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Article

Firm Value and Cross Listings: The Impact of Stock Market Prestige

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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 a network analysis methodology to derive broad market-based measures of prestige for 45 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. In contrast, firms cross listing in less prestigious markets experience a significant valuation discount over this post-listing period. The reputation of the cross-border listing destinations is therefore a useful signal of firm value going forward. Our findings are consistent with the view that cross listing in a prestigious market enhances firm visibility, strengthens corporate governance, and lowers informational frictions and capital costs.

Keywords: cross-listings; network analysis

JEL classifications: G15, G20

1. Introduction

Prior to the onset of the global financial crisis in 2008, one of the most important issues debated in the financial press was whether U.S. stock markets were still the dominant destination for global financial services. U.S. stock exchanges assumed the mantle of the world's leading financial center in the years following World War II [1], becoming the primary destination of global equity activity, especially from other important financial centers. However, bolstered by the significant pace of globalization in the early 1990s, an increasing number of alternative destinations have emerged to achieve the level of sophistication needed to compete for these equity activities. This evolution has brought with it potential consequences for the geography of financial activity and has affected the hierarchy of international financial centers. As financial conditions return to a more normal mode of operations following the recent crisis, this issue of competitiveness is likely to re-emerge as international stock markets attempt to solidify their position in the hierarchy of global finance.

Many of these emerging financial centers have experienced higher volumes of domestic equity offerings that in previous years would have “migrated” to foreign destinations. At the same time, they were more successful in attracting foreign firms that in past would have preferred to list in more traditional destinations. In light of these changing dynamics of increased globalization in equity markets, our study analyzes the potential effects on companies that implement cross-listing activities around the world.

A company's decision to have a foreign listing 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 [2–5]. Among the benefits, cross listings can reduce market-segmentation problems [6,7], enhance firm visibility and lessen informational asymmetries [8], lower the cost of capital and improve liquidity [9], strengthen investor protection [10,11], and improve the capacity of controlling shareholders to transfer ownership [12].

Several empirical studies document that foreign firms cross listing on U.S. exchanges have enjoyed significant valuation gains *vis-à-vis* those without such a listing (see, for example, [13–16]). Greater competition from overseas financial centers also raises the possibility that foreign firms could also attain these valuation benefits by cross listing in other prominent destinations. Roosenboom and Van Dijk [17] document the importance of the stock market destination by showing that cross listings in United States and London have generated greater cumulative abnormal returns for shareholders.

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 reputation of the destination (more formally defined as *prestige* in the next section) 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 foreign listings enhance firm visibility, lowering informational frictions and capital costs. This premise, which is based on the “investor recognition” hypothesis developed in Merton [18], has been explored by several studies [8,19–21].

We expand on this hypothesis by arguing that this information update should also depend on the company's own market of origin. Among other benefits, cross listing on a prestigious foreign stock exchange may boost visibility, improve corporate governance and firm transparency, and ameliorate

capital costs. These improvements in valuation, however, should be stronger for firms originally listed in a less prestigious location that does not offer these economic and certification benefits. In contrast, firms originally listed in a relatively prestigious location are already enjoying these benefits. In fact, cross listing in a location with lower prestige might alarm investors and harm firm value.

The challenging task of our premise is to derive a measure of market reputation that reflects these potential certification benefits. We propose a social network measure of market prestige. This index produces a ranking of the popularity of each stock market as a location of destination for equity issuance activities. The ranking is determined by taking into account simultaneously both the popularity of each given location as the destination of choice for foreign companies seeking to raise capital through an initial public offering (IPO) and the relative popularity of the locations of origin of the issuing firms. Using a methodology common in network analysis, we are able to derive a time-varying measure of prestige for 45 global stock exchanges and test the impact on valuation for companies cross listing between 1990 and 2006.

We find evidence that cross listing has a substantial impact on firm valuation, once we condition the analysis on the *ex ante* prestige of both markets of origin and destination. Firms that choose to have foreign listings in more prestigious markets relative to their own domestic market enjoy significant valuation gains over the five years following the listing. Moreover, foreign listings in markets that had been less prestigious than the market of origin are associated with declining valuations over the following five years. We also find valuation effects from the evolution of the destination market. Irrespective of whether a firm chooses a less or more prestigious destination at the time of the cross-listing event, its valuation increases (decreases) if the host market subsequently improves (deteriorates) its global status. Our results are consistent with the findings of Doidge, Karolyi, and Stulz [13,14] that document valuation gains from listing on U.S. exchanges over the past two decades. Over this period, U.S. exchanges—as we formally show in a later section—have been arguably the most prestigious destination markets; thus, by focusing on U.S. cross listings, we virtually condition on a rise in prestige.

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. 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 publicly-traded firms from roughly 125 countries.

The primary focus of our analysis is the subset of the 45 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 about 6225 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. A cross-listing represents a publicly traded company's listing on an exchange other than its primary stock exchange. Firms can use this cross listing to raise capital (referred to as a Level III listing on U.S. stock exchanges) but often simply opt to list trading shares. Our sample of cross-listings also includes American depository receipts (ADRs) and their Global depository receipts (GDRs) counterparts. The task of identifying cross listings is nontrivial because there is no consolidated source of information on these activities. The typical information on initial or secondary issuance available from various vendors only captures firms that issue domestically or outside their home market but does not fully identify all cross-listing 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, Citibank, and Deutsche Bank. Collectively, these ADR programs 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 larger 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 is sometimes fragmented. To consolidate our listings information, we compiled a complete timeline for all cross-listed firms using 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. Cross Tabulation of Home and Destination Country Markets.

Host Market	Home 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

Table 1. Cont.

Host Market	Home 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
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

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 45 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 3650 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 [22] and Sarkissian and Schill [23]), although their sample periods are somewhat different. Table 2 tabulates multiple cross-border listings by the location of the host market. The table excludes Level I OTC listings and private placements. Most firms have just a single foreign listing with only about 10 percent of the sample opting for a second foreign listing.

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 the number of *official* foreign listings for all major stock market destinations. The order of the listings 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.

Tables 1 and 2 illustrate the dominance of U.S. stock exchanges as the most preferred destination by overseas companies, which is well documented by earlier literature (for example, [13]). 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 [14] and Peristiani [24] 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 Exchange¹. 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.

A unique feature of our database is that we make concerted effort to trace the decision to cross list over a firm's public life cycle. Using information provided by Osiris, we 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. In particular, more than half of the cross listings are initiated within four years of going public.

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.*).

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.

¹ 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.

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

	Asia	Continental Europe	Oceania	North America	Other	ALL
Firm Age (years)	Distribution of Cross-Listed Firms by Age (percent)					
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
	Cumulative Distribution of All Public Firms that Cross List by Age (percent)					
0	0.0	0.0	0.0	0.0	0.0	0.0
1	1.4	3.7	1.5	1.2	1.8	1.9
2	1.6	4.4	2.1	1.7	2.4	2.4
3	1.8	5.1	2.3	1.9	2.7	2.7
4	1.9	5.6	3.4	2.2	3.1	3.0
5	2.1	6.1	4.0	2.4	3.3	3.3
6	2.2	6.7	5.0	2.7	3.7	3.7
7	2.3	7.1	5.7	2.9	4.2	4.0
8	2.5	7.6	6.2	3.2	4.6	4.3
9	2.7	8.1	6.9	3.4	5.0	4.6
10	3.1	8.3	8.2	3.8	5.6	5.0

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 cumulative distribution 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. Company-specific information was obtained from Osiris Bureau Van Dijk.

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 three percent of them opt to do so after ten years. By comparison, the rate of internationalization is much higher in Europe, where more than eight percent of the companies in this region chose to cross list over the same ten-year post-IPO period.

3. Network Analysis Measures of Stock Market Prestige

As indicated in the introduction, we are conjecturing that our market-based measure of market prestige collectively reflects the wide array of benefits enjoyed by firms cross listing to that location. This index 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 [25], 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.

In addition, the prestige of a certain destination should be especially boosted if it is able to attract companies already trading in more reputable markets where there is already a high level of information transparency. The well-established infrastructure of information acquisition technology (analysts, underwriters, *etc.*) existing in a reputable market can be extended to the new destination, encouraging the development of a local information acquisition infrastructure. Moreover, the ability to attract companies from prestigious locations can have a certification effect that can boost a market's future ability to attract other foreign companies, thus deepening the impact of these information externality gains even further.

How can we capture all these certification benefits using a single measure of market prestige? Existing studies have typically based this assessment on 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, [5,23,26]).

The importance of a market location certainly could be reflected in its overall size. In special scenarios, where flows are already highly concentrated, a total size measure of prestige will be useful. However, in a framework where multiple locations may be competing for attracting IPO companies, the assessment of market prestige is more intricate. As noted by Cetorelli and Peristiani [28], United States was the top destination for foreign IPOs in 1995, attracting almost 60 percent of global flows (based on the dollar volume of proceeds provided by Securities Data Corporation). Germany and the United Kingdom were a distant second and third, with shares of 17 and 10 percent, respectively. U.S. exchanges were therefore the dominant location in global equity activity. By 2005, however, Germany was the top destination attracting only about 33 percent of the global flows, followed by the United States with 31 percent, Hong Kong with 13 percent, and the United Kingdom with 10 percent. Hence, ten years later there is no dominant location with absolute majority. Instead, based on raw aggregate flows there are multiple locations that share similar levels of importance.

Interestingly, a closer look at Hong Kong reveals that virtually all the inflows were from Mainland China companies with just a handful of companies from other locations choosing to issue in this market. Moreover, we find that no other foreign companies chose to issue in China. 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. In this sense, aggregate flows *per se* may not be a good indicator of a stock market's ability to generate certification effects to boost the valuation of firms cross listing there.

These examples based on actual issuance flows illustrate 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 illustrate this further, in 1995 the Deutsche Börse attracted about 17 percent of global IPOs. More important, 40 percent of these inflows came from companies domiciled in the prestigious U. S. market, representing 55 percent of foreign IPO activity by U.S. companies in any market. By the end of 2000, inflows to Germany from U.S. companies tripled, representing more than 80 percent of total foreign IPO activity by U.S. companies. The fact that these inflows stem from top-tier markets should help enhance the overall prestige of the German market and its ability to expand further going forward.

An accurate assessment of the prestige of alternative destination markets for equity activity should therefore benefit from taking a network-based approach by expanding the informational content of standard, one-dimensional aggregates to consider the entire matrix of location-to-location flows. 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 emergence of many new and more liquid sophisticated financial centers adhering to stronger corporate governance principles.

There have been many applications of network-based methodologies to economics. A recent example more relevant to our study is the work on venture capital (VC) financing by Hochberg, Ljungqvist, and Lu [27]. 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. The level of prestige is calculated using the same network metrics applied in our study. The same authors also show in a separate paper that these 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 [27].

We apply these same concepts by adopting a specific algorithm developed in network analysis, commonly referred to as *index of rank prestige*. Cetorelli and Peristiani [28] provide a more detailed description and analysis of the rank prestige measure. Using data of global IPO activity, we aggregate firm-level data to construct a matrix of IPO flows originated by companies originally from any of the n_i locations and to any n_j locations. Hence, the matrix element x_{ij} represents the total volume of IPOs by companies from location n_i taking place in location n_j (with domestic IPO activity captured on the main diagonal of this matrix).

We define the rank prestige of location n_i as:

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

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 and N unknowns, the individual rank prestige measures. As shown by Katz [29], 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 highly-prestigious nodes or if it is chosen by many other nodes with lower rank.²

² See also [30] for a complete illustration of this and other network methods.

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 [31]. 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 ([31], 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. As noted previously, 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 [32], 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 investigate the effect of bank reputation (see, for example, [32–34]). Our network measure of prestige is a more sophisticated variant of these earlier measures used in this bank reputation literature.

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 above, 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. In many ways, this approach is similar to our exercise of constructing a sample of cross-listed outlined in the previous with exception that now we focus on firms that issue capital both domestically and outside their home market but excludes all other nonissuing cross-listings. 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 occasional missing cross-border flows using information from Bloomberg that traces in greater detail a firm's corporate action calendar.

It is important to note that the prestige measure is compiled based on IPO 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). In light of the off-shore nature and special legal tax regime of Luxemburg, this stock market is excluded from the analysis. Over the entire 1990–2006 period, our sample included more than 35,000 equity offerings in 45 country- or region-level equity locations, amounting to roughly \$2.1 trillion in proceeds.

The prestige rankings are summarized in Table 4 for three reference years, 1995, 2000 and 2006 for the entire panel of equity markets. The stock market prestige indexes used in our subsequent regression analysis are computed yearly over a rolling five-year period. The long lags associated with these prestige measures reduce any possible regression endogeneity problems or reverse-causality problems. This moving-average measure also provides a stable outlook in the historical evolution of the stock market rankings by smoothing out any transient movements, such as “hot” or “cold” cycles often experienced by many IPO markets.

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

Table 4. Cont.

1995		2000		2006	
Country	Prestige	Country	Prestige	Country	Prestige
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

In reference to the examples discussed in the previous section, notice that while Hong Kong in 1995 may have been the third most important location by aggregate cross listing flows, the fact that such flows were from Mainland China only, contributed to a prestige score for Hong Kong that ranked it only eleventh. Similarly, the rise in prestige for Germany reported in the Table between 1995 and 2000 reflects the above mentioned fact that much of the cross listing flows were from firms originally listed in the U.S., the location with the highest prestige score.

More broadly, Table 4 illustrates that, together, the three major U.S. exchanges were the most influential stock market destinations among all competing locations throughout the whole time period, 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. At the same time, the table also reveals significant changes over time in the ranking across a consistent number of competing locations. We use this ranking reshuffling for identification purposes.

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 33 out of our 45 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.

As argued earlier, these factors affecting a location's prestige should be reflected in terms of potential benefits from expanded visibility, lower informational frictions and capital costs, with the reverse also possibly true, if a firm cross lists in a less visible location than the one of origin.

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_{it} , 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:

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

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_{itC} represents country-specific controls that vary over time (for example, corporate governance scores and macroeconomic variables), and the vector x_{it} 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:

$$q_{ti} = \alpha_0 + \alpha_1 I_t + \alpha_2 I_C + \alpha_3 q_I + \alpha_4 I_V + \gamma Z_{iC} + \beta x_{ti} + \lambda L_{ti} + \lambda_M L_{ti}^M + \lambda_{OTC} L_{ti}^{OTC} + \varepsilon_{ti}. \quad (3)$$

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_{ti}^M gauges the importance of these multiple listings.³ 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 [35] 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, we also include a dummy variable L_{ti}^{OTC} indicating the presence of these lower tier listings in United States.⁴

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:

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

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

³ 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).

⁴ 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 unofficial listings on the Deutsche Börse and the regional German stock exchanges.

$\text{Gap}_{0i}^{H,D} = |P_{0i}^H - P_{0i}^D|$ (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 $\text{MORE}_{t+j,i} = L_{t+j,i} \times \text{Gap}_{0i}^{H,D} \times I_{0i}^{H,D}$ 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 $\text{LESS}_{t+j,i} = L_{t+j,i} \times \text{Gap}_{0i}^{H,D} \times (1 - I_{0i}^{H,D})$. While the explanatory variables $\text{MORE}_{t+j,i}$ and $\text{LESS}_{t+j,i}$ are constructed to capture the valuation effect of moving to a more or less prestigious stock market destination, it is important to note that these are relative comparisons that eliminate all the synchronous economic cycles shared by global equity markets. For instance, if both origin and destination are going through a hot IPO issuance period, the relative difference in prestige rankings may not vary, meaning that the measures $\text{MORE}_{t+j,i}$ and $\text{LESS}_{t+j,i}$ would remain fairly unchanged and should not influence firm value.

Second, we argue that a company may benefit if it cross lists in a more reputable market abroad, but also that investors might further reward a firm for the subsequent improvements in prestige of its host market. We measure the improvement in prestige by

$$\text{IMPROVE}_{ti}^H = \sum_{t=1}^K P_{ti}^H - P_{0i}^H. \quad (5)$$

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.⁵

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

$$q_{ti} = \alpha_0 + \alpha_1 I_t + \alpha_2 I_C + \alpha_3 q_i + \alpha_4 I_V + \gamma z_{tC} + \beta x_{ti} + \lambda_M L_{ti}^M + \lambda_{OTC} L_{ti}^{OTC} + \sum_{j=0}^K \lambda_{\text{MORE},j} \text{MORE}_{t+j,i} + \sum_{j=0}^K \lambda_{\text{LESS},j} \text{LESS}_{t+j,i} + \lambda_{\text{IMPROVE}} \text{IMPROVE}_{ti}^H + \varepsilon_{ti}. \quad (6)$$

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

Hypothesis 1: A company will potentially garner significant valuation gains after cross listing in a host market with a higher prestige than its domestic market. A strong form of this maintained hypothesis asserts that $H_0 : \lambda_{\text{MORE},j} \leq 0$ versus the alternative that $H_1 : \lambda_{\text{MORE},j} > 0$. A weaker version of this premise is defined by $H_0 : \bar{\lambda}_{\text{MORE}} \leq 0$ versus the alternative that $H_1 : \bar{\lambda}_{\text{MORE}} > 0$, such that $\bar{\lambda}_{\text{MORE}} = \sum_{j=0}^K \lambda_{\text{MORE},j} / (K + 1)$; 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 valuation benefits

⁵ 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.

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

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 $H_0 : \lambda_{\text{IMPROVE}} \leq 0$ versus the alternative $H_1 : \lambda_{\text{IMPROVE}} > 0$.

4.1. Country- and Firm-Specific Controls

To test these different hypotheses, our analysis includes a fairly comprehensive set of explanatory variables that includes country or stock market characteristics and measures of firm growth prospects. Furthermore, our analysis is the first to control for the life cycle of the firm that is an important determinant of value. The country-specific controls, denoted by the explanatory vector z_{it} , include the gross domestic product per capita as a proxy for a country's economic development (GDP_CAPITAL). In addition, the regression controls for a country's scale of financial integration using the Penn Table index of trade openness (OPENNESS), measured by the sum of exports and imports divided by real GDP.

The overall reputation of a location is likely to depend ultimately by the underlying institutional governance structure in a country. In order to test that our prestige measure does not simply reflect a country's governance, we added 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 "rule of law" protection such as those proposed by La Porta, Lopez-de-Silanes, Shleifer, and Vishny [36,37]. Levine and Zervos [38] 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.

The explanatory vector x_{it} 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. The specification includes two direct measures of the company's financial strength: sales growth (SALES_GROWTH), measured by the change in logarithm of total sales, and the return-on-assets ratio (ROA).

Table 5. Definitions and Summary Statistics for Regression Variables.

Explanatory Variables	Definition	Cross-Listed	Non-Cross-Listed	Difference
<u>Dependent Variable</u> q_{it}				
Tobin's q	Tobin's q ratio = (Total Assets – Book Value Equity + Market Value Equity)/Total Assets (percent)	144.61	135.54	–9.07 ***
<u>Country Controls</u> Z_{ic}				
FREEDOM_SCORE	Composite Heritage World Freedom Index (percent)	68.94	69.18	0.22 ***
GDP_CAPITAL	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
<u>Firm Controls</u> x_{it}				
SIZE	Total assets (in \$ millions)	4680.9	2055.8	–2625 ***
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 ***
<u>Cross Listing</u>				
L_{it}^{OTC}	= 1 if firm (i) has a Level I U.S foreign issue at year (t); 0 otherwise	0.079	0.0216	–0.057 ***
L_{it}	=1 if firm (i) has cross listing at year (t); 0 otherwise	0.691		
L_{it}^M	=1 if firm (i) has multiple listings at year (t); 0 otherwise	0.101		
IMPROVE _{it}	Cumulative improvement in the reputation of the host market after the cross listing	–0.053		
$MORE_{t+j,i} = L_{t+j,i} \times \text{Gap}_{0i}^{H,D} \times I_{0i}^{H,D}$	Indicator (j) years after firm cross listed on a more prestigious exchange multiplied by the prestige score gap (percent)	0.577		
$LESS_{t+j,i} = L_{t+j,i} \times \text{Gap}_{0i}^{H,D} \times (1 - I_{0i}^{H,D})$	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 ($t = 0$). $\text{Gap}_{0i}^{H,D} = |P_{0i}^H - P_{0i}^D|$. $I_{0i}^{H,D} = 1$ 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 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. Firms with a foreign listing are domiciled in countries with higher GDP per capita, but generally have somewhat similar Freedom Index and openness scores. Not surprisingly, firms with cross listings are larger, with 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

This section discusses the impact of cross listings on firm value outlined by the regression specifications in the previous section. Our analysis focuses 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.

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 the q ratio 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 better economic growth (measured by real GDP per capital) experience significantly larger valuation gains as investors expect these firms to be more profitable.

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

Firm Valuation Models:				
Explanatory Variables	(2)	(3)	(4)	(5)
Intercept	−16.355	−15.279	−17.560	−15.587
q _i	1.066 ***	1.060 ***	1.057 ***	1.037 ***
<u>Country Controls</u> Z _{it} .				
FREEDOM_SCORE	1.568 ***	1.517 ***	1.559 ***	1.583 ***
GDP_CAPITAL	2.769 ***	2.734 ***	2.756 ***	2.806 ***
OPENNESS	−0.318 ***	−0.316 ***	−0.321 ***	−0.318 ***
<u>Firm Controls</u> x _{it} .				
SALES_GROWTH	1.029 **	1.036 **	0.981 **	1.029 **
log(AGE)	0.955	1.497	3.649	3.129
log(AGE) ²	−0.768 *	−0.839 *	−1.150 *	−1.054 *
log(SIZE)	−11.155 ***	−10.929 ***	−11.020 ***	−10.991 ***
log(SIZE) ²	0.576 ***	0.546 ***	0.555 ***	0.536 ***
ROA	0.527 ***	0.527 ***	0.529 ***	0.532 ***

Table 6. Cont.

Firm Valuation Models:				
Cross-Listing Effects				
L_{ti}^{OTC}	−6.180 ***	−6.047 ***	−4.815 ***	
L_{ti}^M	5.336 ***	5.466 ***	5.325 ***	
L_{ti}	3.568			
IMPROVE _{ti}			1.435 ***	
		$L_{t+0,i} : 10.94 ***$	$MORE_{t+0,i} : 0.904 ***$	
		$L_{t+1,i} : 5.15 **$	$MORE_{t+1,i} : 0.625 ***$	
		$L_{t+2,i} : 0.275$	$MORE_{t+2,i} : 0.372 **$	
		$L_{t+3,i} : 1.154$	$MORE_{t+3,i} : 0.478 ***$	
		$L_{t+4,i} : −0.643$	$MORE_{t+4,i} : 0.406 **$	
		$L_{t+5,i} : 0.560$	$MORE_{t+5,i} : 0.420 **$	
			$LESS_{t+0,i} : 0.802$	
			$LESS_{t+1,i} : −1.680$	
			$LESS_{t+2,i} : −2.067 **$	
			$LESS_{t+3,i} : −1.929 **$	
			$LESS_{t+4,i} : −2.635 ***$	
			$LESS_{t+5,i} : −0.945$	
Hypothesis Testing: F-tests				
Hypothesis 1:				8.38 ***
$H_0 : \lambda_{MORE,j} \leq 0, j = 0, \dots, 5$				
Hypothesis 1: $H_0 : \bar{\lambda}_{MORE} \leq 0$				45.69 ***
Hypothesis 2:				3.23 ***
$H_0 : \lambda_{LESS,j} \geq 0, j = 0, \dots, 5$				
Hypothesis 2: $H_0 : \bar{\lambda}_{LESS} \geq 0$				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_1 = 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 regression models were also estimated controlling for firm level fixed-effects. Overall, the findings were very similar. However, in this case the estimation sample is reduced because of the unbalanced nature of the panel. The symbols (*), (**), and (***) indicate statistical significance at the 10, 5, and 1 percent levels, respectively. Numbers in parentheses represent t-statistics.

The empirical findings also reveal a strong positive relationship between the FREEDOM_SCORE and firm value, 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 [10,11]. 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 appears 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 AGE².⁶ A company's age is an important determinant because younger 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 simple binary 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 [13] and Sarkissian and Schill [23], 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 uncommon with only about 240 firms in our sample opting 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_{ti}^M 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.

⁶ 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.

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 $\text{MORE}_{t+j,i}$ and $\text{LESS}_{t+j,i}$, respectively. Furthermore, 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 $\text{LESS}_{t+j,i}$ variables. More important, the gap in prestige between the host and domestic markets $\text{Gap}_{0i}^{\text{H,D}}$ is evenly distributed across these two directional variables.⁷

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 $H_1: \lambda_{\text{MORE},j} > 0$ or $H_1: \lambda_{\text{LESS},j} < 0$. 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 $\bar{\lambda}_{\text{MORE}}$ is 0.53. A one-standard-deviation increase in $\text{Gap}_{0i}^{\text{H,D}}$ (around 10 percent) produces roughly a five percent boost in firm value. Similarly, we find that $\bar{\lambda}_{\text{LESS}}$ 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 higher valuation signified by some of the positive coefficients of $\lambda_{\text{MORE},j}$ is not surprising given the large number of studies cited previously outlining several potential benefits of cross listing on a more reputable stock market (for example, improved firm visibility, lower cost of capital, enhanced liquidity, and stronger investor protection). In contrast, the reasons behind the significant decline in the q ratio indicated by the negative value of $\bar{\lambda}_{\text{LESS}}$ are less clear.

Why should investors be concerned whether a firm cross-lists on a less prestigious exchange? For one, companies with a primary listing in a prestigious market should already enjoy the certification and financial access benefits domestically irrespective of whether they elect to have a secondary foreign

⁷ The average $\text{Gap}_{0i}^{\text{H,D}}$ 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).

listing in a less prestigious location. However, their choice to cross-list on a stock exchange with poor financial infrastructure and inferior investor protection rules could be alarming to some investors.

In fact, our regression analysis provides additional evidence that the valuation discount for firms that cross list in lesser stock markets is not spurious. The negative coefficient on L_{it}^{OTC} indicates that Level I listings on the OTC in the United States are poorly received by investors, lowering a firm's q ratio by about 6.2 percent. This finding reinforces the view that market perceptions are indeed influenced by the reputation of the host destination. Most of the OTC foreign listings are sponsored or unsponsored ADRs that have minimal reporting SEC requirements. Foreign companies listing on the OTC are not required to publish reports in compliance to U.S. GAAP and generally such a listing would not be expected to provide any certification benefits. Foreign firms with Level I listings generally do not have access to U.S. capital markets and are therefore unable to raise capital at lower cost to enhance growth opportunities. Arguably, a U.S. OTC listing by foreign firms could be counterproductive, creating the impression that they are not capable of satisfying more prudent disclosure requirements. This adverse market reaction to cross listing in a destination with minimal disclosure requirements is not unique to the U.S. OTC market. Sarkissian and Schill [16] examine the impact of foreign listings on several large international stock exchanges. They find a negative valuation effect in Luxemburg, arguably not a very reputable host destination with weak disclosure requirements given its off-shore and tax-heaven status.

Cross listing in a less prestigious market could also indicate a weaker financial outlook. These firms can be viewed as lacking the financial strength and prospects to move to a more prestigious destination. However, the empirical evidence is not very supportive of this premise. Generally, we find that firms cross listing in less reputable markets are actually more profitable than their peers that cross listed in more prestigious markets.

Our empirical evidence is therefore more supportive of the premise that a secondary listing in a less prestigious market could distort a firm's financial visibility and corporate governance profile, resulting in a valuation discount. The decrease in firm value may also be consistent with the presence of agency problems [39]. Agency theories argue that overoptimistic managers with misaligned incentives are more likely to squander the firm's cash flows on riskier negative net-present-value projects. Claessens and Schmukler [40] document a close link between the company's foreign sales ratio and the likelihood of a foreign listing. Thus, a firm's move to a less prestigious destination may also be followed by an expansion of its operations in that host market. Investors might be troubled by the possibility that the company might decide to operate and invest in a host destination with greater uncertainty.

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 $IMPROVE_{it}^H$ 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 $IMPROVE_{it}^H$ 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 or less prestigious. 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. These studies mostly 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 $H_0 : \lambda_{\text{MORE},j} \leq 0$ or $H_0 : \lambda_{\text{LESS},j} \geq 0$ in favor of the alternatives, although admittedly some of the longer run coefficients are now less significant. The decrease in 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.

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

Firm Valuation Models:				
Explanatory Variables	(2)	(3)	(4)	(5)
Intercept	−39.833	−37.401	−41.506	−41.975
q _I	1.213 ***	1.207 ***	1.204 ***	1.195 ***
<u>Country Controls</u> Z _{ic} .				
FREEDOM_SCORE	1.737 ***	1.630 ***	1.734 ***	1.771 ***
GDP_CAPITAL	3.036 ***	2.972 ***	3.024 ***	3.074 ***
OPENNESS	−0.351 ***	−0.341 ***	−0.354 ***	−0.352 ***
<u>Firm Controls</u> x _{ti} .				
SALES_GROWTH	0.601	0.615	0.563	0.585
log(AGE)	1.847	2.300	4.408	3.485
log(AGE) ²	−0.840 *	−0.911 *	−1.211 *	−1.075 *
log(SIZE)	−16.02 ***	−15.99 ***	−16.02 ***	−15.99 ***
log(SIZE) ²	0.956 ***	0.941 ***	0.947 ***	0.945 ***
ROA	0.628 ***	0.630 ***	0.631 ***	0.630 ***
<u>Cross-Listing Effects</u>				
L _{ti} ^{OTC}		−2.864	−2.554	−2.573
L _{ti} ^M		3.484 **	3.862 **	3.831 **
L _{ti}		6.038 **		
IMPROVE _{ti}				0.435
			L _{t+0,i} :11.35 ***	MORE _{t+0,i} :2.089 ***
			L _{t+1,i} :4.82 **	MORE _{t+1,i} :1.663 *
			L _{t+2,i} :0.357	MORE _{t+2,i} :0.966
			L _{t+3,i} :0.650	MORE _{t+3,i} :0.532
			L _{t+4,i} :−1.620	MORE _{t+4,i} :0.139
			L _{t+5,i} :0.607	MORE _{t+5,i} :0.878
				LESS _{t+0,i} :1.729 *
				LESS _{t+1,i} :−0.989
				LESS _{t+2,i} :−1.374 **
				LESS _{t+3,i} :−1.228 **

Table 7. Cont.

Firm Valuation Models:				
Explanatory Variables	(2)	(3)	(4)	(5)
				LESS _{t+4,i} : -1.852 ***
				LESS _{t+5,i} : -0.211
Hypothesis Testing: F-tests				
Hypothesis 1:				
$H_0 : \lambda_{\text{MORE},i} \leq 0, j = 0, \dots, 5$				2.15 **
Hypothesis 1: $H_0 : \bar{\lambda}_{\text{MORE}} \leq 0$				8.43 ***
Hypothesis 2:				
$H_0 : \lambda_{\text{LESS},i} \geq 0, j = 0, \dots, 5$				1.81 *
Hypothesis 2: $H_0 : \bar{\lambda}_{\text{LESS}} \geq 0$				2.18
Number of Observations	9709	9709	9709	9709
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.

Despite the smaller statistical significance of these post-listing effects, the average effect of cross listing in a more prestigious market $\bar{\lambda}_{\text{MORE}}$ is 0.89, comparatively larger than when we included foreign listings in United States. The empirical findings affirm that the valuation premium not only accrues to firms that listed on the highly prestigious U.S. exchanges, but is 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 $\bar{\lambda}_{\text{LESS}}$ over this six-year horizon is roughly -0.66 , but not statistically significant from zero. Much of this lower significance in $\bar{\lambda}_{\text{LESS}}$ 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 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 $\lambda_{\text{MORE},j}$ and $\lambda_{\text{LESS},j}$ 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 $\lambda_{\text{LESS},j}$ 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.

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 *
q _i	1.056 ***	0.989 ***
<u>Country Controls</u> Z _{tc}		
FREEDOM_SCORE	0.316	2.440 ***
GDP_CAPITAL	2.209 ***	3.020 ***
OPENNESS	−0.501 ***	−0.311 ***
<u>Firm Controls</u> x _{ti}		
SALES_GROWTH	1.081 *	0.922
log(AGE)	20.004 ***	−22.217 ***
log(AGE) ²	−3.550 ***	2.370 **
log(SIZE)	−11.094 ***	−12.972 ***
log(SIZE) ²	0.453 ***	0.799 ***
ROA	0.463 ***	0.675 ***
<u>Cross-Listing Effects</u>		
L _{ti} ^{OTC}	−2.755	−4.743 **
L _{ti} ^M	6.838 **	4.416 **
IMPROVE _{ti}	1.626 **	1.518 ***
MORE _{t+0,i}	1.282 ***	0.490 *
MORE _{t+1,i}	1.034 ***	0.131
MORE _{t+2,i}	0.459 **	0.356
MORE _{t+3,i}	0.399 *	0.689 **
MORE _{t+4,i}	0.322	0.595
MORE _{t+5,i}	0.226	0.809 **
LESS _{t+0,i}	4.315 *	0.017
LESS _{t+1,i}	−1.740	−1.186
LESS _{t+2,i}	−3.201	−1.483 **
LESS _{t+3,i}	−3.204 *	−1.268 *
LESS _{t+4,i}	−4.109 **	−2.146 ***
LESS _{t+5,i}	−2.286	−0.490
<u>Hypothesis Testing: F-tests</u>		
Hypothesis 1: H ₀ : $\bar{\lambda}_{\text{MORE},i} \leq 0, j = 0, \dots, 5$	7.50 ***	3.69 ***
Hypothesis 1: H ₀ : $\bar{\lambda}_{\text{MORE}} \leq 0$	31.69 ***	18.02 ***
Hypothesis 2: H ₀ : $\bar{\lambda}_{\text{LESS},i} \geq 0, j = 0, \dots, 5$	2.28 **	1.45
Hypothesis 2: H ₀ : $\bar{\lambda}_{\text{LESS}} \geq 0$	3.07 *	5.52 ***
Number of Observations	7505	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.

The magnified impact on the valuation of younger firms illustrates that foreign listings convey useful information to market participants for this sub-sample of firms. Several studies document that firm visibility is a crucial factor for younger, more opaque firms. Krigman, Shaw, and Womack [41] 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 [42,43]. Chung and Jo [44] find a positive relationship between analyst following and Tobin's q . Thus, higher financial visibility can ultimately improve the franchise value of a younger 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.

6. Conclusions

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 45 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. We show that firms cross listing in a more prestigious market enjoy significant valuation gains over the five-year period following the listing. In comparison, we document that firms cross listing in less prestigious markets suffer a significant decline in valuation over this post-listing period. In addition, we find that a firm's valuation is affected by the subsequent change in reputation of the destination market.

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 November 2006, the Committee on Capital Markets Regulation, a group of business professionals and academics, issued an extensive study arguing that U.S. public markets have lost their edge and proposed reforms to lessen the regulatory burden and relax several aspects of the Sarbanes-Oxley Act [45]. A McKinsey and Company report, 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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Author Contributions

Both authors contributed equally to this article.

Conflicts of Interest

The authors declare no conflict of interest.

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