the alternative $H_1 : \lambda_{IMPROVE} > 0$.

4.1 Country- and Firm-Specific Controls

To control for country-specific effects, the explanatory vector $z_{tG\bullet}$ includes the gross domestic product per capita as a proxy for a country's economic growth (GDP_GROWTH). A large literature in finance asserts that the underlying institutional governance structure in a country is critical in promoting long-run economic growth. We explore the significance of institutional governance factors even further by adding into the regression the composite Heritage World Freedom Index (FREEDOM_SCORE). This index rates countries according to the degree of freedom they have across several dimensions (regulation, trade, fiscal, government, monetary, investment, financial, property rights, and corruption) and is similar in scope to other measures of legal protection such as those proposed by La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997, 1998). Levine and Zervos (1998) show a strong link between various measures of financial development, banking development, and long-run economic growth. A convenient feature of the FREEDOM_SCORE is that it is measured yearly for every country or region in our sample. In addition to this country-level governance score, we control for a country's scale of financial integration by including the Penn Table index of trade openness (OPENNESS), measured by the sum of exports and imports divided by real GDP.

The explanatory vector $x_{ti\bullet}$ controls for several firm characteristics. To allow for the possibility of nonlinear relationships, we use a quadratic functional form for both firm age (AGE) and size (SIZE). A firm's size is proxied by total assets and its age is measured from year of incorporation. Both AGE and SIZE are good indicators of a firm's life cycle. Although newly

created smaller companies are riskier, they are expected to garner, on average, larger q valuations because of their higher growth potential. A more direct measure of a company's ability to prosper is sales growth (SALES_GROWTH), measured by the change in logarithm of total sales.

Table 5 provides summary statistics for all the variables used in our regression analysis. We observe that firms that chose to have a cross listing attain higher Tobin's q valuations relative to companies without any foreign listings over the entire sample period. Firms with a foreign listing are domiciled in countries with higher growth in GDP per capital, but generally have somewhat similar Freedom Index and openness scores. Not surprisingly, firms with cross listings are larger, having greater financial visibility and name recognition to complete a cross-border transaction. Consistent with their higher firm valuations, cross-listed companies also have significantly higher sales growth.

5. THE RELATIONSHIP BETWEEN FIRM VALUE AND CROSS LISTINGS: EMPIRICAL EVIDENCE

In this section, we formally analyze the impact of cross listings on firm value, outlined by the regression specifications in the previous section. The first phase of our analysis concentrates on the subset of companies that opted to have an international listing. This conditional approach provides the most effective way for assessing the valuation gains (losses) from cross listing in a more (less) prestigious market. In a subsequent section, we estimate the determinants of firm q in an unconditional framework that encompasses the entire sample of public companies.

While the unconditional approach is broader, jointly considering the impact on firm value for both cross-listed firms and firms without any international presence, it is not suited for testing the directional benefits of cross listing formalized by Hypotheses 1 and 2 because of endogeneity and latency problems. We elaborate on these complexities in the next section, but the gist of the endogeneity problem is that firms without an existing listing can also garner a valuation premium because of the ability to cross list in the future. While it is possible to control for this unobserved likelihood to cross list using a Heckman correction model, it is very difficult to ascertain where a firm would cross list, making it impossible to calibrate the directional benefits of cross listing on a more (or less) prestigious stock market.

5.1 Conditional Regressions

The first column in Table 6 presents the baseline specification described by equation (2) that focuses on the basic relationship between a country's macroeconomic conditions and firm-specific factors and q valuations during the period 1990-2006. This specification establishes a useful benchmark for assessing the contribution of an international listing. The coefficient estimates of this basic model confirm a strong link between the q ratio and the country's underlying economic fundamentals. Companies operating in countries with higher economic growth (measured by real GDP per capital) experience significantly larger valuation gains as investors expect these firms to be more profitable.

The empirical findings also reveal a strong positive relationship between the FREEDOM_SCORE and a firm's q ratio, affirming the importance of financial structure and corporate governance. In particular, the strong link between the freedom score and the q ratio indicates that companies operating in an environment governed by strong economic and political principles enjoy higher valuations. This finding is consistent with the bonding hypothesis arguing that cross listings enable companies to strengthen outside investor protection by raising capital in a market with more rigorous laws and regulations and better corporate governance principles (Coffee 1999 and Stulz 1999). In addition to the Freedom index, the regression also controls for the impact of international economic integration (OPENNESS), measured by the sum of exports and imports divided by real GDP. We observe a negative relationship between trade openness and firm value. This result is somewhat surprising given that the freedom index and trade openness are positively correlated. However, these two indexes produce different country rankings, which might account for their differential effect. For instance, Japan ranks in the top tier in terms of economic freedom, but achieves very low trade openness scores that are more comparable to those of India.

Firm characteristics and financial performance are also key components of valuation, as investors are expected to aggressively price any changes in these factors. The regression model controls for these nonlinear life cycle effects by including AGE (time from the year of incorporation) and AGE^2.[8] A company's age is an important determinant because younger

[8] An alternative approach is to measure age from the time of the IPO. As shown previously, a firm's public age is closely linked with the decision to cross list. However, measuring age from the time it was established is perhaps more closely linked with the q ratio because it captures more accurately a firm's growth life cycle and value creation.

companies with a much better growth outlook are often rewarded with higher q ratios. Indeed, we discover that the relationship between firm age and firm value is concave, dissipating as the company gets older. In comparison, we observe a convex relationship between a firm's size and value. The importance of company growth is also seen in the significant and positive coefficient of SALES_GROWTH, a finding that is consistent with several other studies in the literature.

The second and third columns in Table 5 summarize the parameter estimates of the regression specifications defined by equations (3) and (4). In addition to firm- and country-specific effects, these models also investigate the impact of foreign listings. We observe that the single dummy variable L_{ti}, indicating the presence of a cross listing, is not statistically significant, although it is positively related with firm value.

To better gauge the timing of investor response, we decompose the single cross-listing dummy into six yearly indicators that trace the effect over a five-year period after the cross listing (including year 0, representing the time of the foreign listing). Consistent with the findings of Doidge, Karolyi, and Stulz (2004) and Sarkissian and Schill (2009), the results of this more dynamic specification appear to suggest that the benefits of cross-border listings are concentrated primarily at years 0 and 1. In particular, the coefficient estimate of year 0 reveals an immediate boost in valuation of 10.94 percent from the foreign listing. These valuation gains appear to be transient, however, as they dissipate and are not statistically significant in the years following the cross listing.

Another interesting finding of the regression results is that firms cross listing in multiple locations experience a significant increase in their q ratios. More specifically, the presence of a multiple listing raises the q ratio by about 5.4 percent. As illustrated in Table 2, however, multiple listings are not very common. Only about 240 firms in our sample opt to have more than one foreign listing in official market destinations. Considering the relatively low frequency of multiple listings, it is more difficult to decompose L^{M}_{ti} by year to further understand the timing of these gains. In general, most of these additional foreign listings occurred after the primary foreign listing. One reason for the strong positive impact is that multiple listings are a good proxy for a company's intensity of internationalization and global growth opportunities.

We find that, in contrast to the positive response to multiple listings, a Level I listing on the OTC and private placements in the United States are negatively received by investors because they lower a firm's q ratio by about 6.2 percent. This finding is perhaps an interesting

preamble to our focus on stock market prestige because it appears to suggest that market perceptions are indeed influenced by the reputation of the host destination.

To better understand the importance of host-market prestige, the last column in Table 6 summarizes the findings of the specification that controls for the directional benefit of listing on a more or a less prestigious market, measured by the explanatory variables $MORE_{t+j,i}$ and $LESS_{t+j,i}$, respectively. Again, we decompose these directional variables to trace the response at time 0 (year of foreign listing) and over the five years following the listing. As expected, companies are inclined to cross list on more reputable exchanges; therefore, more than 75 percent of the primary foreign listings are placed in more prestigious host markets. Given our large sample of foreign listings, however, there are an adequate number of observations for estimating the parameters of the $LESS_{t+j,i}$ variables. More important, the gap in prestige between the host and domestic markets, $Gap_{0i}^{H,D}$, is evenly distributed across these two directional variables.[9]

The regression results highlight a significant difference in the response of firm value to cross listing on a more (or less) prominent stock exchange. The benefits of a foreign listing on a prestigious market are positive and very significant, not just around the time of the listing but also for some time thereafter as firms continue to reap higher valuations over the five years following their foreign listing. In contrast, we observe that companies with a foreign listing on a less prestigious stock market experience a significant decline in their q ratios. At the bottom of Table 6, we report Wald F-statistics that test Hypotheses 1 and 2. Based on these formal statistical tests, we cannot reject the alternative hypotheses that either $H_1 : \lambda_{MORE,j} > 0$ or $H_1 : \lambda_{LESS,j} < 0$. These results underscore the significant disparity in valuations between companies cross listed on a more or a less prestigious stock exchange.

To better understand the economic effect of these directional variables, we need to adjust for the scale of the gap between the host and domestic markets. The average effect over this six-year post-listing period $\bar{\lambda}_{MORE}$ is 0.53. A one-standard-deviation increase in $Gap_{0i}^{H,D}$ (around 10

[9] The average $Gap_{0i}^{H,D}$ over the entire sample is 8.9 percent. The maximum gap of 25 percent represents a cross listing from Ireland to the United States, while the minimum gap score of -21 percent corresponds to a cross listing from the United Kingdom to South Africa (recall that U.S. companies' overseas listings are excluded from our analysis).

percent) produces roughly a 5 percent boost in firm value. Similarly, we find that $\bar{\lambda}_{LESS}$ is roughly around -1.4, meaning that firms opting for a less prestigious market suffer a comparatively more significant decline in their q ratios. The valuation discount is particularly large one to four years after the cross listing. Interestingly, investors appear to be less punishing on companies cross listing on less reputable destinations at $(t = 0)$. The response to a one-standard-deviation increase in the prestige gap between host and domestic markets is about -14.5 percent, representing a substantial drop in firm value.

The significant jump in $\lambda_{MORE,j}$ is not surprising given the large number of studies cited in the introduction that point to an array of potential benefits stemming from cross listings (for example, improved firm visibility, reduced market-segmentation problems, lower cost of capital, and stronger investor protection). In comparison, the reasons behind the significant decline in firm value experienced by companies listed on less prestigious exchanges are less transparent. One possible explanation is that there is an inherent adverse selection mechanism: Firms that cross list on less prestigious stock markets are actually weaker companies that lack the financial strength to move to a more prestigious destination. The empirical evidence appears to dismiss this possibility, however, revealing that firms cross listing in less reputable markets are actually more profitable than their peers that have foreign listings in more prestigious markets.

The pre-listing strength of firms that moved to less prestigious destinations may be more consistent with agency problems (Jensen 1986). Agency theories argue that overoptimistic managers are more likely to squander the firm's cash flows on negative net-present-value projects. In the current framework, a lot of the overinvestment may in fact be directed to these less prestigious market destinations.

When we turn our attention to analyzing the importance of the post-listing improvement in the prestige index of the host market (Hypothesis 3), the parameter estimate of $IMPROVE^{H}_{ti}$ is positive and statistically significant. The ability of an exchange to improve its reputation among its competitors therefore has a positive influence on its own cross-listed companies. The overall impact is not large compared to the actual cross listing on a more prestigious market. A one-standard-deviation increase in $IMPROVE^{H}_{ti}$ generates about a 1.5 percent increase in the q ratio.

Our evidence so far has revealed a strong asymmetric investor response to companies with cross-border listings on host markets that are more and less prestigious. As noted

previously, many of the earlier studies analyzing the various facets of international listings have focused primarily on foreign firms (non-U.S. companies) that opted for a U.S. listing. Most of these studies document a strong link between a U.S. listing and a firm's value. In many ways, these studies analyze a special case where firms opt for the most prestigious host market.

It would be interesting, however, to investigate whether companies continue to enjoy these valuation benefits when they list on reputable markets outside the United States. In Table 7, we re-estimate our valuation equations by excluding U.S.-bound listings. Overall, even after excluding foreign listings on U.S. stock exchanges, we continue to observe a large disparity in investors' valuations of firms listing on more and less reputable exchanges. Looking at the Wald F-statistics, we reject $H_0 : \lambda_{MORE,j} \leq 0$ or $H_0 : \lambda_{LESS,j} \geq 0$ in favor of the alternatives, although admittedly some of the longer run coefficients are now less significant. This lower significance may simply be an artifact of lower statistical power resulting from dropping the U.S.-bound listings that play a crucial role in fitting the relationship between the q ratio and cross-listing choices.

Despite the smaller statistical significance of these post-listing effects, the average effect of cross listing in a more prestigious market $\overline{\lambda}_{MORE}$ is 0.89, comparatively larger than when we included foreign listings in United States. The empirical findings affirm that these certification benefits not only accrue to firms that listed on the highly prestigious U.S. exchanges, but are also enjoyed by companies with cross-border listings on other reputable host-country destinations. Evaluating the average effect of having a foreign listing in a less prestigious market $\overline{\lambda}_{LESS}$ over this six-year horizon is roughly -0.66, but not statistically significant from zero. Much of this lower significance in $\overline{\lambda}_{LESS}$ can be attributed to the positive boost in valuation experienced at the time of the listing $(t = 0)$. Even though these firms are cross listing in a less reputable market, the evidence reveals a bump-up in their q ratios in their first year.

To better understand the importance of information discovery at the time of the cross listing, we re-estimate the firm value regressions separately for younger and mature firms (Table 8). For simplicity, the group of young firms is represented by companies that cross listed within the first five years of their public life. The results reveal a significant difference in the coefficients of $\lambda_{MORE,j}$ and $\lambda_{LESS,j}$ between young and mature firms. Young firms enjoy a relatively greater boost in q after cross listing on a more reputable exchange. In contrast, with the

exception of the positive coefficient of $\lambda_{LESS,j}$ at the time of the listing $(t = 0)$, they experience a bigger drop in valuation when they opt for a foreign listing on a less prestigious exchange.

The magnified impact on the valuation of younger firms illustrates that foreign listings convey useful information to market participants. Several studies document that firm visibility is a crucial factor for younger, more opaque firms. Krigman, Shaw, and Womack (2001) find that IPO companies are more predisposed to switch lead underwriters to improve research coverage. There is also strong evidence of a close link between investment analysis and institutional ownership (O'Brien and Bhushan 1990 and Falkenstein 1996). Chung and Jo (1996) find a positive relationship between analyst following and Tobin's q. Thus, higher financial visibility can ultimately improve the franchise value of the firm.

Our findings showcase several dimensions in which investors respond to the certification value of foreign listings. The large increase observed in the q ratio of younger firms at the year of the foreign listing $(t = 0)$ likely signifies an immediate impact of improving financial visibility. Understandably, these immediate certification benefits are very strong for companies that move to the most prestigious exchanges; however, we also find that younger firms that cross list in less reputable destinations than their home market experience a temporary valuation boost.

5.2 Unconditional Regressions

The regression analysis presented in the previous section investigates the impact of foreign listings only for the subset of firms that decided to cross list. In a statistical context, these conditional regressions focusing only on the treatment group offer a better perspective for analyzing the ex post performance of cross-listed firms. Understandably, this approach ignores a large segment of the information set represented by firms without a cross listing. However, the unconditional approach (that is, comparing the q ratio of all firms with and without cross listings) is fraught with endogeneity and sample selection problems (Doidge, Karolyi, and Stulz 2004).

In the unconditional framework, a large segment of public firms do not have a foreign listing. The absence of a listing generates endogeneity problems because forward-looking investors price firms not only on their actual listings, but perhaps also on their likelihood to have a foreign listing. To better illustrate this endogeneity problem, consider two very similar public firms in a small emerging market and suppose that one of these firms chooses to list on the NYSE. Our conditional regression findings from the previous section demonstrate that this firm

will likely enjoy a significant boost in valuation. Forward-looking investors, however, might also partially reward the firm that has not yet cross listed with a higher premium, anticipating that it will also list on the NYSE. A simple unconditional regression that controls only for the effect of the cross-listing decision will produce biased coefficients.

The two-step Heckman-type estimator partially corrects for this endogeneity problem by controlling the incentive to cross list (Heckman 1979). While the Heckman method can control for the unobserved incentives to cross list, it cannot ex ante account for the directional effects gained by firms listing in a more or a less prestigious market. Given the large number of choices of host-market destinations and countries of origin, the task of controlling for these latent market choices would be highly speculative. The unconditional approach is therefore less suitable for examining the directional effects of listing on a more prestigious market because the choice variables $\mathrm{MORE}_{t+j,i}$ and $\mathrm{LESS}_{t+j,i}$ are unobserved for domestically listed firms. Nevertheless, this approach is very useful for comparing differences between international firms with domestic and foreign listings and those without foreign listings.

In this section, we use a variation of the Heckman self-selection method to correct for some of these embedded endogeneity problems stemming from the cross-listing decision. The unconditional specification is defined by

$$\begin{aligned} q_{ti} = {} & \alpha_0 + \alpha_1 I_t + \alpha_2 I_C + \alpha_3 q_I + \alpha_4 I_V + \gamma z_{tC\bullet} + \beta x_{ti\bullet} + \mu \mathrm{MILLS}_{ti} + \\ & \lambda_M L_{ti}^{M} + \lambda_{OTC} L_{ti}^{OTC} + \sum_{j=-K}^{K} \lambda_j L_{t+j,i} + \varepsilon_{ti}. \end{aligned} \tag{6}$$

The inverse Mills ratio, MILLS_{ti}, is derived from a first-stage probit regression. The dependent variable in the probit equation, defined as the probability that the company will cross list, depends on an explanatory vector, $w_{ti\bullet}$,

$$\begin{aligned} & y_{ti}^{*} = \delta_0 + \delta_1 I_t + \delta_2 I_C + \delta_3 q_I + \delta_C z_{tC\bullet} + \delta_Z z_{ti\bullet} + \upsilon_{ti} = \delta w_{ti\bullet} + \upsilon_{ti}, \\ & y_{ti} = 1 \ \text{ if } \ y_{ti}^{*} > 0 \quad \text{(firm cross lists);} \\ & y_{ti} = 0 \ \text{ if } \ y_{ti}^{*} \le 0 \quad \text{(firm does not cross list).} \end{aligned} \tag{7}$$

The Mills ratio is defined by

$$\text{MILLS}_{ti} = \frac{\varphi(\delta w_{ti\bullet})}{\Phi(\delta w_{ti\bullet})} \quad \text{if} \quad \text{firm cross lists,}$$
$$\text{MILLS}_{ti} = -\frac{\varphi(\delta w_{ti\bullet})}{1-\Phi(\delta w_{ti\bullet})} \quad \text{if} \quad \text{otherwise.} \tag{8}$$

The functions $\varphi(\bullet)$ and $\Phi(\bullet)$ represent the normal density and cumulative distribution functions, respectively. Consistent with our previous regression specifications, the probit equation includes the customary year, country, and industry effects that may influence the incentive to cross list. In addition, the vector $z_{ti\bullet}$ incorporates an array of firm characteristics that influence the decision to cross list. One notable difference in the current version is that the explanatory variable $L_{t+j,i}$ traces the impact on firm value K years before and after the cross listing.

Table 9 briefly reports the estimates of the first-stage probit regression. As expected, a greater volume of cross-listing activity, measured by the variable INDUSTRY_LISTINGS, has a strong impact on the probability of a firm having a cross listing. Both country-specific controls are very important, as firms domiciled in countries with higher FREEDOM_SCORE and GDP_GROWTH are more likely to seek a foreign listing. Looking at firm-specific controls, we observe that larger firms have a greater probability of cross listing. The incentive for a foreign listing has a more concave relationship with firm age. Better capitalized firms (measured by equity to assets, or EQA) and firms with higher solvency ratios have a greater propensity to list abroad.

The unconditional regression estimates of firm value are corrected for endogeneity using a two-step Heckman-type estimation method (Table 10). The sample firm size in this framework is quite large, as it encompasses all companies in our panel with available information. The explanatory variable MILLS_{ti} corrects for the inherent endogeneity problems by controlling the conditional probability that the company will opt for a cross listing. Consistent with our priors, the Mills ratio is positively related with a firm's q, indicating that investors reward a company with a larger q premium if it is perceived to have a greater likelihood of cross listing.

By and large, we observe that the unconditional regression estimates are consistent with those revealed in the conditional framework. In particular, country- and firm-specific characteristics continue to be key determinants of firm value. The unconditional regressions, however, also document a large valuation disparity between cross-listed and domestic firms.

With investors expected to respond to the announcement or actual event of the foreign listing, the valuation premium climaxes at (t=0) and (t=-1). Somewhat surprisingly, firms with foreign listings appear to garner this premium up to five years before the event.

This significant gap in the q ratio was extensively documented by Gozzi, Levine, and Schmukler (2008). To rationalize this ex ante difference in q between domestic and cross-listed firms, the authors look at segmentation theories (Errunza and Miller 2000). According to this premise, firms opt for a cross listing to circumvent domestic market inefficiencies (such as illiquidity and poor regulation) that discourage investors. According to segmentation theories, the valuation gap for firms with cross listings would more likely be experienced before the event because the market anticipates the benefits of a lower cost of capital. In contrast, bonding theories would predict that these firm valuations will be more permanent and persist after the cross listing.

The last two columns of Table 10 re-estimate the unconditional specification for mature and younger firms. Here, a firm is classified as mature when its public age (years from time of IPO) is greater than five years. This breakdown reveals that, for the most part, the observed ex ante valuation premium is garnered by the younger firms. This result lends further support to the segmentation arguments discussed above, because clearly these younger firms have the most to gain by circumventing their inefficient domestic markets.

6. CONCLUSION

This paper investigates the impact of global cross-listing activities on a firm's valuation, an issue that has attracted much interest in the financial literature. Several studies have documented that cross listings on U.S. stock exchanges generate large valuation benefits. Our study analyzes a broader framework for this premise, asserting that firm value is differentially affected depending on the reputation gap between the domestic and cross-listing destination markets. Specifically, we hypothesize that the prestige of the destination exchange serves as a signaling mechanism for investors to update information regarding the future value of the cross-listing firm.

We apply a methodology common in network analysis to estimate a time-varying measure of prestige for forty-five country or regional stock exchanges between 1990 and 2006. Our findings reveal a strong differential effect for firms cross listing in a more or a less

prestigious market than their domestic market. In particular, we show that firms cross listing in a more prestigious market enjoy significant valuation gains over the five-year period following the listing. We also document that the effect is symmetric, as firms cross listing in less prestigious markets suffer a significant decline in valuation over this same five-year post-listing period. In addition, we find that a firm's future valuation also benefits if the destination market raises the firm's reputation globally.

One major implication of our findings is that stock exchange reputation is a very important factor for enticing cross-border listings. Over the last few years, there has been intense debate about the declining role of U.S. equity markets in attracting foreign listings. In 2006, the Committee on Capital Markets Regulation, a group of business professionals and academics, issued a long report arguing that U.S. public markets have lost their edge and proposing reforms to lessen the regulatory burden and relax several aspects of the Sarbanes-Oxley Act. A McKinsey and Company study, commissioned by New York City in 2007, echoed many of these themes as a way to improve New York's competitive position as a major global financial center.

Our findings, however, appear to suggest that any policies that lower regulatory or exchange listing standards might be counterproductive and backfire over the long run. The empirical evidence suggests that investors attach a high value to a stock market's ability to certify listed companies. Any attempt to lower these disclosure standards to boost short-term benefits might harm the prestige of the exchange and erode its ability to attract high-quality foreign firms in the future.

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Table 1. Cross Tabulation of Home and Destination Country Markets

Host Market	Argentina	Australia	Austria	Canada	China	Euronext	Germany	Hong Kong	India	Ireland	Israel	Italy	Japan	Korea	Luxembourg	Malaysia	Mexico	N Zealand	Norway	OMX	Other	Singapore	S Africa	Spain	Switzerland	Taiwan	U.K.	U.S.	Total
Argentina				1											1		1							1					4
Australia				3		2	1	2		1						1		30		1	3	2					13	5	64
Austria		1				1	3						1								1								7
Canada		10				2		1												1		1		1			9	42	67
China								1														2							3
Euronext				8					3			7	13		6				1	45	4		10	5	3	2	22	20	149
Germany			10	1	5	20			1	2	9	3	5		3						2		1		2		4	14	82
Hong Kong					94											2						2							98
India		1			1																2							2	6
Ireland				1		2																					16		19
Israel						1																					1	4	6
Italy						5	1																					1	7
Japan							1					1		1		1											7	9	20
Korea									1				1			2					3							1	8
Luxembourg						7	2		44												5					9	4		71
Malaysia					1																	2					1		4
Mexico				1											2														3
N Zealand		44		1																	1						14		60
Norway				4		2				1	1				1												2	3	14
OMX				2		1						1	2		3				15				1		4		2	5	36
Other			1	4		1																				3		6	15
Singapore		6			5			7	1		1		4			94			1		5						2	8	134
S. Africa		1		2											3												11		17
Spain						1						1			1		10				19								32
Switzerland		1	3	7		23	17						3							2	1		4			17	52	130
Taiwan					2		1															1	1					1	6
U.K.	2	65	3	42	12	96	77		44	37	12	34	28	2	2	6	9	1	7	50	71	6	18	29	6	31		125	815
U.S.	20	115	13	304	53	116	48	18	73	15	79	26	188	8	8	18	56	7	12	49	198	36	39	15	5	41	214		1774
Total	22	244	30	381	173	280	151	29	167	56	102	73	245	11	30	124	76	38	36	148	315	52	74	51	20	86	339	298	3651

Notes: This table presents a cross tabulation of the home-country and host-exchange locations for all cross listings. The sample includes all cross listings except the unofficial foreign listings on German stock exchanges. The group "Other" includes the small countries and host markets used in our analysis. Table 4 provides a complete list of all forty-five host country/region destinations. Information on cross listings was compiled from Datastream, various ADR Programs, Capital IQ, and Bloomberg Financial.

Table 2. Destinations for the Sample of Cross-Listed Firms

Host Market	First Listing	Second Listing	Third Listing
Argentina	2	2	
Australia	59	4	1
Austria	4	2	1
Canada	62	1	4
China	3		
Euronext	136	8	5
Germany	53	18	11
Hong Kong	97	1	
India	6		
Ireland	19		
Israel	6		
Italy	3	2	2
Japan	17	1	2
Korea	8		
Luxembourg	45	25	1
Malaysia	4		
New Zealand	56	4	
Norway	17	1	
OMX	35		1
Singapore	129	5	
South Africa	17		
Spain	26	5	1
Switzerland	111	10	9
Taiwan	6		
U.K.	664	51	17
U.S.	937	81	1
Other Markets	15	1	2
Total	2537	222	58

Notes: This table presents *official* foreign listings for all major stock market destinations. The order of the second and third listing is not chronological but reflects more the importance of the host destination. The table excludes Level I listings in the United States. The table also does not include the large number of unofficial cross listings on German stock exchanges. Information on cross listings was compiled from Datastream, various ADR Programs, Capital IQ, and Bloomberg Financial.

Table 3. Cross-Listing Activities of U.S. and Overseas Public Companies

	Asia	Continental Europe	Oceania	North America	Other	ALL
Firm Age (years)	A. Distribution of Cross-Listed Firms by Age					
1	57.39	46.75	22.62	26.81	30.46	40.71
2	5.51	7.21	5.95	9.59	11.26	7.67
3	4.76	7.21	2.98	5.09	3.31	5.58
4	3.01	4.33	11.31	6.26	6.62	5.29
5	5.01	3.61	5.36	3.33	2.65	3.88
6	1.00	4.09	7.14	4.50	7.95	4.12
7	2.01	3.13	5.36	3.91	5.30	3.44
8	2.51	2.52	2.38	4.11	2.65	2.91
9	0.50	1.92	1.79	3.13	3.31	2.04
10	2.01	0.60	3.57	4.50	3.31	2.28
10>	15.79	17.91	30.36	26.42	19.21	20.72
	B. Fraction of All Public Firms that Cross-List by Age					
0	0.000	0.000	0.000	0.000	0.000	0.000
1	0.014	0.037	0.015	0.012	0.018	0.019
2	0.016	0.044	0.021	0.017	0.024	0.024
3	0.018	0.051	0.023	0.019	0.027	0.027
4	0.019	0.056	0.034	0.022	0.031	0.030
5	0.021	0.061	0.040	0.024	0.033	0.033
6	0.022	0.067	0.050	0.027	0.037	0.037
7	0.023	0.071	0.057	0.029	0.042	0.040
8	0.025	0.076	0.062	0.032	0.046	0.043
9	0.027	0.081	0.069	0.034	0.050	0.046
10	0.031	0.083	0.082	0.038	0.056	0.050

Notes: The two panels in this table describe the cross-listing activities of international firms over the period 1990-2006. Both panels cross tabulate the first cross listing with the age of the firm. Firm age is measured by the year of the first listing minus the year the firm had its IPO (or first domestic listing, if IPO date is missing). To compute the fraction of public firms that decided to cross list, we use a nonparametric duration approach that corrects for censoring. In this framework, the cross listing is considered the terminal event. The region "Other" represents mostly firms domiciled in Africa and South America. Information on cross listings was compiled from Datastream, various ADR Programs, Capital IQ, and Bloomberg Financial. Company-specific information was obtained from Osiris Bureau Van Dijk.

Table 4. Country Rankings Based on the Network Prestige Index of IPO Activity

1995		2000		2006	
Country	Prestige	Country	Prestige	Country	Prestige
United States	0.211	United States	0.222	United States	0.152
Japan	0.059	Germany	0.064	United Kingdom	0.055
United Kingdom	0.059	United Kingdom	0.049	Germany	0.046
Euronext	0.033	Japan	0.035	Hong Kong	0.037
Germany	0.029	Euronext	0.027	Japan	0.035
China	0.016	China	0.023	Euronext	0.032
Australia	0.014	Italy	0.016	China	0.027
Mexico	0.014	Australia	0.015	Canada	0.027
Canada	0.012	Canada	0.013	Australia	0.017
Italy	0.011	Nordic Exchanges	0.011	South Korea	0.013
Hong Kong	0.01	Hong Kong	0.009	Italy	0.01
Nordic Exchanges	0.01	South Korea	0.009	Singapore	0.008
India	0.007	Switzerland	0.008	Russia	0.007
South Korea	0.007	Taiwan	0.006	Middle East	0.007
Indonesia	0.006	Spain	0.005	Brazil	0.006
Thailand	0.006	Greece	0.003	India	0.006
Taiwan	0.006	Singapore	0.003	Switzerland	0.004
Malaysia	0.005	Malaysia	0.003	Norway	0.004
Singapore	0.005	Indonesia	0.002	Spain	0.004
Switzerland	0.004	India	0.002	Thailand	0.004
Argentina	0.003	Ireland	0.002	Taiwan	0.004
Philippines	0.003	Turkey	0.002	Austria	0.003
Chile	0.001	Formerly Eastern Bloc	0.002	Nordic Exchanges	0.003
Middle East	0.001	Norway	0.001	Poland	0.003
Norway	0.001	Austria	0.001	Austria	0.002
New Zealand	0.001	Philippines	0.001	Formerly Eastern Bloc	0.002
Pakistan	0.001	Poland	0.001	New Zealand	0.002
Poland	0.001	Argentina	0.001	Greece	0.001
Spain	0.001	Hungary	0.001	Ireland	0.001
Turkey	0.001	Thailand	0.001	Mexico	0.001
Other Africa	0	Bangladesh	0	Turkey	0.001
Austria	0	Brazil	0	Philippines	0.001
Bangladesh	0	Chile	0	Argentina	0
Brazil	0	Egypt	0	Bangladesh	0
Formerly Eastern Bloc	0	Israel	0	Chile	0
Egypt	0	Mexico	0	Egypt	0
Greece	0	New Zealand	0	Indonesia	0
Hungary	0	Middle East	0	Israel	0
Ireland	0	Other Africa	0	Hungary	0
Israel	0	Peru/Ecuador	0	Other Africa	0
Peru/Ecuador	0	Pakistan	0	Pakistan	0
Russia	0	Russia	0	Peru/Ecuador	0
South Africa	0	South Africa	0	South Africa	0
Sri Lanka	0	Sri Lanka	0	Sri Lanka	0
Venezuela/Colombia	0	Venezuela/Colombia	0	Venezuela/Colombia	0

Notes: The prestige index for location i is obtained as a weighted average of the prestige index of all locations in the matrix, where the weights are represented by the total volumes from each location directed toward location i. IPO equity issuance flows were obtained from Thomson Financial *Securities Data Corporation* and Bloomberg Financial.

Table 5. Definitions and Summary Statistics for Regression Variables

Explanatory Variables	Definition	Cross Listed	Non-Cross Listed	Difference
Dependent Variable q_{ti}				
Tobin's q	Tobin's q ratio = (Total Assets - Book Value Equity + Market Value Equity) / Total Assets (percent)	144.61	135.54	-9.07***
Country Controls $Z_{tC\bullet}$				
FREEDOM_SCORE	Composite Heritage World Freedom Index (percent)	68.94	69.18	0.22***
GDP_GROWTH	GDP per capita (percent)	83.81	75.95	-7.86***
OPENNESS	Trade openness (exports and imports)/real GDP (percent)	3.65	3.64	-0.009
Firm Controls $x_{ti\bullet}$				
SIZE	Total assets (in $ millions)	4,680.9	2,055.8	-2,625***
AGE	Age from time of incorporation (in years)	30.59	29.87	-0.728***
ROA	Return on assets (percent)	0.526	1.082	0.554
GROWTH_SALES	Change in logarithm of total sales	0.1293	0.0478	-0.081***
Cross Listing				
L_{ti}^{OTC}	= 1 if firm (i) has a Level I U.S foreign issue; 0 otherwise	0.079	0.0216	-0.057***
L_{ti}	=1 if firm (i) has cross listing at year (t); 0 otherwise	0.691		
L_{ti}^{M}	=1 if firm (i) has multiple listings at year (t); 0 otherwise	0.101		
$IMPROVE_{ti}$	Cumulative improvement in the reputation of the host market after the cross listing	-0.053		
$MORE_{t+j,i} = L_{t+j,i} \times Gap_{0i}^{H,D} \times I_{0i}^{H,D}$	Indicator (j) years after firm cross listed on a more prestigious exchange multiplied by the prestige score gap (percent)	0.577		
$LESS_{t+j,i} = L_{t+j,i} \times Gap_{0i}^{H,D} \times (1 - I_{0i}^{H,D})$	Indicator (j) years after firm cross listed on a less prestigious exchange multiplied by the prestige score gap (percent)	0.037		
Firm-Year Observations		19,879	160,412	

Notes: P_{0i}^{H} = prestige index of the host market of firm (i) at the time of cross listing (t = 0). P_{0i}^{D} =prestige index of the domestic market of firm (i) at the time of the cross listing (t = 0). $Gap_{0i}^{H,D} = \left| P_{0i}^{H} - P_{0i}^{D} \right|$. $I_{0i}^{H,D} = 1$ if $P_{0i}^{H} - P_{0i}^{D} > 0$; 0 otherwise. The symbols (*), (**), and (***) indicate statistical significance at the 10, 5, and 1 percent levels, respectively. Because of missing values, the number of year-firm observations varies by the variable. The table reports the maximum available number of firm-year observations. By definition, non-cross-listed firms do not have official listings; therefore they have missing values for cross-listing information.

Table 6. Conditional Regressions for Firms with Cross Listings
Dependent Variable: Firm's Tobin's q

Explanatory Variables	(1)	(2)	(3)	(4)
Intercept	-16.355	-15.279	-17.560	-15.587
	(-0.45)	(-0.43)	(-0.48)	(-0.43)
q_I	1.066***	1.060***	1.057***	1.037***
	(10.23)	(10.11)	(10.08)	(10.11)
Country Controls $Z_{tC\bullet}$				
FREEDOM_SCORE	1.568***	1.517***	1.559***	1.583***
	(4.55)	(4.53)	(4.50)	(4.53)
GDP_GROWTH	2.769***	2.734***	2.756***	2.806***
	(5.34)	(5.35)	(5.35)	(5.36)
OPENNESS	-0.318***	-0.316***	-0.321***	-0.318***
	(-4.39)	(-4.43)	(-4.44)	(-4.38)
Firm Controls $x_{ti\bullet}$				
SALES_GROWTH	1.029**	1.036**	0.981**	1.029**
	(2.09)	(2.11)	(2.01)	(2.12)
log(AGE)	0.955	1.497	3.649	3.129
	(0.30)	(0.47)	(1.14)	(0.97)
$\log(AGE)^2$	-0.768*	-0.839*	-1.150*	-1.054*
	(-1.43)	(-1.56)	(-2.15)	(-1.96)
log(ASSETS)	-11.155***	-10.929***	-11.020***	-10.991***
	(-8.08)	(-7.80)	(-7.86)	(-7.67)
$\log(ASSETS)^2$	0.576***	0.546***	0.555***	0.536***
	(6.06)	(5.59)	(5.67)	(5.40)
ROA	0.527***	0.527***	0.529***	0.532***
	(8.20)	(8.22)	(8.28)	(8.35)
Other Cross-Listing Dummies				
L_{ti}^{OTC}		-6.180***	-6.047***	-4.815***
		(-3.84)	(-3.7)	(-2.98)
L_{ti}^{M}		5.336***	5.466***	5.325***
		(3.23)	(3.33)	(3.25)
Primary Cross-Listing-Year Dummies				
L_{ti}		3.568		
		(1.71)		
$L_{t+0,i}$			10.94***	
			(4.22)	
$L_{t+1,i}$			5.15**	
			(2.21)	
$L_{t+2,i}$			0.275	
			(0.11)	
$L_{t+3,i}$			1.154	
			(0.49)	

Table 6 continued on next page

$L_{t+4,i}$			-0.643	
			(-0.29)	
$L_{t+5,i}$			0.560	
			(0.25)	
Directional Cross-Listing Controls				
$MORE_{t+0,i}$				0.904***
				(4.26)
$MORE_{t+1,i}$				0.625***
				(3.24)
$MORE_{t+2,i}$				0.372**
				(2.10)
$MORE_{t+3,i}$				0.478***
				(2.59)
$MORE_{t+4,i}$				0.406**
				(2.27)
$MORE_{t+5,i}$				0.420**
				(2.54)
$LESS_{t+0,i}$				0.802
				(0.91)
$LESS_{t+1,i}$				-1.680
				(-1.39)
$LESS_{t+2,i}$				-2.067**
				(-2.18)
$LESS_{t+3,i}$				-1.929**
				(-2.37)
$LESS_{t+4,i}$				-2.635***
				(-2.89)
$LESS_{t+5,i}$				-0.945
				(-1.17)
$IMPROVE_{ti}$				1.435***
				(3.21)
Hypothesis Testing: F-tests				
Hypothesis 1: $H_0 : \lambda_{MORE,j} \leq 0, j = 0,\ldots,5$				8.38***
Hypothesis 1: $H_0 : \overline{\lambda}_{MORE} \leq 0$				45.69***
Hypothesis 2: $H_0 : \lambda_{LESS,j} \geq 0, j = 0,\ldots,5$				3.23***
Hypothesis 2: $H_0 : \overline{\lambda}_{LESS} \geq 0$				10.71***
Number of Observations	14,734	14,734	14,734	14,734
R-square	0.213	0.215	0.216	0.219

Notes: q_I = average q ratio of the NAICS industry in which the company is classified. The remaining regression variables are defined in Table 5. In addition to these explanatory variables, the regression model includes year dummy effects, country fixed effects, and vintage effects (calendar year in which the firm does its cross listing). Standard errors are clustered by home country and year. The symbols (*), (**), and (***) indicate statistical significance at the 10, 5, and 1 percent levels, respectively. Numbers in parentheses represent t-statistics.

Table 7. Conditional Regressions on Firms that Cross Listed, Excluding U.S. Cross Listings
Dependent Variable: Firm's Tobin's q

Explanatory Variables	(1)	(2)	(3)	(4)
Intercept	-39.833	-37.401	-41.506	-41.975
	(-1.06)	(-1.01)	(-1.09)	(-1.10)
q_I	1.213***	1.207***	1.204***	1.195***
	(15.17)	(14.95)	(15.19)	(15.00)
Country Controls $Z_{tC\bullet}$				
FREEDOM_SCORE	1.737***	1.630***	1.734***	1.771***
	(4.48)	(4.35)	(4.45)	(4.55)
GDP_GROWTH	3.036***	2.972***	3.024***	3.074***
	(5.02)	(5.00)	(5.04)	(5.08)
OPENNESS	-0.351***	-0.341***	-0.354***	-0.352***
	(-4.77)	(-4.78)	(-4.83)	(-4.78)
Firm Controls $x_{ti\bullet}$				
SALES_GROWTH	0.601	0.615	0.563	0.585
	(1.07)	(1.09)	(1.01)	(1.04)
log(AGE)	1.847	2.300	4.408	3.485
	(0.51)	(0.64)	(1.22)	(0.97)
$\log(AGE)^2$	-0.840*	-0.911*	-1.211*	-1.075*
	(-1.38)	(-1.50)	(-1.99)	(-1.77)
log(ASSETS)	-16.02***	-15.99***	-16.02***	-15.99***
	(-10.86)	(-10.84)	(-10.87)	(-10.80)
$\log(ASSETS)^2$	0.956***	0.941***	0.947***	0.945***
	(9.45)	(9.18)	(9.24)	(9.16)
ROA	0.628***	0.630***	0.631***	0.630***
	(7.71)	(7.75)	(7.79)	(7.75)
Other Cross-Listing Dummies				
L_{ti}^{OTC}		-2.864	-2.554	-2.573
		(-1.83)	(-1.63)	(-1.64)
L_{ti}^{M}		3.484**	3.862**	3.831**
		(1.82)	(2.05)	(2.02)
Primary Cross-Listing-Year Dummies				
L_{ti}		6.038**		
		(2.43)		
$L_{t+0,i}$			11.35***	
			(3.72)	
$L_{t+1,i}$			4.82*	
			(1.80)	
$L_{t+2,i}$			0.357	
			(0.13)	
$L_{t+3,i}$			0.650	
			(0.24)	

Table 7 continued on next page

$L_{t+4,i}$			-1.620	
			(-0.64)	
$L_{t+5,i}$			0.607	
			(0.22)	
Directional Cross-Listing Controls				
$MORE_{t+0,i}$				2.089**
				(2.20)
$MORE_{t+1,i}$				1.663*
				(1.96)
$MORE_{t+2,i}$				0.966
				(1.33)
$MORE_{t+3,i}$				0.532
				(0.81)
$MORE_{t+4,i}$				0.139
				(0.22)
$MORE_{t+5,i}$				0.878
				(1.08)
$LESS_{t+0,i}$				1.729*
				(1.91)
$LESS_{t+1,i}$				-0.989
				(-1.22)
$LESS_{t+2,i}$				-1.374**
				(-1.98)
$LESS_{t+3,i}$				-1.228**
				(-2.01)
$LESS_{t+4,i}$				-1.852***
				(-2.86)
$LESS_{t+5,i}$				-0.211
				(-0.33)
$IMPROVE_{ti}$				0.435
				(0.69)
Hypothesis Testing: F-tests				
Hypothesis 1: $H_0 : \lambda_{MORE,j} \leq 0, j = 0,\ldots,5$				2.15**
Hypothesis 1: $H_0 : \overline{\lambda}_{MORE} \leq 0$				8.43***
Hypothesis 2: $H_0 : \lambda_{LESS,j} \geq 0, j = 0,\ldots,5$				1.81*
Hypothesis 2: $H_0 : \overline{\lambda}_{LESS} \geq 0$				2.18
Number	9,709	9,709	9,709	9,709
R-square	0.248	0.250	0.251	0.251

Notes: The regression variables are defined in Tables 5 and 6. In addition to these explanatory variables, the regression model includes year dummy effects, country fixed effects, and vintage effects (calendar year in which the firm does its cross listing). Standard errors are clustered by home country and year. The symbols (*), (**), and (***) indicate statistical significance at the 10, 5, and 1 percent levels, respectively. Numbers in parentheses represent t-statistics.

Table 8. Conditional Regressions with Cross Listings by Maturity of Firms
Dependent Variable: Firm's Tobin's q

Explanatory Variables	Young Firms	Mature Firms
Intercept	159.435***	-71.583*
	(3.37)	(-1.88)
q_I	1.056***	0.989***
	(11.00)	(7.61)
Country Controls $Z_{tC\bullet}$		
FREEDOM_SCORE	0.316	2.440***
	(0.90)	(6.25)
GDP_GROWTH	2.209***	3.020***
	(3.91)	(5.48)
OPENNESS	-0.501***	-0.311***
	(-5.50)	(-3.89)
Firm Controls $x_{ti\bullet}$		
SALES_GROWTH	1.081*	0.922
	(1.70)	(1.64)
log(AGE)	20.004***	-22.217***
	(4.69)	(-3.33)
$\log(AGE)^2$	-3.550***	2.370**
	(-4.80)	(2.41)
log(ASSETS)	-11.094***	-12.972***
	(-6.57)	(-6.78)
$\log(ASSETS)^2$	0.453***	0.799***
	(3.71)	(5.90)
ROA	0.463***	0.675***
	(6.45)	(7.60)
Other Cross-Listing Dummies		
L_{ti}^{OTC}	-2.755	-4.743**
	(-1.13)	(-2.41)
L_{ti}^{M}	6.838**	4.416**
	(2.43)	(2.23)
Directional Cross-Listing Controls		
$MORE_{t+0,i}$	1.282***	0.490*
	(4.34)	(1.74)
$MORE_{t+1,i}$	1.034***	0.131
	(4.12)	(0.48)
$MORE_{t+2,i}$	0.459**	0.356
	(1.97)	(1.39)
$MORE_{t+3,i}$	0.399*	0.689**
	(1.77)	(2.17)
$MORE_{t+4,i}$	0.322	0.595
	(1.58)	(1.59)

Table 8 continued on next page

$MORE_{t+5,i}$	0.226	0.809**
	(1.19)	(2.32)
$LESS_{t+0,i}$	4.315*	0.017
	(1.71)	(0.02)
$LESS_{t+1,i}$	-1.740	-1.186
	(-0.85)	(-1.14)
$LESS_{t+2,i}$	-3.201	-1.483**
	(-1.62)	(-1.97)
$LESS_{t+3,i}$	-3.204*	-1.268*
	(-1.83)	(-1.89)
$LESS_{t+4,i}$	-4.109**	-2.146***
	(-2.24)	(-2.68)
$LESS_{t+5,i}$	-2.286	-0.490
	(-1.18)	(-0.65)
$IMPROVE_{ti}$	1.626**	1.518***
	(2.07)	(3.10)
Hypothesis Testing: F-tests		
Hypothesis 1: $H_0 : \lambda_{MORE,j} \leq 0, j = 0,\ldots,5$	7.50***	3.69***
Hypothesis 1: $H_0 : \overline{\lambda}_{MORE} \leq 0$	31.69***	18.02***
Hypothesis 2: $H_0 : \lambda_{LESS,j} \geq 0, j = 0,\ldots,5$	2.28**	1.45
Hypothesis 2: $H_0 : \overline{\lambda}_{LESS} \geq 0$	3.07*	5.52***
Number of Observations	7,505	7,248
R-square	0.259	0.224

Notes: Young firms are those that cross listed within the first five years after going public. The variables are defined in Tables 5 and 6. In addition to these explanatory variables, the regression model includes year dummy effects, country fixed effects, and vintage effects (calendar year in which the firm does its cross listing). Standard errors are clustered by home country and year. The symbols (*), (**), and (***) indicate statistical significance at the 10, 5, and 1 percent levels, respectively. Numbers in parentheses represent t-statistics.

Table 9. First Stage of Heckman Correction: Probit Regression on the Decision to Cross List
Dependent Variable: The probability that the firm will cross list in year (t)

Explanatory Variables	(1)
Intercept	-9.480***
	(1212.5)
INDUSTRY_LISTINGS	0.0004***
	(80.9)
Country Controls $Z_{tC\bullet}$	
FREEDOM_SCORE	0.050***
	(362.5)
GDP_GROWTH	0.033***
	(71.1)
Firm Controls $x_{ti\bullet}$	
SALES_GROWTH	1.911***
	(8.38)
log(AGE)	0.029*
	(3.6)
$\log(AGE)^2$	0.015***
	(147.7)
log(ASSETS)	0.766***
	(251.2)
$\log(ASSETS)^2$	-0.092***
	(135.4)
EQA	0.033**
	(5.1)
SALES_GROWTH	-0.013**
	(5.25)
ROA	-0.003***
	(28.61)
SOLVENCY_RATIO	0.005***
	(167.8)
Firm-Year Observations	130,804
Cross-Listed Firms	1,862
Non-Cross-Listed Firms	21,154
Pseudo R^2	0.295

Notes: The explanatory variable INDUSTRY_LISTINGS represents the number of cross listings at the industry level (NAICS) that took place in year (t). The variable SOLVENCY_RATIO is measured by after-tax profits plus depreciation divided by liabilities and represents the ability of a firm to meet its funding obligations. EQA is the equity-to-assets ratio. The remaining explanatory variables are defined in Tables 5 and 6. The symbols (*), (**), and (***) indicate statistical significance at the 10, 5, and 1 percent levels, respectively. In addition to these explanatory variables, the regression model includes year dummy effects, country fixed effects, and vintage effects (calendar year in which the firm does its cross listing). Numbers in parentheses represent chi-square values.

Table 10. Unconditional Regressions for Firms with or without Cross Listings with the Heckman Correction

Dependent Variable: Firm's Tobin's q

Explanatory Variables	All Firms	Mature Firms	Young Firms
Intercept	-34.148*	-54.463**	-13.153
	(-1.70)	(-2.51)	(-0.48)
q_I	1.243***	1.132***	1.266***
	(14.97)	(13.76)	(13.89)
Country Controls $Z_{tC\bullet}$			
FREEDOM_SCORE	0.877***	1.168***	0.534
	(2.91)	(3.91)	(1.47)
GDP_GROWTH	2.115***	2.029***	2.262***
	(4.54)	(4.12)	(4.56)
OPENNESS	-0.128***	-0.171***	-0.142***
	(-3.24)	(-4.34)	(-2.73)
Firm Controls $x_{ti\bullet}$			
SALES_GROWTH	1.738***	1.123***	2.211***
	(7.71)	(4.93)	(6.93)
log(ASSETS)	-14.254***	-13.282***	-15.385***
	(-12.22)	(-10.9)	(-12.64)
$\log(\text{ASSETS})^2$	1.049***	1.095***	0.964***
	(10.75)	(10.78)	(8.87)
log(AGE)	-5.607**	-0.632	8.321***
	(-2.83)	(-0.23)	(2.92)
$\log(\text{AGE})^2$	-0.254	-0.477	-2.682***
	(-0.66)	(-1.2)	(-4.38)
ROA	0.528***	0.558***	0.498***
	(7.58)	(6.16)	(7.89)
MILLS_RATIO	7.139***	7.145***	4.721***
	(7.51)	(7.13)	(2.93)
Other Cross-Listing Dummies			
L_{ti}^{OTC}	-0.869	-0.967	-1.044
	(-0.53)	(-0.56)	(-0.26)
L_{ti}^{M}	3.750***	3.346***	8.435***
	(3.96)	(3.25)	(3.33)
Primary Cross-Listing-Year Dummies			
$L_{t-5,i}$	13.566**	9.217	18.299**
	(2.66)	(1.49)	(2.54)
$L_{t-4,i}$	10.829**	5.913	16.408**
	(2.21)	(1.02)	(2.38)
$L_{t-3,i}$	12.114**	8.439	15.042**
	(2.18)	(1.31)	(2.17)

$L_{t-2,i}$	12.997***	7.534	17.629**
	(2.84)	(1.57)	(2.68)
$L_{t-1,i}$	23.546***	16.036***	30.022***
	(5.95)	(3.56)	(5.55)
$L_{t+0,i}$	22.053***	16.913***	27.048***
	(7.60)	(4.1)	(6.08)
$L_{t+1,i}$	3.369	-0.054	11.162**
	(1.31)	(-0.02)	(2.81)
$L_{t+2,i}$	-0.609	-2.972	5.712
	(-0.23)	(-0.89)	(1.38)
$L_{t+3,i}$	0.724	3.276	2.575
	(0.27)	(0.83)	(0.62)
$L_{t+4,i}$	-0.434	1.797	0.444
	(-0.17)	(0.52)	(0.11)
$L_{t+5,i}$	1.486	4.831	0.685
	(0.57)	(1.42)	(0.15)
Number	120,971	73,531	47,440
R-square	0.186	0.190	0.179

Notes: For the sample of cross-listed and non-cross-listed firms, a firm is classified in the "young" category if its public age (years from the time of the IPO or first domestic listing) is less than five years. The MILLS_RATIO is defined by equation (8). The remaining regression variables are defined in Tables 5 and 6. In addition to these explanatory variables, the regression model includes year dummy effects, country fixed effects, and vintage effects (calendar year in which the firm does its cross listing). Standard errors are clustered by home country and year. The symbols (*), (**), and (***) indicate statistical significance at the 10, 5, and 1 percent levels, respectively.