The Correlation Between Cross-Listing Premia, US Stock Prices, and Volume of US Trading: A Challenge to Law-Based Theories of Cross-Listing

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Abstract

This paper tests whether "legal bonding" is a primary cause of cross-listing premia. If cross-listing premia are due to bonding, premia should fluctuate over time, following the attractiveness of the US legal regime relative to foreign regimes. If cross-listing premia are caused by other factors, their changes over time will track those other factors. Using monthly and annual data on cross-listing premia between 1990 and 2006, I find that one of the strongest predictors of fluctuations in cross-listing premia over time is US stock prices. Premia of cross-listed foreign firms subject to US regulation (listed on level 2 or 3) are strongly and positively correlated with NASDAQ and S&P-500 indices, but premia of cross-listed firms not subject to US regulation (listed on level 1 or 4) are not correlated with NASDAQ and S&P-500. Exchange-traded firms with low volumes of US trading do not trade at a premia, but exchange-traded firms with high volumes of US trading trade at a high premia, even though both are subject to the same US regulation. The correlation between cross-listing premia and the NASDAQ index is strongly and positively predicted by (a) the portion of a firm's trading volume which takes place in the US; (b) firm stock price volatility; (c) being traded on a major exchange. These findings, taken together, suggest that U.S. share prices are important drivers of share prices for foreign cross-listed firms, and thus of cross-listing premia. These findings are inconsistent with bonding being the dominant explanation for premia, but consistent with both "firm growth opportunities" theory of cross-listing and with behavioral explanations.

Introduction

It is well known that foreign firms cross-listed in the US enjoy "cross-listing premia" – higher market valuations than non-cross-listed firms (Doidge, Karolyi, and Stulz 2004). The causes of these premia are not yet clear. Early literature attributed benefits of cross-listing to reduced market segmentation and increased liquidity, visibility, and shareholder base.[1] More recent research suggests that cross-listing is beneficial because of "bonding": by cross-listing in the US, controllers and managers of foreign firms voluntarily subject themselves to US laws and institutions, credibly promising not to exploit minority investors (Stulz 1999; Coffee 1999 and 2002). Since stronger investor protection can increase value of minority shares, firms located in countries with poor investor protection may benefit by "borrowing" more stringent US laws through cross-listing.

The bonding theory has a growing empirical support. Firms from countries with weak investor protection regimes are more likely to cross-list in the US (Reese and Weisbach, 2002), while firms that have a large controlling shareholder are less likely to cross-list (Doidge, Karolyi, Lins, Miller, and Stulz, 2006). Not only do cross-listed firms have higher valuations than non-cross listed firms, but cross-listed firms subject to US regulation (listed on levels 2 or 3) have higher valuations than cross-listed firms not subject to US regulation (listed on levels 1 or 4) (Doidge, Karolyi, Stulz 2004). Moreover, US-regulated cross-listed firms from countries with weak investor protection regimes enjoy higher premia (Doidge, Karolyi, Stulz 2004). Cross-listed firms have lower private benefits of control, as proxied by voting premia in dual class shares (Doidge 2004). When firms cross-list in the US, their cost of capital declines (Hail and Leuz 2006).

However, the criticism of the bonding hypothesis has also been growing. It stemmed from the observation that cross-listed firms can misbehave without suffering notable legal consequences, which renders bonding largely toothless. The SEC enforcement against foreign issuers is weak, and private litigation is rare (Siegel 2005; Licht 2003). The fact of cross-listing doesn't seem to change firms' earnings management, at least in some poorly governed countries (Lopes, Tukamoto, and Galdi 2007). Thus, the most recent literature concentrated on separating the value of different cross-listing effects – bonding, liquidity, capital cost, market segmentation, and so forth.

Separating these effects empirically is hard because firms opting into the US capital market "borrow" a bundle of things – not only "legal" ones (laws on the books, enforcement, regulators, judges, competent lawyers, and other legal professionals), but also "non-legal" ones (investors, consumers, analysts and other financial professionals, the ability to trade around the clock, and so forth). The fact that foreign firms listed on level-23 are traded at a higher premium than those listed on level-14 is consistent with the bonding hypothesis, but is also consistent with investor recognition hypothesis (if

[1] See Karolyi 1996 and 2004 for literature review.

investors pay more attention to firms traded on national exchanges), analyst coverage hypothesis (if analyst coverage adds more value if a firm is traded on national exchange, or if trading on national exchange adds more analysts that are not picked up by existing databases), and so forth.

To separate these effects, researches have had to look for natural experiments, which limits the sample and weakens generalizability of findings. In a relatively small sample of firms with dual-class shares, Bris, Cantale, and Nishiotis (2005) find that both bonding and market segmentation create significant benefits to cross-listed companies, but the economic effect of market segmentation is twice as large as that of bonding. In a study of Canadian firms traded in the US, King and Segal (2004) find that it's increased liquidity, rather than governance needs, that predicts increases in valuations. Most other papers report results consistent with both bonding and the alternatives (Fresard and Salva, 2007).

This paper suggests a different approach to separating the effects of bonding. I start with the observation that if cross-listing premia are caused by bonding, then, the fluctuations of premia over time should follow the fluctuations in comparative quality of laws and institutions affecting investor protection in the US and at a firm's home country. If nothing changes in US laws and the laws of a firm's home country, the premia should remain constant over time; if US laws remain constant, but foreign laws improve (as is commonly argued; see, for example, Doidge, Karolyi, and Stulz 2007), the premia should decline. Importantly, the emphasis here is on *premia* (the difference between the valuation of cross-listed firms and their non-cross-listed counterparts), rather than on the valuation of cross-listed firms themselves. Stock prices of US and foreign firms can move for a variety of reasons, but if investors are willing to overpay for cross-listed firms relative to otherwise similar non-cross-listed firms because of bonding benefits, their willingness to overpay for bonding should remain proportional to the value of bonding over time.

This long-term approach also allows to detect support for alternative hypotheses. If premia are due to improved liquidity, the fluctuations of premia over time should follow the fluctuations in the portion of a firm's shares traded in US relative to a firm's overall trading volume. If, as Gozzi, Levine, and Schmuckler (2006) argue, premia are short-lived and merely represent investor response to a one-time revelation of good inside information at the time of the listing announcement, then, the fluctuations of premia over time should follow the fluctuations in new listings. Finally, I suggest (but provide no theoretical treatment here) a new hypothesis that I call "mimicry": by cross-listing, a firm exposes itself to general fluctuations of another country's capital markets. In the "mimicry" hypothesis, the more a foreign firm looks like a domestic firm (trades on a more visible national exchange of a host country; trades a larger portion of its public float on a national exchange of a host country, etc.), the more it is treated as a host-country's firm by investors, and the more its premium tracks stock prices of host country's firms.

I assemble a large panel of all firms cross-listed in the US between 1990 and 2006, on all levels of listing. I separate all cross-listed firms into two groups – US-regulated (listed in the US on levels 2 or 3, or "level-23") and US-unregulated (listed in the US on levels 1 or 4, or "level-14").[2] One well-known difficulty is that comparing cross-listed firms to the universe of all non-cross-listed firms might result in comparing apples and oranges: cross-listed firms might be vastly different, with different patterns across countries, in a way that cannot be captured through available financial and accounting variables. To reduce this problem, I compare cross-listed firms not with the universe of non-cross-listed firms, but with a sample of non-cross-listed firms that are similar to cross-listed firms. For each cross-listed firm, I select a match – a non-cross-listed public firm from the same country with the closest propensity to cross-list. The propensity to cross-list is based on industry, firm asset size, profitability, and leverage. I then compute "cross-listing premium" – the difference between the Tobin's Q of a cross-listed company and the Tobin's Q of its match.

There is a disagreement as to whether cross-listing premia should be calculated on an annual or monthly basis. Some components of Tobin's Q (market values) are available monthly, but others (book values) are available only annually. One solution here is to interpolate monthly values for variables reported annually and construct monthly measures of Tobin's Q. An alternative is to use annual measures. The latter approach loses valuable information; the former approach creates noise by using interpolation. I therefore use both annual and monthly values of premia, computed from 1990 through 2005; the results are very similar.

I then look at changes in cross-listing premia over time, separately for level-23 and level-14 cross-listed firms, and ask whether these trends follow the pattern that one would expect based on the changes in US and non-US laws of investor protection. The answer is no. The general trend throughout the 1990s was the improvement of investor protection regimes around the world without corresponding improvements in the US, and thus the reduction of the difference between the quality of investor protection in US and outside the US. However, the premia of level-23 firms have not been steadily declining since the 1990.

Instead, the premia of level-23 firms exhibit a fascinating time trend: they are strongly positively correlated with NASDAQ and S&P-500 indices. That is, the more investors are willing to pay for large public US firms, the more they are willing to pay for foreign firms cross-listed in the US on levels 2 or 3, but not for otherwise similar large public foreign firms not cross-listed in the US (but often listed on other reputable exchanges, like London, Frankfurt, or Toronto).

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[2] A subset of level-1 firms (those traded on OTCBB) is regulated similarly to exchange-traded firms. Accordingly, I treat OTCBB firms, together with exchange-traded firms, as US-regulated firms. For parsimony, I call this group a "level-23" group, even though it includes a small number of level-1 firms.

These results are not explained by the bonding hypothesis because nothing in the bonding hypothesis predicts the persistent correlation between stock prices of US firms and foreign cross-listed firms in the absence of changes in US regulation. These results are also not explained by the liquidity hypothesis, because the correlation between premia and NASDAQ/S&P persist after controlling for the trading volumes. These results are not explained by the investor recognition hypothesis, because that hypothesis does not suggest that investors should change their valuations of cross-listed firms when they change their valuations of US firms.

Two hypotheses are consistent with the discovered pattern. First is the "growth opportunities" hypothesis, suggesting that in "hot" markets, firms' growth opportunities are better, and therefore investors are willing to pay for those firms more. The second hypothesis is my "mimicry" hypothesis – when a foreign firm trades on a national exchange of another country, in the eyes of investors, it starts resembling firms of the host country and therefore picks up market fluctuations of the host country.

I then ask whether other predictors of time trends in cross-listing premia are consistent with the bonding hypothesis. The answer is no. In particular, exchange-listed firms with low volumes of US trading, relative to their non-US trading, do not trade at a premium at all. At the same time, exchange-listed foreign firms with high volumes of US trading trade at a significant premium. This is not consistent with the bonding hypothesis because the applicability of US regulation does not depend on the volume of US trading; it depends only on the level of listing. This finding is also not consistent with the "growth opportunities" hypothesis (a firm's growth opportunities do not depend on the volume of US trading), but is consistent with both the liquidity hypothesis and the "mimicry" hypothesis.

My next question is what predicts the degree of correlation between a firm's cross-listing premium and NASDAQ/S&P indices. One strong predictor, consistent with my "mimicry" hypothesis is the volume of a firm's shares traded in the US, controlling for the volume of that firm's shares traded outside the US. Other strong predictors are: being traded on NASDAQ (positive); firm size (positive), unsystematic risk (positive), and global industry Tobin's Q (positive). On the country level, GDP/capita is a negative predictor of the correlation between a firm's cross-listing premium and NASDAQ/S&P indices.

In other words: larger, more volatile firms from high-Q industries, located in poor countries, are more likely to "peg" their Tobin's Q's to the state of the US stock market.

This paper makes several contributions to the cross-listing literature. It is the first to document the strong correlation between cross-listing premia and US stock prices over time. It is also the first to analyze this correlation over time and to present cross-sectional results linking firm- and country-level characteristics to the correlation between premia and US stock prices. This paper is the first to document that cross-listing premia are not strongly attached to the level of US regulation: to the contrary, premia

disappear completely for firms with below-median US trading volume, even when those firms are fully subject to US regulation.

Finally, this paper presents an interesting puzzle for asset-pricing scholars; the correlation between premia of foreign cross-listed firms and the indices of a host country needs to be explained on a rigorous theoretical level that's outside the scope of this paper.

This paper proceeds as follows. Section 1 describes the sample and variables. Section 2 develops the methodology. Section 3 presents the results.

1. Sample and Variables

1.1. Sample and Propensity Matching

To construct a sample of cross-listed companies, I begin with a list of all foreign companies cross-listed in the United States on all levels of listing (OTC = level 1, stock exchanges and NASDAQ = levels 2 and 3, and PORTAL = level 4). Foreign firms can be listed in the US either directly or as American Depository Receipts (ADRs). I obtain the list of ADRs by combining ADR databases from Citibank, Deutsche Bank, JP Morgan, and the Bank of New York. Each of these sources claims to be comprehensive, in fact, none is. Some foreign firms, especially from Canada and Israel, are listed directly, rather than as ADRs. To identify these firms, I collect data on securities of non-US issuers traded directly on NYSE, NASDAQ, AMEX, OTC Bulletin Board, and Pink Sheets from the websites for these exchanges and trading platforms. I then merge these lists; remove duplicates, reconcile discrepancies, and obtain the total number of foreign cross-listed firms – 4,062. I cross-check the lists of ADRs provided by the four banks against the lists of traded foreign companies provided by NYSE and other trading platforms to ensure consistency.

For companies that had several listing types, I assign the most regulated listing level. That is, if a company is traded on NYSE (level 2) and over-the-counter (level 1), I treat it as a level 2 company. Firms whose highest listing level is 1 or 4 are coded as "level-14" firms; firms whose highest listing level is 2 or 3 are coded as "level-23" firms. The only exception is firms traded on Bulletin Board: although they are technically level-1 firms, they are reporting companies under US securities laws, and are therefore subject to SOX. Therefore, I treat these firms as "level-23" firms.[3]

I match cross-listed firms onto the Datastream database, which contains share price and financial data. I keep only firms which were cross-listed at year-end 2001 and have full or partial financial data during 2000-2005. I drop firms if key financial or accounting variables (size, EBITDA, sales, debt) are missing for more than two years in the row. If a firm is missing data for a particular financial variable in

[3] Other studies, including my own prior work, incorrectly treat OTC Bulletin Board companies as not subject to SOX.

a particular year but has data for other years, I assign the median value for that country, industry, and year. After removing firms that were not listed in the US before SOX or for which financial information was not available on Datastream, I obtain the sample of 1,694 cross-listed firms.

I select matching non-cross-listed firms from the same country based on propensity to cross list (the predicted probability of cross-listing from a logit model of a firm's decision to cross-list). Let D_i be a dummy variable, which equals 1 if a firm is cross-listed and zero otherwise, and let $\mathbf{X}_i$ be a vector of firm-level variables. For each country with one or more cross-listed firms, I select matches from a pool of all firms from that country with full or partial financial data in Datastream during 2000-2005, again dropping firms with missing data for more than two years in a row, and using country medians to fill in missing data for shorter periods. I estimate a logit model, separately for each country:

$$prob(D_i = 1) = \alpha + \beta_i * X_i + \varepsilon_i$$

The financial variables included in X_i are computed as of 2001 -- the last pre-SOX year. They are measures of ln(asset size), two-digit NAICS industry code, ROA (EBITDA/total assets), pre-SOX sales growth (geometric average sales growth from 1999 to 2001), and leverage (total debt over book value of equity).

I then use the coefficients from the logit regression to compute the probability of cross-listing $E(D_i)$ for each firm:

$$E(D_i) = \alpha + \beta_i * X_i$$

Within each country, I match each cross-listed firm to its "nearest neighbor" in cross-listing propensity among the non-cross-listed firms without replacement. This creates matched pairs of companies that are similar in characteristics that predict cross-listing.

After removing firms that did not have matches in their countries, I obtain the final sample of 1,073 cross-listed firms and 1,073 non-cross-listed matches. 407 cross-listed firms are level-23; the other cross-listed firms are level-14.

The propensity matching is, inevitably, imperfect. One problem is that I match already cross-listed firms against non-cross-listed firms, yet the fact of cross-listing affects the variables I use for the match. This endogeneity will result in misspecification of the matching variables –one would ideally want to match based on the hypothetical values that the cross-listed firm would have if it were not cross-listed. I also need to limit the variables I match on to preserve sample size. However, any resulting mismatch will be important for my results only if omitted matching variables (or any misspecification of variables) correlate with the sources of both the second and third differences – that is, with the after-minus-before SOX change in Tobin's q or market/book, and the difference in this change between level-23 and level-14 pairs. This possibility cannot be excluded, but I know of no reason to expect such a

correlation. I address match imperfection through robustness checks, and obtain similar results (i) studying firm-level changes in Tobin's q (relative to an index of non-cross-listed firms from the same country) instead of pair changes; and (iii) in unreported regressions in which I conduct a simpler match on country and industry, and as close as possible in market capitalization.

Table 1, Panel A provides summary statistics on cross-listed firms subject to SOX, cross-listed firms not subject to SOX, and matching non-cross-listed firms. On average, cross-listed companies are larger than their matches. Panel B lists the number of firms in each country.

1.2. Variables

For each firm, I compute year-end and month-end Tobin's q as (market value of common shares plus book value of preferred shares plus book value of debt), divided by book value of assets, from January 1990 through the end of December 2005. While market values are available for each month, book values are only available annually; for monthly values of Tobin's q, I use the most recent available annual data and interpolate it to create monthly values. I then compute a pair's Tobin's q for each firm, each month – the difference between the Tobin's q of a cross-listed company and its match. Pair Tobin's q's are winsorized at 1%/99%, as are firm-level Tobin's q's in regressions that use these variables. Winsorizing at 0.5%/99.5% produces similar results (not reported).

I also use the following firm-level control variables. All data is from Datastream. All non-dummy firm-level and country-level control variables are normalized to mean = 0, $\sigma = 1$. I use these control variables for the cross-listed firm only, not for its matching firm.

I measure firm size as ln(sales) as of year-end of each year between 1990 and 2005. As a robustness check, I use firm asset size, with similar results.

I use sales growth as a proxy for a firm's growth opportunities. Sales growth is defined as the two-year geometric average of annual growth in sales. Sales growth data is available for 997 cross-listed firms (337 on level-23).

As a measure of profitability, I use return on assets, defined as EBITDA divided by book value of assets. This measure is annual, collected for each year between 1990 and 2005. The availability of this variable differs by year; as of 2001, ROA data is available for 1015 firms (293 on level-23). As an alternative measure, I use net income margin – net income before preferred dividends over total sales, with similar results (not reported).

As a measure of firm risk, I use the standard deviation of abnormal returns to each cross-listed firms. Unsystematic risk is based on the standard market model, using logged returns:

$$r_{i,t} = \alpha_i + \beta_i * r_{m,t} + \varepsilon_{i,t}$$

Here, the market index is an equal-weighted index of the non-cross-listed firms in my sample from the same country. Data is available for 1041 firms (353 level-23 firms).

As an alternative measure of risk, I use "total risk" – the standard deviation of total share price returns.

I measure financial leverage as total debt to equity (total debt divided by the book value of common equity), at the end of each year. The number of matched pairs with available data varies over time; as of 2001, it is 977 (325 are level-23).

I also use the following country-level variables to measure the quality of home-country governance. Except as indicated below, higher scores indicate better governance.

Spamannn: A country-level variable developed by Holger Spamannn (2006), measuring multiple aspects of investor protection under company and securities laws. The components include rules governing board composition, voting, disclosure, preemptive rights, and so forth. I use the cumulative measure. This measure can be understood as updating, refining, and correcting the better-known LLSV measures of antidirector rights ((La Porta et al. 1998) and securities law protections (La Porta et al. 2006). In unreported regressions, I substitute the LLSV measures for Spammann; the LLSV measures are not significant.

Antidirector Rights and Accounting Rules. Country-level measure of corporate governance developed in La Porta et al. 1998.

Country Disclosure (S&P): Standard and Poor's Transparency Rankings from 2002. S&P compiled these rankings at the firm level. Because of their limited coverage, I would lose a considerable fraction of of the sample if I used this variable as a firm-level control. As in Litvak (2007a), I use the firm-level scores develop a country-level measure of disclosure, which equals the country median of the disclosure measure for all cross-listed firms in my sample. The total S&P score is composed of three sub-scores—for financial transparency and information disclosure, board and management structure and process, and ownership structure and investor relations (Patel and Dallas, 2002). I use the overall S&P score; results using sub-scores are consistent (not reported). This survey is available only for 2002.

GDP per capita is from the World Bank's World Development Indicators database for 2001.

Table 1, Panel B presents Pearson correlation coefficients for the main variables in this study.

2. Methodology

[to be added; it is mostly explained in the Results section and in the headings to tables]

3. Results

3.1. Figures

Figure A compares monthly fluctuations in Tobin's Q of cross-listed firms subject to US regulation (exchange-traded) with their non-cross-listed matches. Although these two values move similarly, a notable gap emerges around 1997 and then disappears around 2002. Tobin's Q's of exchange-traded firms dramatically increased around the time of the US Internet bubble and sharply declined thereafter; Tobin's Q's of otherwise similar non-cross-listed firms were mostly flat.

Figure B compares monthly fluctuations in Tobin's Q's of cross-listed firms not subject to US regulation (traded over-the-counter or on PORTAL) with their non-cross-listed matches. The two are again moving similarly (which increases confidence in the quality of the match). In contrast with the pattern found in Figure A, neither group in Figure B experiences a sharp increase in Tobin's Q's around the bubble time.

Figure C looks at the time fluctuations in cross-listing premia, instead of Tobin's Q. In this figure, I define cross-listing premium as the difference between Tobin's Q of an exchange-traded firm minus the Tobin's Q of its non-cross-listed match. Cross-listing premia exhibit a strong "bubble" pattern, very similar to that seen in the NASDAQ index. I add the line representing the value of the NASDAQ index. The two lines move together throughout the range. The correlation between the median cross-listing premium of level-23 firms and the NASDAQ Index is 0.83.

In Figure D, I compare the cross-listing premia of level-14 firms to the changes in the NASDAQ index. The two do not move together. While the NASDAQ index exhibits the bubble around the late 1990s, the premia for level-14 firms steadily decline over the years.

In Figure E, I look more closely at the bubble years (1998 through 2001). I compare the monthly fluctuations in premia of level-23 firms with changes in the NASDAQ index. The co-movement is striking. The correlation between the two values is 0.81. In Figure F, I repeat the procedure for level-14 firms. The correlation falls to only 0.29.

In Figure G, I plot monthly changes in premia of level-23 firms, level-14 firms, and the S&P-500 index. The results are very similar to what we've seen in Figures A through E. Premia for level-23 firms (the difference between the Tobin's Q of an exchange-traded firm and its match) are following the S&P-500 pattern (corr=0.83); premia for level-14 firms do not (corr=-0.63).

Generally, because the NASDAQ index is highly correlated with the S&P-500 index, my results are very similar for both. In the remainder of the paper, I present the results for the NASDAQ index, reminding the reader that the S&P-500 results are similar.

3.2. Tables

3.2.1. Basic Results

In Table 3, I move to regression analysis and ask whether changes in NASDAQ predict changes in premia, controlling for a variety of firm-level characteristics, and controlling for period effects. Panel A uses panel data of Tobin's Q's, calculated monthly and annually between 1990 and 2006. All regressions include firm fixed effects, firm clusters to address the problem of serial correlation (Bertrand et all, 2004), and period dummies. Independent variables include: the NASDAQ index, firm size (ln sales), sales growth, global industry Q, and leverage. Including other variables (such as firm risk or ROA), or excluding some of the used variables, does not notably change the results.

The dependent variable in this table is Tobin's Q. In unreported robustness checks, I use a different dependent variable – "pair premia" (the difference between the Tobin's Q of a cross-listed company and Tobin's Q or its match). The results are very similar. Because my sample was constructed in the way that kept only the firms that did not change their listing level in the midstream, the dummy for the listing level drops out in the fixed effects specification.

Columns 1 and 2 report the results with monthly measures of Tobin's Q; Columns 3 and 4 use annual measures. Tobin's Q's correlate strongly and positively with the NASDAQ index. When the NASDAQ Index is interacted with dummies for the trading platform, the interaction between the exchange-traded dummy and the NASDAQ Index emerges as significant and positive; the interaction of level-14 platforms (OTC and PORTAL) with the NASDAQ Index is not significant. This confirms the result we've seen in the graphs: the NASDAQ index strongly predicts Tobin's Q of exchange-traded foreign firms, but not that of OTC/PORTAL-traded foreign firms.

There is a disagreement as to whether the use of firm fixed effects is appropriate in this research design. I therefore report the results of both – with and without firm fixed effects; they are very similar. Panel B contains the results of regressions with firm random effects, instead of firm fixed effects. In unreported robustness checks, I also obtain similar results without using either firm fixed or firm random effects.

Panel B is otherwise similar to Panel A. It uses firm random effects, period fixed effects, and firm clusters. Columns 1, 2, 4, and 5 use country fixed effects; Columns 4 and 6 do not, to preserve the coefficients on country-level variables. This does not significantly affect the results. The use of a "pair premia" as a dependent variable (instead of Tobin's Q) produces similar results (not reported).

As Columns 1 and 4 show, the NASDAQ index correlates strongly with Tobin's Q. When interacted with dummies for trading platforms, the interaction of exchange-traded dummy and the NASDAQ index is again significant and positive. Other consistent predictors of Tobin's Q are: being cross-listed, and especially traded on one of the main exchanges (positive); firm size (negative); global industry Tobin's Q (positive), and the quality of home country's disclosure (positive).

Having shown that the use of monthly and annual values of Tobin's Q produces similar results, I proceed to report only the results with the monthly values of Tobin's Q. The use of annual values does not change the results. Likewise, the use of "pair premia" as a dependent variable produces similar results in remaining tables (not reported).

3.2.2. Relationship Between Trading Volume and Cross-Listing Premia

In Table 4, I test the hypothesis that cross-listing premia is (at least partly) explained by the volume of US trading, rather than by bonding. In this table, the sample is limited to cross-listed companies, listed on all levels. Column 1 includes all cross-listed firms. Column 2 includes firms with above-median ratio of US trading volume to non-US trading volume. Column 3 includes firms with below-median ratio of US trading volume to non-US trading volume. The dummy for "exchange-traded" captures the value added by being a subject to US laws and regulations, as compared to merely trading in the US.

The results are very strong. The dummy for exchange-traded firms is significant and positive when all firms are included into a regression. This replicates results in prior papers. When we limit the sample to firms with above-median volume of US trading (relative to their non-US trading), the dummy for exchange-traded firms is again significant and positive. However, when we look at the firms with lower-than-median volume of US trading (relative to their non-US trading), the dummy for exchange-traded firms becomes insignificant. If the US law adds no value to firms with below-median US trading, we may reasonably question whether it adds value to firms with above-median US trading, or whether excess valuations of those firms are due to other factors.

Another notable result: Tobin's Q's of higher-than-median US-volume firms are correlated with the NASDAQ Index, but Tobin's Q's of lower-than-median US-volume firms are not. Apparently, a firm's ability to "peg" its stock prices to a US market index requires a substantial amount of US-based trading (or else – less plausibly – US investors are more willing to trade stocks of foreign firms whose prices move together with the NASDAQ index). Adding or removing explanatory variables does not change this result.

These results are not consistent with the bonding hypothesis. Firms listed on NYSE or NASDAQ are subject to the same US regulation regardless of the volume of traded shares. If bonding drives the premia, we would not expect to see the difference between the premia of high-US-trading and low-US-

trading firms. The complete absence of premia among lower-than-median US-trading firms is a significant challenge to the bonding hypothesis.

In Table 5, I explore the relationship between premia and the volume of US trading further. in Column 1, the sample is limited to exchange-traded foreign firms; in Column 2, to OTC and PORTAL-traded foreign firms; Colum 3 further narrows the sample to NYSE-traded foreign firms; Column 4, to NASDAQ-traded; Column 5, to OTC, and Column 6, to PORTAL. We see again that Tobin's Q's of firms listed on major exchanges (but not on OTC or PORTAL) are correlated with the NASDAQ Index. Volume of US trading positively predicts premia for exchange-traded foreign firms, but not for OTC and PORTAL-traded foreign firms. Controlling for the volume of US trading, the volume of non-US trading is a negative predictor of premia (further consistent with the view that premia are explained by the portion of a firm's volume traded in the US). As a separate measure of US-versus-non-US trading volume, I use the ratio of a firm's US volume to its non-US volume (columns 3 through 6). This variable is a significant positive predictor of premia for NASDAQ-traded foreign firms, and, surprisingly, a significant negative predictor of premia for PORTAL-traded foreign firms.

3.2.2. What Predicts the Correlation Between Cross-Listing Premia and the NASDAQ Index

In Table 6, I turn to the question of what predicts the correlation between cross-listing premia and the NASDAQ index. The dependent variable here is the correlation between a firm's monthly Tobin's Q and the NASDAQ index. Because this variable does not change over time, the use of panel techniques is inappropriate. All regressions here use country random effects (to preserve coefficients on country-level variables) and country clusters. The use of country fixed effects produces very similar results (not reported).

In Column 1, the sample is limited to cross-listed firms. I report the results separately for each type of trading; the omitted type is over-the-counter. In Columns 2 and 3, I use all firms, cross-listed and non-cross-listed.

The most consistent predictor of the correlation between Tobin's Q and the NASDAQ index is the firm's volume of US trading, controlling for its volume of non-US trading. Being traded on NASDAQ is another strong predictor. Consistent with findings in prior tables, the interaction between a dummy for NYSE or NASDAQ with the US-trading volume is significant and positive, but the interaction for OTC or PORTAL are not.

In all tables, the results are very similar when I use the S&P-500 index instead of NASDAQ (not reported).

Conclusion

This paper uses long-term panel data on cross-listing premia to test the "bonding" hypothesis – whether the excess valuation of US-listed foreign firms can be attributed to US laws. My main finding – that Tobin's Q's of cross-listed firms are strongly correlated with the NASDAQ and S&P indices – is not explained or predicted by the bonding hypothesis. If investors are willing to pay more for cross-listed firms because of the value added by US laws, then, over time, cross-listing premia should follow the changes in the difference between US laws and the laws of firms' home countries – that is, decline throughout the 90s. I do not find this pattern. Instead, I find a strong correlation of premia with NASDAQ/S&P.

Nothing in the bonding hypothesis explains why the value added to foreign firms by the exposure to US laws should fluctuate with the NASDAQ. More interestingly, none of the existing theories of cross-listing explain this main finding. The liquidity hypothesis may explain why increased trading in the US predicts higher Tobin's Q, but it does not explain why increased trading in the US predicts higher correlation between cross-listing premia and NASDAQ. Likewise, investor recognition hypothesis may predict why cross-listed firms are traded at a premium to their non-cross-listed counterparts, or why this premium is predicted by the exposure to investors (e.g., through the analyst coverage), but it does not explain the premia-NASDAQ correlation. Other existing theories have the same problem.

On the other hand, as discussed above, my secondary findings are consistent with some of the existing theories. For example, I replicate (using different data and different methodology) the Doidge, Karolyi, Stulz finding that level-23 firms are traded at a premium to otherwise similar non-cross-listed firms. I also replicate their result that the premia of level-23 firms are higher than that of level-14 firms. These two findings are consistent with the bonding hypothesis, investor recognition hypothesis, and analyst coverage hypothesis. However, the reported patterns of fluctuations of premia over time are not explained by either of these three hypotheses.

I find no premia for level-23 firms with lower-than-median volume of US trading, controlling for their non-US trading. This is not consistent with the bonding hypothesis. The finding that higher volume of trading in the US predicts higher premia is consistent with the liquidity hypothesis. However, even controlling for the volume, premia are still predicted by NASDAQ, which his not explained by the liquidity hypothesis.

Thus, the overall result is that existing theories explain some portion of the cross-listing premia, but not the entire premia. More theoretical work is needed to link the size of the premia to NASDAQ/S&P.

References

Bris, Arturo, Salvatore Cantale, and George Nishiotis (2007), A breakdown of the valuation effects of international cross-listing. Working paper.

Coffee, John (1999), The future as history: the prospects for global convergence in corporate governance and its implications, *Northwestern University Law Review* 93, 641-708.

Coffee, John (2002), Racing over the top? The impact of cross-listing and stock market competition on international corporate governance, *Columbia Law Review* 102, 1757-1831.

Doidge, Craig (2004), U.S. cross-listings and the private benefits of control: evidence from dual-class firms, *Journal of Financial Economics*, 72, 519-553.

Doidge, Craig, G. Andrew Karolyi, and Rene Stulz (2004), Why are foreign firms listed abroad in the U.S. worth more?, *Journal of Financial Economics* 71, 205-238.

Doidge, Craig, G. Andrew Karolyi, Karl V. Lins, Darius P. Miller, and Renee Stulz (2006), Private benefits of control, ownership, and the cross-listing decision. Working paper.

Dyck, Alexander and luigi Zingales (2004), Private benefits of control: An international comparison, *Journal of Fiannce* 59, 537-600.

Foerster, S and G. Andrew Karolyi, 1998, the long-run performance of global equity offerings, *Journal of International Financial Market, Institutions, and Money* 8, 383-4112.

Fresard, Laurent and Carolina Salva (2007), Does cross-listing in the U.S. really improve corporate governance?: Evidence from the value of corporate liquidity. Working paper.

Gozzi, Juan Carlos, Ross Levine, and Sergio L. Schmuckler (2006), Internationalization and the evolution of corporate valuation. World Bank policy research working paper 3933.

Hail, Luizi and Christian Leuz (2006), Cost of capital and cash flow effects of U.S. cross-listings. Working paper.

Karolyi, Andrew G. (2004), The world of cross-listings and cross-listings of the world: challenging conventional wisdom. Working paper.

King and Segal (2004), International Cross-Listings and the Bonding Hypothesis. Working paper, Bank of Canada.

Licht, Amir (2001), Managerial opportunism and foreign listing: some direct evidence, *University of Pennsylvania Journal of International Economic Law* 22, 325-347.

Licht, Amir (2003), Cross-listing and corporate governance: bonding or avoiding? *Chicago Journal of International Law* 4, 122-141.

Lopes, Alexsandro Broedel, Yhurika Sandra Tukamoto, and Fernando Caio Galdi (2007), Earnings Management and Cross-listing in Brazil. Working paper. Available on SSRN at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=997880

Merton, Robert (1987), A simple model of capital market equilibrium with incomplete information, *Journal of Finance* 4, 473-510.

Reese, William A. J. and Michael S. Weisbach (2002), Protection of minority shareholder interests, cross-listing in the United States, and subsequent equity offerings, *Journal of Financial Economics* 66, 65-104.

Siegel, John (2005), Can foreign firms bond themselves effectively by submitting to U.S. law? *Journal of Financial Economics* 72, 319-360.

Stulz, Renee (1999), Globalization, corporate finance, and the cost of capital, *Journal of Corporate Finance* 12, 8-25.

Figure A: Monthly median Tobin's Q of exchange-traded cross-listed firms and their non-cross-listed matching firms (corr=0.87)

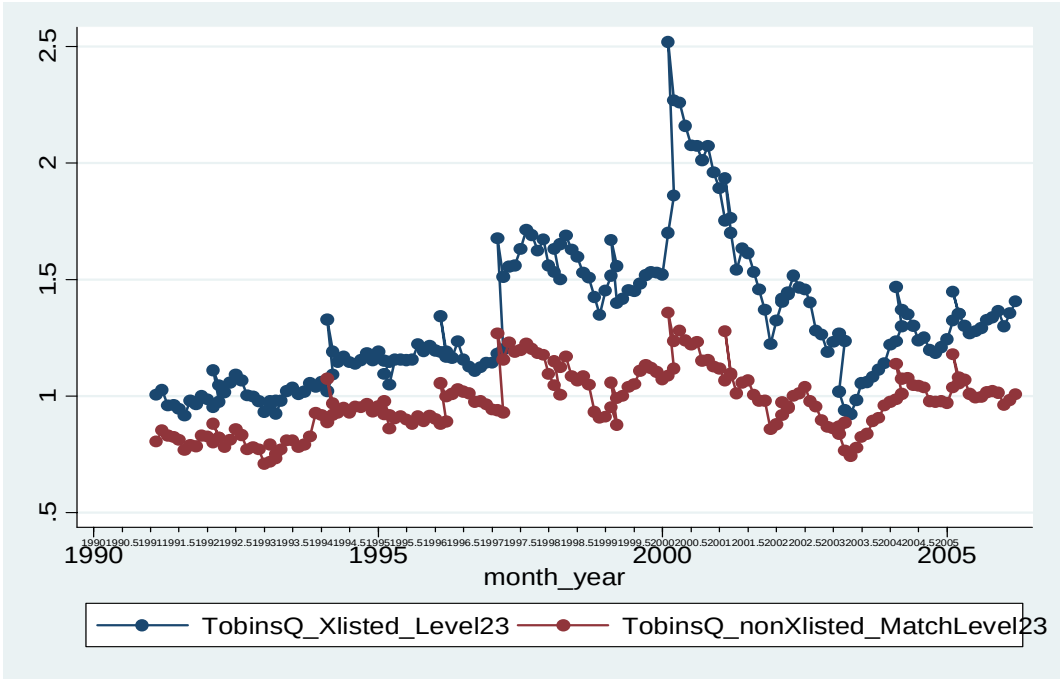


Figure B: Monthly median Tobin's Q of cross-listed firms traded over-the-counter or on the PORTAL market and their non-cross-listed matching firms (corr=0.73)

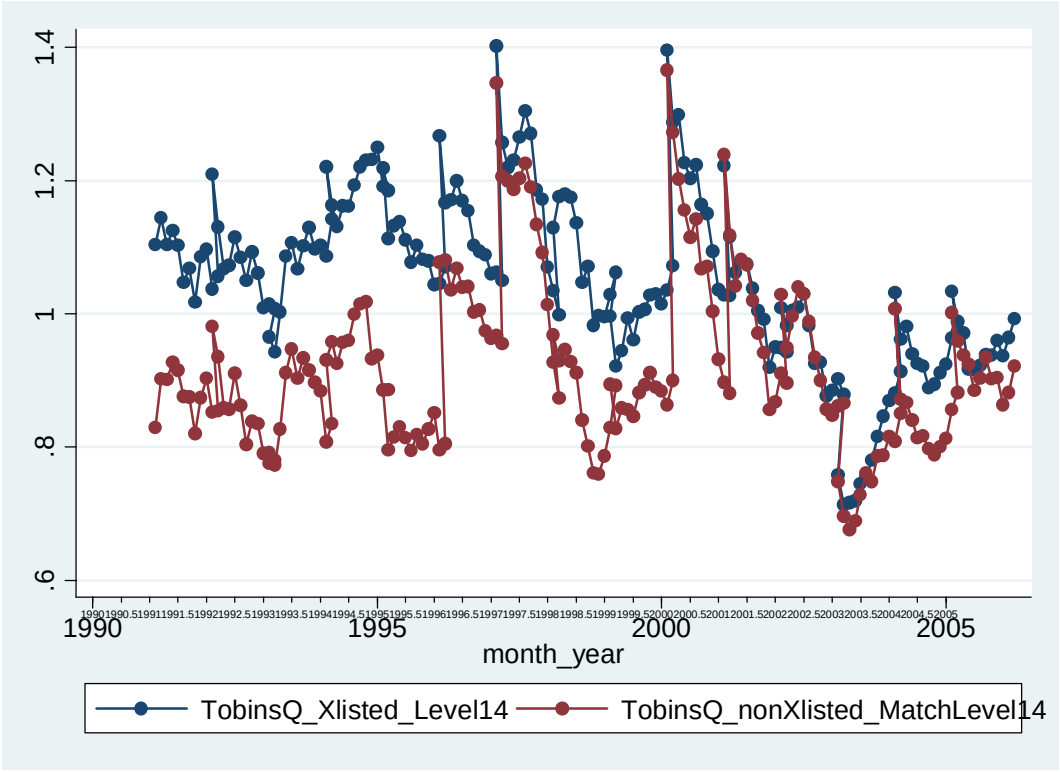


Figure C: Median Cross-Listing Premia of Level-23 Firms (Tobin's Q of an Exchange Firm minus Tobin's Q of its Non-Cross-Listed Match); NASDAQ Index[4] (corr=0.83)

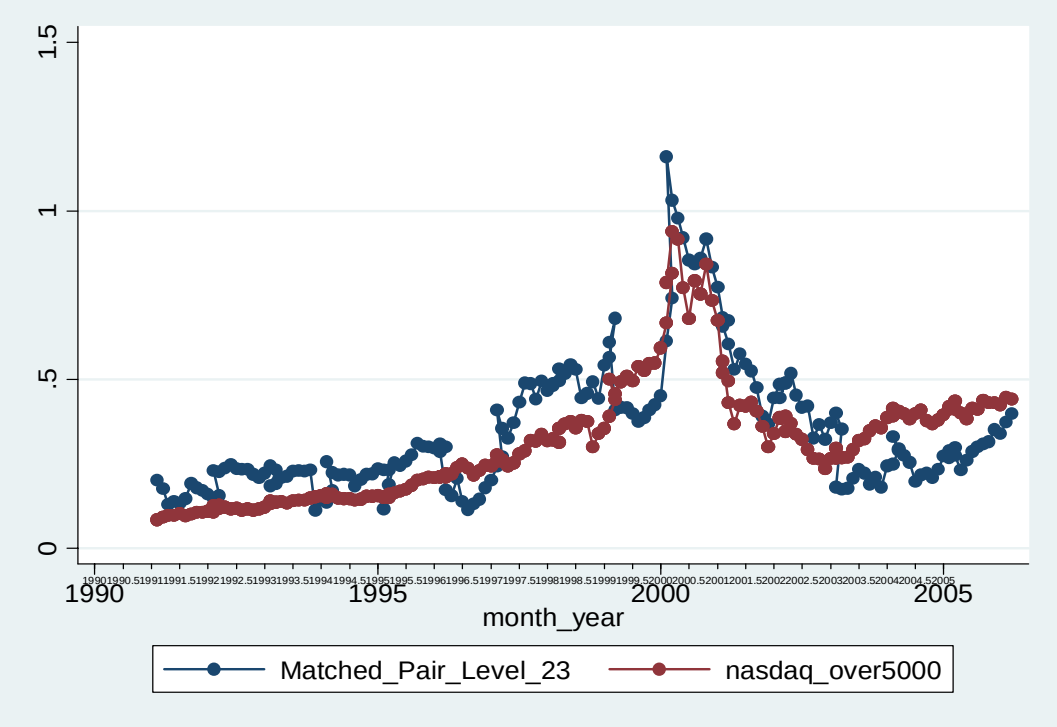
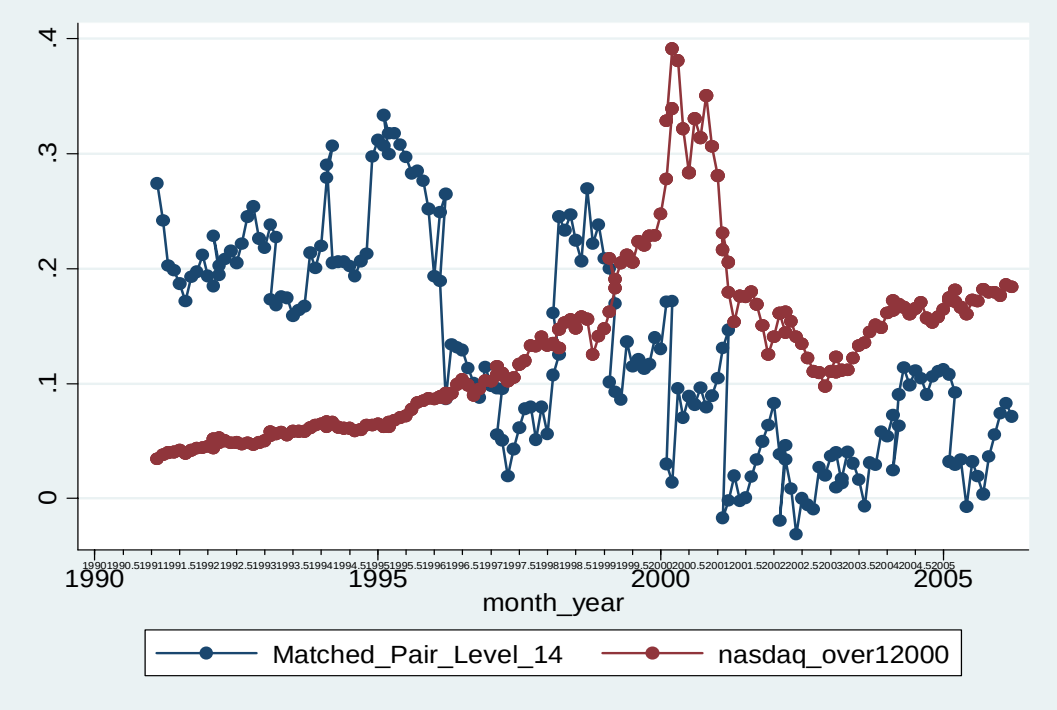


Figure D: Median cross-listing premia of level-14 firms (Tobin's Q of a non-exchange-traded cross-listed firm minus Tobin's Q of its non-cross-listed match); NASDAQ Index[5] (corr=-0.5)



[4] NASDAQ Index is scaled by 5000 for this graph
[5] NASDAQ Index is scaled by 12000 for this graph

Figure E: Median Cross-Listing Premia of Level-23 Firms (Tobin's Q of an Exchange Firm minus Tobin's Q of its Non-Cross-Listed Match); NASDAQ Index;[6] 1998-2002 (corr=0.81)

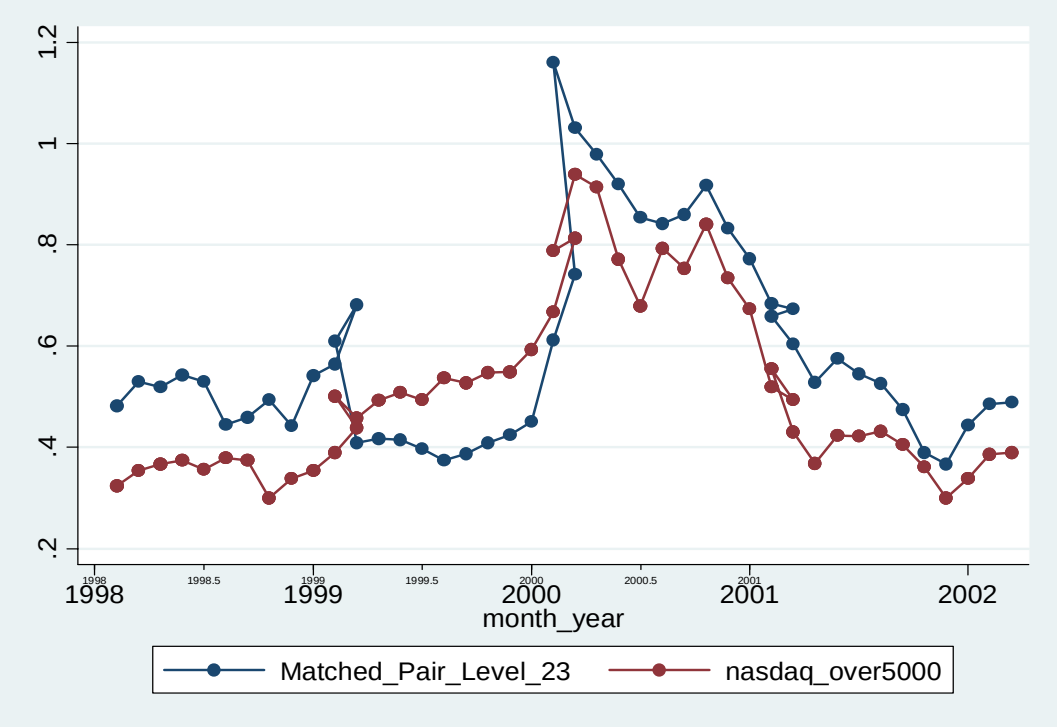
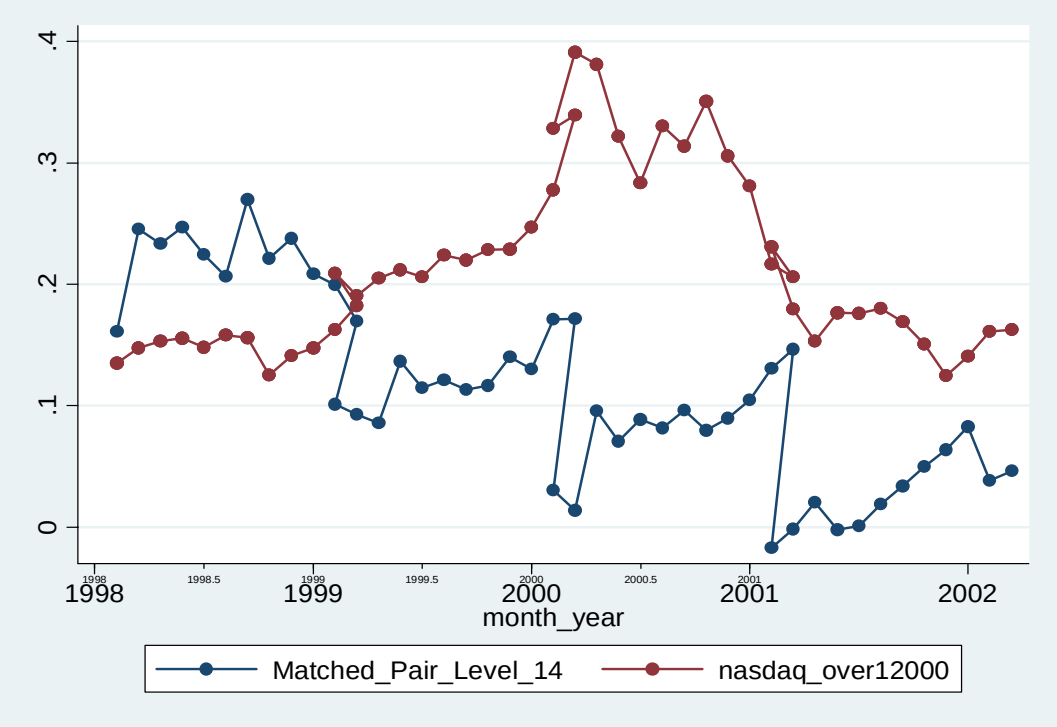
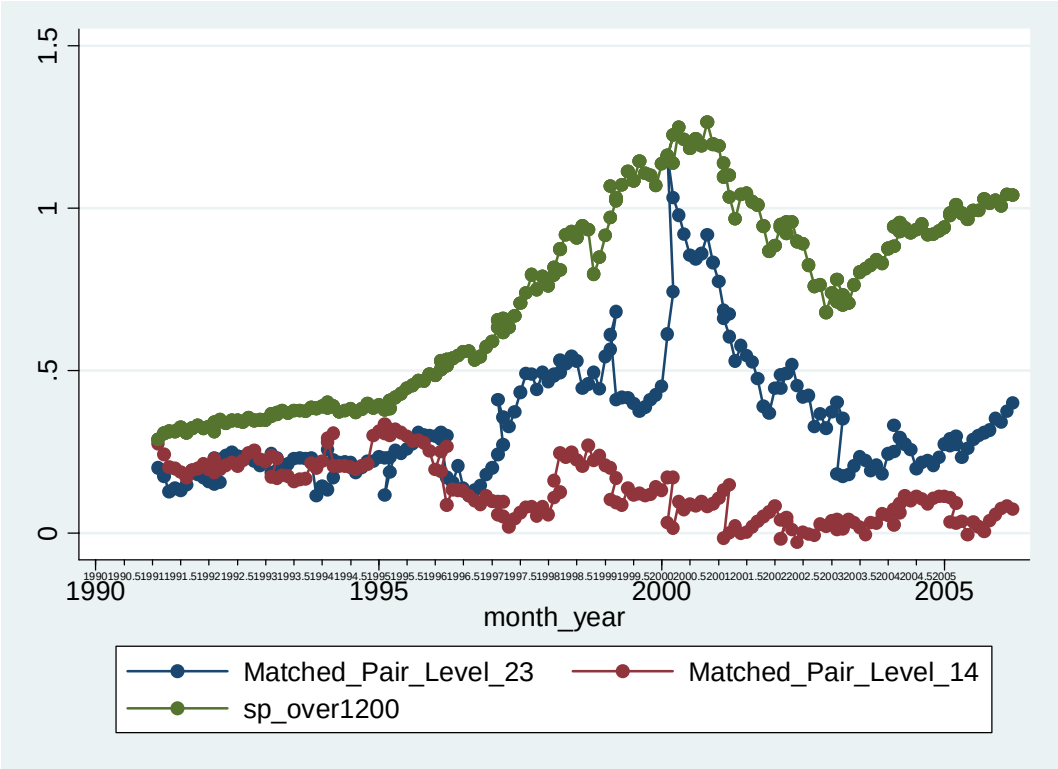


Figure F: Median Cross-Listing Premia of Level-23 Firms (Tobin's Q of an Exchange Firm minus Tobin's Q of its Non-Cross-Listed Match); NASDAQ Index;[7] 1998-2002 (corr=-0.29)



[6] NASDAQ price is scaled by 5000 for this graph
[7] NASDAQ price is scaled by 1200 for this graph

Figure G: Median cross-Listing premia of Level-23 Firms (Tobin's Q of an exchange-traded cross-listed firm minus Tobin's Q of its non-cross-listed match); median premia of level-14 firms (Tobin's Q of a non-exchange traded cross-listed firm minus Tobin's Q of its non-cross-listed match); and S&P 500 Index[8] (corr between level-23 premia and S&P=0.83; corr between level-14 premia and S&P=-0.63)



[8] S&P 500 Index is scaled by 1200 for this graph

Table 1, Panel A: Summary Statistics

Variables are measured as of year-end of 2001; winsorized at 1%/99% level.

	Firms	Mean	Std. Dev.
Level-23 Cross-Listed Firms			
Tobin's Q	331	1.366251	0.846759
Assets	349	1.00E+09	3.76E+09
Sales Growth	337	0.009651	0.049723
ROA	329	2.242153	21.19873
Leverage	348	0.283463	0.212897
Unsystem. Risk	353	0.02335	0.019261
Level-14 Cross-Listed Firms			
Tobin's Q	646	0.902781	0.846759
Assets	664	6.22E+08	2.33E+09
Sales Growth	660	0.010737	0.039715
ROA	636	4.224027	22.34646
Leverage	664	0.277139	0.224403
Unsystem. Risk	685	0.027221	0.021
Non-Cross-Listed Matched Firms			
Tobin's Q	933	0.90784	1.036815
Assets	977	3.33E+08	1.15E+09
Sales Growth	970	0.018545	0.061953
ROA	905	5.527303	38.20105
Leverage	976	0.2385645	0.281007
Unsystem. Risk	1009	0.028583	0.027501

Table 2: Pearson Correlations

Significant results (at 5% level or better) are in **boldface**; p-values are in parentheses. Level-23 firms only (subject to SOX)

	Tobin's Q	Asset Size	Sales Growth	ROA	Leverage	Unsystem Risk	Current Ratio	GDP per Capita	S&P Disclosure
Assets	-0.067	1							
p-value	(0.221)								
Sales Growth	-0.065	**0.516**	1						
p-value	(0.247)	**(0.00)**							
ROA	**-0.130**	0.011	0.050	1					
p-value	**(0.022)**	(0.838)	(0.381)						
Leverage	**-0.126**	-0.001	0.033	**-0.207**	1				
p-value	**(0.022)**	(0.991)	(0.545)	**(0.000)**					
Unsyst Risk	0.055	-0.015	-0.022	-0.049	-0.074	1			
p-value	(0.322)	(0.781)	(0.687)	(0.381)	(0.168)				
Current Ratio	-0.004	-0.013	-0.016	0.016	-0.071	-0.013	1		
p-value	(0.948)	(0.829)	(0.789)	(0.790)	(0.215)	(0.826)			
GDP/Capita	0.052	-0.025	0.046	-0.039	-0.064	-0.096	0.033	1	
p-value	(0.353)	(0.645)	(0.406)	(0.490)	(0.238)	(0.075)	(0.575)		
S&P Disclosure	**0.128**	-0.058	-0.074	-0.093	-0.078	-0.116	-0.040	**0.686**	1
p-value	**(0.041)**	(0.338)	(0.234)	(0.136)	(0.203)	(0.053)	(0.542)	**(0.00)**	
Spamann	0.015	0.003	0.043	0.047	-0.089	0.071	-0.039	**-0.173**	**-0.436**
p-value	(0.795)	(0.962)	(0.441)	(0.408)	(0.106)	(0.192)	(0.506)	**(0.001)**	**(0.00)**

Table 3: Relationship Between Cross-Listing Premia and the NASDAQ Index: Panel Data; 1990-2005

Panel A. Results from panel data regressions estimating the relationship between annual changes in cross-listing premia and the NASDAQ index. The dependent variable is the Tobin's q of each company, calculated monthly (Columns 1 and 2) or annually (Columns 3 or 4) between 1990 and 2005. All regressions use firm fixed effects; period fixed effects, and firm clusters. In Columns (1) and (3), the coefficient of interest is that on the NASDAQ Index variable (monthly or annual value of NASDAQ index). In Columns (2) and (4), the coefficient of interest is that on the interaction between the NASDAQ Index and the dummy for the trading platform. Control variables include firm size (ln of sales), sales growth, global industry Tobin's Q, and leverage. All non-dummy independent variables are normalized. *T*-statistics are reported under regression coefficients. Symbols *, **, *** indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface** for variables of interest.

	Monthly		Annual	
	1	2	3	4
NASDAQ Index	**0.054**	0.018	**0.091**	0.035
	(3.98)* **	(1.23)	**(4.85)*** **	(1.89)*
Exchange Traded * NASDAQ Index		**0.119**		**0.179**
		(3.35)* **		**(3.79)*** **
OTC * NASDAQ Index		-0.021		-0.021
		(0.99)		(0.75)
PORTAL * NASDAQ Index		0.058		0.071
		(1.72)*		(1.61)
Firm Size (Ln Sales)	-0.175	-0.26	-0.398	-0.393
	(2.04)**	(3.79)***	(2.75)***	(3.42)***
Sales Growth	-0.016	-0.009	0.013	0.005
	-1.19	(1.05)	-0.6	(0.37)
Global Industry Tobin's Q	0.319	0.325	0.258	0.27
	(7.93)***	(10.19)***	(7.86)***	(9.72)***
Leverage	0.089	0.086	-0.019	-0.068
	(3.48)***	(3.96)***	-0.49	(1.90)*
Constant	1.046	1.074	1.168	1.161
	(29.57)***	(38.73)***	(32.19)***	(42.37)***
Observations	55960	87208	4565	7193
Firms	1726	1726	1721	1721

Panel B: Similar to Panel A, but using firm random effects. The dependent variable is the Tobin's q of each company, calculated monthly (Columns 1 through 3) or annually (Columns 4 through 6) between 1990 and 2005. All regressions use firm random effects; period fixed effects, and firm clusters. Columns 1, 2, 4, and 5 use country fixed effects; Columns 3 and 6 do not use country fixed effects to preserve coefficients on country-level variables. In Columns 1 and 4, the coefficient of interest is that on the NASDAQ Index variable (monthly or annual value of NASDAQ index). In Columns 2, 3, 5, and 6, the coefficient of interest is that on the interaction between the NASDAQ Index and the dummy for the trading platform. Control variables include firm size (ln of sales), sales growth, global industry Tobin's Q, leverage, Ln GDP, country-level measure of disclosure based on S&P disclosure index, and country-level corporate governance measure based on Spamann's index. All non-dummy independent variables are normalized. *T*-statistics are reported under regression coefficients. Symbols *, **, *** indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface** for variables of interest.

	Monthly			Annual		
	Firm RE Country FE		Firm RE	Firm RE Country FE		Firm RE
	1	2	3	4	5	6
NASDAQ Index	**0.036**	0.018	0.021	**0.057**	0.033	0.024
	(2.99)* **	(1.22)	(1.35)	**(3.66)*** **	(1.79)*	(1.25)
Exchange-Traded * NASDAQ Index		**0.119**	**0.138**		**0.168**	**0.194**
		(3.35)* **	**(3.73)*** **		**(3.57)*** **	**(4.11)*** **
OTC * NASDAQ Index		-0.02	-0.027		-0.027	-0.023
		(0.94)	(1.14)		(0.94)	(0.75)
PORTAL * NASDAQ Index		0.06	0.006		0.075	0.012
		(1.78)*	(0.17)		(1.66)*	(0.28)
Exchange-Traded	0.482	0.479	0.454	0.648	0.614	0.585
	(6.36)***	(6.34)***	(5.41)***	(7.60)***	(7.35)***	(6.26)***
OTC	0.149	0.159	0.173	0.157	0.168	0.203
	(2.91)***	(3.14)***	(3.34)***	(2.91)***	(3.17)***	(3.81)***
PORTAL	0.141	0.134	-0.002	0.26	0.24	0.116
	(2.15)**	(2.15)**	(0.03)	(3.41)***	(3.36)***	(1.35)
Firm Size (Ln Sales)	-0.224	-0.234	-0.237	-0.328	-0.333	-0.313
	(4.43)***	(4.61)***	(4.72)***	(9.11)***	(9.26)***	(8.32)***
Sales Growth	-0.01	-0.01	-0.002	0.01	0.009	0.008
	(1.18)	(1.16)	(0.18)	(0.71)	(0.68)	(0.52)
Global Industry Tobin's Q	0.341	0.325	0.321	0.315	0.3	0.31
	(11.03)***	(10.61)***	(9.51)***	(13.40)***	(12.80)***	(12.14)***
Leverage			0.064			-0.064
			(2.77)***			(2.34)**
Ln (GDP)			-0.029			-0.014
			(0.98)			(0.41)
S&P Country Disclosure			0.137			0.124
			(4.18)***			(3.28)***
Spamann			-0.018			-0.033
			(0.94)			(1.5)
Index Non-Xlisted Firms			0.055			0.083
			(1.59)			(2.30)**
Constant	0.489	0.498	0.939	0.506	0.518	0.966
	(5.49)***	(5.62)***	(24.39)***	(4.27)***	(4.44)***	(27.04)***
Observations	87208	87208	70868	7193	7193	5840
Firms	1726	1726	1334	1721	1721	1331

Table 4: The Absence of Cross-Listing Premia in Low-Trading Exchange-Listed Firms: Panel Data; 1990-2005

Results from panel data regressions estimating the relationship between trading volumes, NASDAQ Index, and cross-listing premia. The sample is limited to cross-listed companies, listed on all levels. Column 1 includes all cross-listed firms. Column 2 includes firms with above-median ratio of US trading volume to non-US trading volume. Column 3 includes firms with below-median ratio of US trading volume to non-US trading volume. The dependent variable is the Tobin's q of each company, calculated monthly between 1990 and 2005. All regressions use firm random effects; period fixed effects, country fixed effects, and firm clusters. The coefficients of interest are those on the "Exchange-Traded Dummy" and NASDAQ Index. Control variables include firm size (ln of sales), sales growth, global industry Tobin's Q, and leverage. All non-dummy independent variables are normalized. *T*-statistics are reported under regression coefficients. Symbols *, **, *** indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface** for variables of interest.

	Single Companies: Tobin's Q		
	All X-Listed Firms	High-Ratio-US-Trading	Low-Ratio-US-Trading
	1	2	3
Exchange-Traded Dummy	**0.366**	**0.298**	-0.023
	(4.76)* **	**(3.36)*** **	(0.18)
NASDAQ Index	**0.045**	**0.062**	-0.03
	(2.73)* **	**(2.86)*** **	(1.51)
Firms Size (LnSales)	-0.146	-0.148	-0.215
	(2.04)**	(1.76)*	(1.93)*
Sales Growth	-0.015	-0.011	-0.015
	(1.58)	(0.83)	(1.24)
Global Industry Q	0.337	0.289	0.484
	(8.87)***	(7.42)***	(5.57)***
Leverage	0.033	0.044	0.014
	(1.15)	(1.07)	(0.34)
Country FE, Period FE, Firm RE, Firm Clusters	yes	yes	yes
Constant	0.528	0.455	0.551
	(5.21)***	(3.35)***	(4.08)***
Observations	51368	27989	23379
Firms	862	454	408

Table 5: Relationship Between Trading Volume, NASDAQ Index, and Cross-Listing Premia: Panel Data; 1990-2005

Panel A. Results from panel data regressions estimating the relationship between trading volumes, NASDAQ Index, and cross-listing premia. The dependent variable is the Tobin's q of each company, calculated monthly between 1990 and 2005. All regressions use firm random effects; period fixed effects, country fixed effects, and firm clusters. The sample is split as follows: exchange-traded firms (Column 1), OTC and PORTAL traded firms (Column 2); foreign firms traded on NYSE (Column 3); NASDAQ (Column 4); OTC (Column 5); PORTAL (Column 6). In Columns (1) and (2), the coefficient of interest is that on the NASDAQ Index variable (monthly or annual value of NASDAQ index) and the volumes of US and non-US trading. In Columns (3) through (6), the coefficient of interest is that on the NASDAQ Index and the ratio of a firm's median volume of US trading to its non-US trading. Control variables include firm size (ln of sales), sales growth, global industry Tobin's Q, and leverage. All non-dummy independent variables are normalized. *T*-statistics are reported under regression coefficients. Symbols *, **, *** indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface** for variables of interest.

	Exchange Traded	OTC and PORTAL	NYSE	NASDAQ	OTC	PORTAL
	1	2	3	4	5	6
NASDAQ Index	**0.118**	-0.022	**0.099**	**0.166**	-0.042	0.053
	(4.33)* **	(0.86)	**(3.54)*** **	**(1.91)***	(1.45)	(1.65)*
Ratio Volume of Firm US Trading to Non-US Trading			0.036	**0.271**	0.001	**-0.029**
			(0.95)	**(2.70)*** **	(0.03)	**(2.73)*** **
Volume of US Trading (Firm Median)	**0.153**	0.706				
	(8.80)* **	(1.40)				
Volume of Non-US Trading (Firm Median)	**-0.05**	0.026				
	(5.66)* **	(0.8)				
Firm Size (LnSales)	-0.203	-0.197	-0.133	-0.307	-0.118	-0.457
	(1.5)	(2.18)**	(1.01)	(0.82)	(1.28)	(1.60)
Sales Growth	-0.038	-0.006	-0.031	-0.114	0.00	-0.038
	(2.15)**	(0.55)	(1.73)*	(1.48)	(0.03)	(2.35)**
Leverage	0.087	-0.006	0.054	0.138	-0.019	-0.032
	(1.70)*	(0.16)	(0.89)	(1.39)	(0.42)	(0.43)
Global Industry Q	0.288	0.357	0.245	0.355	0.347	0.511
	(5.45)***	(6.56)***	(4.21)***	(2.96)***	(4.98)***	(4.22)***
Constant	0.681	0.629	0.759	-0.007	0.292	0.589
	(5.50)***	(4.42)***	(5.05)***	(0.02)	(2.33)**	(1.88)*
Country FE, Period FE, Firm RE, Firm Clusters	yes	yes	Yes	Yes	Yes	Yes
Observations	14302	34325	10388	3722	21210	7226
Firms	240	567	174	64	322	120

Table 6: Predictors of Correlation Between Cross-Listing Premia and NASDAQ Index

The dependent variable is, for each firm, the correlation between its monthly Tobin's q and the NASDAQ Index, both calculated between 1990 and 2005. All regressions use country random effects and clusters. Column 1 includes only cross-listed firms (listed on all levels); Columns 2 and 3 include all firms. The coefficients of interest are those on the trading volume variables and their interactions with dummies for trading platforms. Other control variables include firm size (ln of sales), sales growth, global industry Tobin's Q, firm's unsystematic risk, leverage, home country GDP and disclosure. All non-dummy independent variables are normalized. *T*-statistics are reported under regression coefficients. Symbols *, **, *** indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface** for variables of interest.

	X-Listed Firms	All Firms	
Firm's US Trading Volume	**0.035**	**0.03**	**-0.076**
	(2.38)**	**(2.18)****	**(3.34)*****
Firm's Non-US Trading Volume	-0.008	-0.007	-0.089
	(1.16)	(0.96)	(1.72)*
NYSE	0.141	0.055	0.071
	(1.33)	(0.63)	(0.8)
NASDAQ	**0.168**	**0.109**	0.085
	(2.54)**	**(2.17)****	(1.3)
PORTAL	0.104	-0.029	-0.026
	(1.17)	(0.68)	(0.76)
OTC		-0.061	-0.039
		(1.96)*	(1.29)
NYSE * US Trading Volume			**0.098**
			(3.75)***
NASDAQ * US Trading Volume			**0.174**
			(6.45)***
OTC * US Trading Volume			0.124
			(1.04)
PORTAL * US Trading Volume			-0.073
			(1.03)
NYSE * Non-US Trading Volume			0.085
			(1.52)
NASDAQ * Non-US Trading Volume			0.112
			(1.57)
OTC * Non-US Trading Volume			0.056
			(0.88)
PORTAL * Non-US Trading Volume			-0.015
			(0.23)
Firm Size (Ln Sales)	**0.038**	**0.033**	**0.042**
	(2.17)**	**(2.26)****	**(3.00)*****
Sales Growth	-0.007	-0.007	-0.006
	(1.19)	(1.04)	(0.83)
Global Industry Tobin's Q	**0.057**	**0.028**	**0.029**
	(5.44)***	**(3.72)*****	**(3.73)*****
Leverage	-0.026	0.002	0.002
	(1.64)	(0.15)	(0.14)
Firm Unsystematic Risk	**0.044**	**0.042**	**0.042**
	(6.59)***	**(6.68)*****	**(6.71)*****
Home Country Ln GDP	**-0.057**	**-0.051**	**-0.067**

	(2.07)**	**(2.41)****	**(2.43)****
Home Country Disclosure	0.053	0.048	0.053
	(1.72)*	(1.71)*	(1.82)*
Constant	-0.06	0.031	0.008
	(1.45)	(1.29)	(0.3)
Observations	40636	72181	72181
Countries	27	28	28

Table 7: Summary of Findings and Existing Theories of Cross-Listing

Theory	Predicts that Level-23 Premium is Correlated with NASDAQ Index?	Secondary Findings Consistent with this Theory	Secondary Findings Not Explained by this Theory
Bonding	No	(1) Level-23 firms are traded at premium; (2) Level-23 premia are higher than Level-14 premia	(1) Fluctuations of premia over time unexplained by governance; (2) Correlation between premia and NASDAQ; (3) Absence of premia among low-volume exchange firms
Investor Recognition	No	(1) Level-23 firms are traded at premium; (2) Level-23 premia are higher than Level-14 Premia	Correlation between premia and NASDAQ
Liquidity	No	More US trading predicts higher premia	Correlation between premia and NASDAQ after controlling for US trading
Analyst Coverage	No	(Possibly): (1) Level-23 firms are traded at premium; (2) Level-23 premia are higher than Level-14 Premia	Correlation between premia and NASDAQ
Growth Opportunities	Yes	(1) Level-23 firms are traded at premium; (2) Level-23 premia are higher than Level-14 Premia; (3) Premia for level-23 firms are correlated with NASDAQ and are higher during the bubble period; (4) correlation with NASDAQ is stronger for firms with larger portion of shares traded in the US.	
Behavioral	Yes	(1) Level-23 firms are traded at premium; (2) Level-23 premia are higher than Level-14 Premia; (3) Premia for level-23 firms are correlated with NASDAQ and are higher during the bubble period; (4) correlation with NASDAQ is stronger for firms with larger portion of shares traded in the US.	