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The Relationship Among U.S. Securities Laws, Cross-Listing Premia, and Trading Volumes

Katherine Litvak (University of Texas)

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The Relationship Among U.S. Securities Laws, Cross-Listing Premia, and Trading Volumes

Kate Litvak*

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Abstract

This paper studies the relationship among the U.S. securities laws, the premia that non-U.S. firms obtain by subjecting themselves to U.S. laws, overall U.S. share prices, and a cross-listed firm's U.S. trading volume. I report three main sets of findings. First, for exchange-traded (NYSE and NASDAQ) cross-listed firms, pair premia and pair returns (premia and returns not explained by valuation and returns for similar non-cross-listed firms from the same home country) are strongly correlated with U.S. stock indices. There is a visually apparent "bubble" in pair premia for these firms, which peaks in early 2000, at the same time as U.S. stock indices. In contrast, pair premia and pair returns for cross-listed firms traded OTC or on PORTAL are not correlated with U.S. indices. The correlation between pair returns and U.S. indices only exists for firms with an above-median ratio of U.S.-based to total trading volume, and is triggered by cross-listing; there is no significant correlation before listing. Second, pair premia for level-23 firms, relative to premia for level-14 firms ("relative pair premia"), exist only in firms with above-median ratio of U.S. to total trading volume. Firms with below-median ratio of U.S. trading have no relative pair premia, regardless of listing level. Third, there are important time variations in relative pair premia. Relative pair premia decline significantly for all firms during the first 6 years after listing, and disappear after year six. The decay is most pronounced for firms with below-median ratio of U.S. trading volume.

These results, taken together, weaken the law-based explanation for cross-listing premia (bonding to U.S. securities regime) and strengthen the non-law-based explanations (liquidity and visibility). They also suggest a behavioral explanation: U.S. investors treat high trading volume, exchange traded firms partly like U.S. firms, but treat OTC firm, Portal firms and low-trading-volume exchange-traded firms like other foreign firms.

* Assistant professor, University of Texas School of Law. Email: klitvak@law.utexas.edu. I thank Bernie Black, Andrew Karolyi, Michael Weisbach, Mark Weinstein, and the participants in the NBER summer institute, the annual meeting of the American Law and Economics Association, and Canadian Law and Economics Association for helpful comments.

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 (e.g., Doidge, Karolyi, and Stulz (DKS), 2004, 2009). The causes of these premia are not yet clear. The early literature attributed these premia to reduced market segmentation and increased liquidity, visibility, and shareholder base (for reviews, see Karolyi, 1996, 2004). More recent research suggests that cross-listing is also beneficial because of "bonding": by cross-listing in the US, controllers and managers of foreign firms subject themselves to US laws and institutions, credibly promising not to exploit minority investors (Stulz, 1999; Coffee, 1999, 2002; Reese and Weisbach 2002, DKS, 2004). In general, U.S. securities laws apply to exchange-traded (NYSE and NASDAQ) cross-listed firms, and not to OTC or Portal-traded firms. Since stronger investor protection can increase the value of minority shares, firms located in countries with poor investor protection may benefit by listing on U.S. exchanges and thus "borrowing" more stringent US laws.

Prior research studied the factors which predict the decision to cross-list, and the relationship between cross-listing premia and home-country characteristics. Firms from countries with weak investor protection regimes are more likely to cross-list in the US (Reese and Weisbach, 2002), and obtain higher premia when they do so (DKS, 2004). Firms with a large controlling shareholder are less likely to cross-list (Doidge, Karolyi, Lins, Miller, and Stulz, 2006), as are firms with high private benefits of control, as proxied by voting premia for firms with two classes of shares (Doidge 2004). When firms cross-list in the US, their cost of capital declines (Hail and Leuz 2006). Premia rise in the year prior to cross-listing, and fall in the year after (Gozzi, Levine, and Schmukler, 2006).

This paper concentrates on the other leg of the relationship. I ask whether characteristics of the host market (rather than the home market) predict cross-listing premia and returns of cross-listed firms. I also study the long-run evolution of cross-listing premia, measured in event time relative to the date of cross-listing.

I study a panel of substantially all firms cross-listed in the US between 1995 and 2006, on all levels of listing. I separate these firms into two groups – US-regulated (listed

in the US on level 2 (exchange traded) or 3 (public offering in the US), which I call "level-23 firms") and US-unregulated (listed in the US on level 1 (traded over the counter) or 4 (traded on the institutions-only Portal market), which I call "level-14 firms").[1] To isolate the effect of U.S. listing on foreign firms, I need to control for both home country and firm characteristics. I do so by comparing cross-listed firms to similar non-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, based on industry, firm asset size, profitability, and leverage. I then compute a "cross-listing premium" – the difference between the Tobin's Q's of a cross-listed company and its match -- and a "pair return" the return to a cross-listed company minus the return to its match.

I study pair premia and pair returns over time, separately for level-23 and level-14 firms. In my first main set of results, I find that the pair premia and pair returns for level-23 firms are strongly positively correlated with the NASDAQ and NYSE indices. There is a visually apparent "bubble" in premia, which peak in early 2000 when the US market peaks, and then fall sharply thereafter. In contrast, the pair premia and pair returns of level-14 firms are not correlated with any US indices; including their own trading platform (OTC index, based on US firms); thus, foreign firms do not simply pick up a beta for whatever trading platform they join.

Prior studies find that firms whose home country returns correlate with US returns prior to cross-listing are more likely to cross list (Foerster and Karolyi, 1998; Baruch, Karolyi, and Lemmon (2007). This tendency does not explain my results. I find that pair returns (pair premia) for level-23 firms do not significantly correlate with US indices prior to cross-listing; the correlation arises after cross-listing. Level-14 pairs show no correlation either before or after cross-listing. That is, cross-listed level-23 firms (and only these firms) partly take on the characteristics of other host exchange firms after they cross-list.

I next ask what predicts the extent of correlation between the pair premia and pair returns of level-23 firms and US indices. The strongest predictor is the firm's US trading

[1] A small number of level-1 firms (those traded on the OTC "bulletin board" are regulated similarly to exchange-traded firms. I treat these firm as US-regulated firms. For parsimony, I refer to all US-regulated (non-US-regulated) firms as level-23 (level-14), even though some US-regulated firms are level-1 firms.

volume. Level-23 firms with an above-median ratio of US-based to total trading volume have pair premia and returns which correlate with US indices; firms with below-median trading volume ratios do not. Other predictors of correlation are: firm's global industry Tobin's Q, unsystematic risk, size, and home country GDP/capita.

I also study whether differences in regulation can explain why pair premia and returns for (US-regulated) level-23 firms correlate with the NASDAQ/NYSE indices, while premia and returns for (unregulated) level-1 firms do not correlate with an OTC index. The answer is no. Here, I exploit a natural experiment. US and foreign companies traded on the Bulletin Board were not subject to SEC regulation prior to 1999 and became fully regulated since mid-2000. Thus, the Bulletin Board index is a "non-regulated" index prior to 1999 and a "regulated" index (like the NASDAQ and NYSE indices) since 2001. I find that the Bulletin Board index did not correlate with pair premia and returns before Bulletin Board firms became SEC-regulated, and still does not correlate today.

My second main set of results concerns which cross-listed firms receive premia. I find that level-23 firms with above-median ratios of US-to-total trading volume have large pair premia relative to level-14 firms (point estimate =0.37), while below-median ratios of US-to-total trading volume have negligible relative premia (point estimate = 0.05, t = 0.40). Thus, the well-known result that level-23 cross-listing produces a price premium is driven entirely by firms with above-median trading volume. The absence of a relative pair premium for below-median trading firms remains true for level-3 firms, which are subject to the strictest disclosure rules and the most plaintiff-friendly litigation environment. This result survives a battery of robustness checks, including different definitions of "median," different limitations of the sample, inclusion of different control variables, and different regression specifications. This finding is in tension with the "bonding" explanation for relative level-23 premia (at least, its mainstream version, based on the stricter disclosure rules which apply to these firms) because the applicability of the disclosure requirements does not depend on the volume of US trading.

I then ask whether exposure to US securities litigation might explain the relationship between US trading volume and relative pair premia. The idea is that damages in a securities suit are proportional to trading volume, so high-trading volume

firms are more likely to be sued for misdisclosure, and hence are more strongly bonded than low-trading-volume firms.[2] The answer seems to be no. Expected damages depend on (1) the absolute volume of US trading in dollars, and (2) the volatility of returns. I find that the *relative* volume of US trading (relative to the firm's total trading volume), rather than the absolute volume, predicts higher relative pair premia. Volatility of returns also does not predict Tobin's Q.

My third main set of findings involves the evolution of relative pair premia after cross-listing. The relative pair premium enjoyed by level-23 firms exists for both above-median and below-median trading volume firms shortly after cross-listing, but is substantially higher for the above-median firms. The premium for both groups declines steadily during the 6 years after cross-listing. After year 6, the relative pair premium remains positive and significant for the high-trading volume firms, but is insignificant for below-median trading volume firms and for all level-23 firms together.

This paper makes several contributions to the cross-listing literature. I document that cross-listing premia of some (but not all) foreign firms are strongly correlated with some (but not all) US indices over time. I analyze this correlation over time and present cross-sectional results linking firm-level characteristics to the correlation between premia and stock prices of US companies. I also 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 the strictest level of US regulation. Finally, I analyze the evolution of premia in years after cross-listing, finding the "end of premia" periods, separately for high-US-trading and low-US-trading foreign firms.

These results, taken together, strengthen the liquidity and visibilility explanations for cross-listing premia, and weaken the bonding explanation. They also suggest a behavior explanation: U.S. investors treat high trading volume, exchange traded firms partly like U.S. firms, but treat low-trading-volume exchange-traded firms and all OTC and Portal-traded firms like other foreign firms.

This paper proceeds as follows. Section 1 describes the sample and variables. Section 2 presents results on the correlation between pair premia and returns and US

[2] I thank Jack Coffee for suggesting this interpretation of my results.

indices. Section 3 presents results on which firms have cross-listing premia. Section 4 presents results on how cross-listing premia change over time (since cross-listing). Section 5 discusses the implications of my results and common explanations for cross-listing premia. Section 6 concludes.

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. 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 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. I obtain a total of 4,062 foreign cross-listed firms.

For companies with more than one listing levels, 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. I code firms whose highest listing level is 1 or 4 (2 or 3) as "level-14" ("level-23") firms. The only exception is that firms traded on the Bulletin Board, although technically level-1 firms, are reporting companies under US securities laws, and are therefore regulated in the same way as exchange-traded firms, so 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

[3] Other studies, including my own prior work on the Sarbanes-Oxley Act (SOX), e.g., Litvak (2007), incorrectly treat OTC Bulletin Board companies as not subject to SOX and other SEC rules.

(roughly the middle of my sample period) 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 during 2000-2005. If a firm is missing data for a particular financial variable in a particular year but has data for other years, I assign the median value for that country, industry, and year. This reduces the sample to 1,694 cross-listed firms (xx on level-23, yy on level-14).

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-industry-year 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 – roughly the middle of my sample period. They are ln(assets), two-digit NAICS industry code, ROA (EBITDA/total assets), geometric average sales growth from 1999 to 2001, and leverage (total debt/book value of equity). I 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 666 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 mismatch will be important for my results only if omitted matching variables (or any misspecification of variables) correlate with monthly pair premia . 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 and firm returns (relative to an index of non-cross-listed firms from the same country) instead of pair premia and returns; and (ii) in unreported regressions in which I conduct a simpler match on country and industry, and as close as possible in market capitalization.

Most of the cross-listed firms which drop out of the dataset due to lack of data or lack of a match are on level-14, so do not affect my principal results, which focus on level-23 firms. The level-23 firms which drop out for lack of data tend to be smaller than the level-23 firms I retain (median assets = $xxx million for dropped firms, versus $yyy million for retained firms), and to be less actively traded (median ratio of US/total trading volume = 0.xx for dropped firms, versus 0.yy for retained firms). These characteristics suggest that if I could keep the dropped firms my main results on which firms receive cross-listing premia, and which firms' prices correlated with US indices, would likely become stronger.

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, but are faster growing and more profitable. Foreshadowing one of my main results, level-23 firms have substantially higher Tobin's q than either level-14 firms or matching firms. 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 December 2005. While market values are available for each month, book values are only available annually. To compute monthly values of Tobin's q for months other than December, I use annual data and

interpolate to create monthly values. I then compute a pair premium for each firm, each month – the difference between the Tobin's *q*'s of a cross-listed company and its match. The interpolation undoubtedly creates noise, but there is no obvious reason why it should create bias. In robustness checks, I use annual values of Tobin's *q*, with similar results (not reported). 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). In regressions which include these control variables, sample size drops to xxx firms (xxx on level-23 and yyy on level-14).

I also use the following firm-level variables, measured annually. 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.

Firm size, measured as ln(sales). As robustness checks, I use ln(assets) and ln(market capitalization), with similar results.

Sales growth, as a proxy for a firm's growth opportunities, measured as two-year geometric average annual growth in sales (or one-year if two-year growth is not available for a particular firm-year).

Unsystematic risk: the standard deviation of a firm's daily abnormal returns computed from the market model, measured separately for each year. I use an equally weighted index of all non-cross-listed matching firms from the same country to construct the market index.

Returns volatility: the standard deviation of a firm's total daily returns computed from the market model, measured separately for each year.

To estimate the sensitivity of a firm's stock price to information in the US, relative to information in the home market, I use the measure developed by Baruch, Karolyi, and Lemmon (2007). This measure estimates the incremental effect of US index movements (I use the NASDAQ index) in explaining variation in the firm's stock price beyond the variation predicted by the firm's home market index.[4]

[4] Baruch Karolyi and Lemmon first compute the R^2 from the market model using a home country index, with weekly returns and one lead and one lag. They then compute R^2 from a similar regression which adds the US index, and compute a F-statistic which measures the additional explanatory power of the US index.

Global industry Tobin's Q: The median Tobin's Q of the firm's global industry, based on . two-digit NAICS industry classification.

Firm's US (worldwide) trading volume: The volume of trading of a firm's shares in the US (worldwide), in thousands of shares.

US/total trading volume: Ratio of US to worldwide trading.

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.

Spamann Index: A country-level variable developed by Holger Spamann (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).

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 the sample if I used this variable as a firm-level control. 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. This survey is available only for 2002.

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

Home country median liquidity: The median trading volume of a country's firms, in thousands of shares.

Table 2 presents Pearson correlation coefficients for the main variables in this study.

I copy their approach, using monthly returns, and a home country index which is the equally weighted return on the non-cross-listed matching firms in my sample.

2. Correlation Between Pair Premia, Pair Returns, and US Indices

2.1. Graphical Results

Figures A-C provide a graphical overview of my first main result: Pair premia for level-23 firms correlate strongly with the NASDAQ index, and show an apparent bubble which coincides with the NASDAQ "bubble" which peaked in early 2000. Figure A shows the median monthly pair premia for level-23 firms, the median premia for level-14 firms, and the NASDAQ index (divided by 4,000 to make the scales comparable). The cross-listing premia of level-23 firms exhibit a strong peak in early 2000, very similar to that seen in the NASDAQ index. The median level-23 premia move together with the NASDAQ index throughout the range. The correlation between the median cross-listing premium of level-23 firms and the NASDAQ Index is 0.83. A similar (unreported) figure using the S&P 500 Index instead of the NASDAQ index is similar.

The cross-listing premia of level-14 firms (red line) does not move similarly. While the NASDAQ index rises sharply in the late 1990s and then declines after 2000, the median premia for level-14 firms steadily decline over both periods.

In Figures B and C, I look more closely at the bubble period. These figures cover January 1998 through December 2002. Figure B compares the monthly fluctuations in median pair premia for level-23 firms with the NASDAQ index. The co-movement is striking. The correlation between the two series is 0.81. In Figure C, I examine level-14 firms. The correlation is visually weak, with no early 2000 bubble in level-14 premia. The measured correlation is 0.29.

2.2. Premia and US Indices: Basic Regression Results

I next move to regression analysis and ask whether changes in the NASDAQ index predict changes in pair premia. The dependent variable is the monthly fractional change in pair premium, between 1995 and 2006. Observations are limited to the period during which a firm is cross-listed.

Regressions (1) and (2) include firm fixed effects, firm clusters, and period (month) dummies. Regression (1) is the base specification. The independent variables are the NASDAQ index, a level-23 dummy, and the interaction between them. The

insignificant and indeed negative coefficient on the non-interacted NASDAQ index shows that there is no correlation between monthly changes in pair premia and NASDAQ for level-14 firms. The significant positive coefficient on the interaction term shows that there is a positive correlation for level-23 firms.

In regression (2), I add firm-level control variables: ln (sales); sales growth; global industry Tobin's Q. The results are very similar to regression (1). In regression (3), I add country-level characteristics, GDP per capita of the home country; and the Spamann securities and corporate law index, and switch to a firm random effects specification to preserve the coefficients on the Spamann index, which is time-invariant. The results are again very similar to regression (1).

In unreported robustness checks I obtain similar results: (i) with annual instead of monthly observations of Tobin's *q*, (ii) with the S&P 500 index or the NYSE index substituted for the NASDAQ index, (iii) with unsystematic risk, leverage, and ROA as additional firm-level control variables; (iv) with additional country variables (from the World Bank); (v) with pair premia (instead of fractional change in pair premia) as the dependent variable**.**

2.3. Pair Returns and Correlation with US Indices

In Table 4, I switch to monthly pair returns, instead of monthly fractional change in pair premia, as the dependent variable. In Panel A, all regressions use firm and month fixed effects, firm clusters, and the same firm-level controls as in Table 3. Regressions (1)-(2) are limited to level-23 pairs; regressions (3)-(4) are limited to level-14 pairs. Regressions (5)-(6) include all pairs, a level-23 dummy, and an interaction between the NASDAQ index and the level-23 dummy. The odd-numbered regressions are limited, similar to Table 3, to the period during which each firm is cross-listed.

Table 4, regression (5), is similar to table 3, regression (2) except for a different dependent variable. Pair returns, like pair premia, correlate strongly with NASDAQ for level-23 firms, as shown by the positive coefficient on the interaction between the NASDAQ Index and a level-23 dummy. Pair returns for level-14 firms do not correlate with NASDAQ, as indicated by the insignificant coefficient on the non-interacted NASDAQ Index. Regressions (1) and (3) tell a similar story. If I limit the sample to

level-23 pairs (regression (1)), pair returns correlate strongly with NASDAQ. If I limit the sample to level-14 pairs (regression (3)), there is no correlation.

The even-numbered regressions in Panel A assess whether the correlation between pair returns and NASDAQ exists during the pre-listing period. I find that it does not, regardless of listing level. The pre-cross-listing correlation between level-23 pair returns and NASDAQ is small and indeed slightly negative. In robustness checks, I obtain similar results with the S&P 500 or NYSE indices, instead of the NASDAQ index, and similar results during the pre-cross-listing period with pair premia rather than pair returns as the dependent variable. These provide evidence that the correlation between US indices and level-23 pair returns are caused by cross-listing, and do not arise because firms whose premia correlate with US indices before listing are more likely to cross-list.

My results are in tension with Baruch, Karolyi and Lemmon (21007), who find that US indices predict returns to level-23 firms during the pre-listing period, and do not predict returns more strongly after cross-listing. I therefore investigate further in in Panel B, using their measure of the sensitivity of a firm's stock price to the NASDAQ index. This variable takes one time-invariant value for each cross-listed company in the sample. Panel B uses country fixed effects and country clusters.

Panel B, regression (1) includes all cross-listed firms, on all levels, during the cross-listing period. The significant positive coefficient on the level-23 dummy indicates that level-23 cross-listing positively predicts the Baruch-Karolyi-Lemmon measure of the informativeness of US indices during the cross-listing period, relative to level-14 cross-listing. Prior to cross-listing, the level-23 dummy is insignificant. In unreported robustness checks, I obtain similar results if I add country-level controls.

Regressions (3) and (4) show that I obtain similar results if I separate the level-23 firms into NYSE and NASDAQ firms, and ask whether an NYSE (NASDAQ) dummy predicts the BKL measure of informativeness of the NYSE (NASDAQ) index.

My results for level-23 firms, while in tension with Baruch, Karolyi and Lemmon (2007), are not directly inconsistent (they do not study level-14 firms). Consider their finding of a tendency for firms with US-like characteristics to cross list. In Panel A, I control for these characteristics through propensity matching. Once I do so, there is no remaining pre-cross-listing correlation. This should not be surprising – it suggests only

that my propensity matching procedure is doing its job. My new result is the emergence of a correlation after cross-listing, even after propensity matching. They do not find stronger post-cross-listing correlation between returns to level-23 firms and US returns. However, my matching approach likely has greater statistical power to detect post-cross-listing changes in correlation.[5]

In sum, Table 4 provides evidence that level-23 firms take on US market characteristics, in part, once they become cross-listed. To the extent that their returns were associated with US returns prior to cross-listing (which I do not directly study), that association strengthens after cross-listing. There is no similar effect for level-14 firms.

In Table 5, I take a more nuanced look at the relationship between different US indices and pair returns. Regressions (1)-(3) examine NYSE pairs; regressions (4)-(6) examine NASDAQ pairs, and regressions (7)-(9) examine OTC pairs. Within each set, the first (second) (third) regression asks whether pair returns are predicted by the NYSE index (NASDAQ index) (OTC index). All regressions use firm and month fixed effects and firm clusters. The premia of NYSE-listed foreign firms are correlated with both NYSE and NASDAQ indices (regressions (1)-(2)), while the premia of NASDAQ-listed foreign firms are correlated only with the NASDAQ index (regressions (4)-(5)). The premia of foreign firms traded OTC (non-BB) are not correlated with any US index (regressions (7)-(9)). No group of foreign firms has premia correlated with the OTC index (regressions (3), (6), and (9)). Table 5 provides evidence that level-23 firms take on, in part, the characteristics of the market they are listed on. OTC-cross-listed firms do not.

2.4. Pair Premia and Returns, Trading Volume, and Correlation with US Indices

Cross-listed firms vary widely in the proportion of trading that takes place in the US (Baruch, Karolyi and Lemmon, 2007). In Table 6, I ask whether, for level-23 firms, a firm's US-based trading volume, as a fraction of total trading volume (with both measured in dollars), predicts the correlation between pair premia (pair returns), and the

[5] The results in Panel B provide evidence that the association between US indices and returns to cross-listed firms is stronger after cross-listing for level-23 firms, *relative to that for level-14 firms*. This is a different question than Baruch Karolyi and Lemmon ask, they ask whether there is a pre-listing association for level-23 firms, *at all*.

NASDAQ index. The intuition is that a firm whose stock is primarily traded in the US (its home country) is more (less) likely to be affected by US market trends. I find evidence to support this intuition.

In table 6, all regressions use firm and month fixed effects and firm clusters, and include all cross-listed firms, on all levels. Regressons (1) and (2) examine the fractional change in pair premia; regressions (3) and (4) examine pair returns. Regressions (1) and (3) (regressions (2) and (4)) examine firms with above (below) median ratio of US/total trading volume. To divide firms into above- and below-median groups, I first compute the monthly ratio for each firm, and average this ratio across all months in which the firm is cross-listed to determine a firm average ratio. I divide the sample at the median of these within-firm average ratios. The principal coefficients of interest are those on the interaction between dummy-23 and the NASDAQ Index (which captures the additional association between the index and the dependent variable for level-23 firms, relative to level-14 firms), and on the non-interacted NASDAQ index (which captures the association for level-14 firms).

In regressions (1) and (3), both the fractional change in pair premia and the pair returns for level-23 firms are positively associated with the NASDAQ index for firms with above-median US trading, relative to any association for level-14 firms. The insignificant coefficient on the NASDAQ index indicates that there is no significant association between the NASDAQ Index and pair premia or pair returns for high-US-trading level-14 firms. However, there are only xx high-trading level-14 firms, so the power is limited.

In regressions (2) and (4), I examine firms with below-median US/total trading volume. There is no significant association between the NASDAQ index and pair premia or pair returns, for either level-23 or level-14 firms.

In Table 7, I investigate further what predicts the association between the NASDAQ index and stock prices of cross-listed companies, using continuous measures of trading volume, instead of the bivariate division (above- or below-median) used in Table 6. The basic specification is in Panel A. I again use the Baruch-Karolyi-Lemmon measure of the sensitivity of returns to the US market as the dependent variable. The

sample is all cross-listed firms, on all levels. I use country random effects (in order not to lose the coefficients on time-invariant country characteristics) and country clusters.

In regression (1), consistent with prior tables, level-23 status predicts correlation with the NASDAQ index. In regression (2) I add separate variables for total trading volume and total US trading volume. US trading volume predicts higher association with the NASDAQ index.

In regression (3) and (4), I use the ratio of US/total trading volume as an independent variable; this continuous measure also predicts higher association with the NASDAQ index. Firms from industries with higher Tobin's Qs, larger, and riskier firms all move more closely with the NASDAQ index, as do firms from high-GDP countries.

In Panel B, I add interactions between level-23 dummy and the control variables in Panel A, to assess what factors influence the tendency for level-23 firms to correlate with the NASDAQ index. The factors that predict association for all cross-listed firms in Panel A do so for level-23 firms, as shown by positive coefficients on the interaction variables: higher US trading volume, higher industry Tobin's q, higher unsystematic risk, and, at the country level, higher GDP/capita. In addition, level-23 dummy * Spamann index is significant and positive.

Once I use interaction terms to isolate the factors that affect the association between level-23 firm returns and the NASDAQ index, the corresponding non-interacted terms show which factors affect this association for level-14 firms. None of these factors are significant for level-14 firms, consistent with the general tendency for these firms' returns not to track US indices.

In unreported robustness checks, I obtain similar results to both Panels A and B with country fixed effects (instead of random effects), and also if I substitute the NYSE index and the S&P 500 index for the NASDAQ index.

In Table 8, I investigate whether the tendency for level-23 firm returns, pair returns, and pair premia to correlate with the NYSE and NASDAQ indices, but not with the OTC index, is related to these firms being subject to US regulation while OTC firms are (almost) not. I exploit a natural experiment here. Prior to 1999, US companies traded on the OTC "Bulletin Board" BB were not subject to SEC regulation; after 2001, they are. Thus, if a firm's exposure to US regulation helps to explain these correlations, we

should observe no (or less) correlation between these firms' returns and US indices before 1999 and a positive (stronger) correlation after 2001. I find no such change in correlations. As controls, I ask whether premia of level-23 firms correlated with the NASDAQ index during those same years; the answer is yes (columns 3 through 6).

3. Which Firms Have Cross-Listing Premia

3.1. Average Premia and US Trading Volume

My second main set of results concerns which firms earn cross-listing premia *on average over time*. We saw in Part 2 that the only firms whose pair premia and pair returns correlate with US indices are level-23 firms with above median ratio of US/total trading volume. However, these short term correlations do not tell us that much about the average premia enjoyed by different firms. A principal explanation for the cross-listing premia enjoyed by level-23 firms, relative to level-14 firms, is that the level-23 firms are subject to US disclosure regulation.. This "bonding" explanation for premia does not directly depend on US trading volume. Thus, if the *average* level-23 cross-listing premium depends on US trading volume, this will be in tension with the standard bonding explanation.

This is precisely the result I find in Table 9. The only level-23 firms with long-term average premia, relative to level-14 firms, are those with above-median US/total trading volume. All regressions include all cross-listed firms, on all levels, and use firm and month fixed effects and firm clusters. Odd (even) numbered regressions are limited to firms with above (below) median ratio of US/total trading volume. The coefficients of interest are those on the dummies for cross-listing level. These show the additional premium for level-23 firms, on top of any premium accorded to level-14 firms.

In regression (1), level-23 firms with above median US trading enjoy an estimated 0.37 premium, relative to level-14 firms. In regression (2), in contrast, the estimated additional level-23 premium is small and insignificant.

In regressions (3)-(6), I use separate dummy variables for level-2 and level-3 cross-listing. In regressions (3)-(4), I divide the sample based on median US/total trading volume for all firms. With this slice of the data, only high-trading level-3 firms have a significant premium. This result, however, is sensitive to how I divide the sample. In

regressions (5)-(6), I divide instead based on the median ratio for level-23 firms. The coefficients on level-2 and level-3 dummies are now both significant for the above-median firms.

The consistent message from these regressions is that only level-23 firms with high US trading volume have significant premia, relative to level-14 firms. For level-23 firms with below-median trading, the coefficients on the level dummies are always insignificant, and sometimes negative.

3.2. Cross-Listing Premia and Exposure to US Litigation

The results in Table 9 are in tension with a simple bonding story, in which level-23 firms earn premia, relative to level-14 firms, by making themselves subject to US regulation. In Table 10, I ask whether a more subtle, litigation-based bonding theory can explain the difference in premia based on Us trading volume. The litigation-based story goes as follows (cf. Siegel, 2006). Suppose that bonding requires not just being formally subject to US regulation, but being practically exposed to the risk of US securities litigation. Firms' exposure to US securities lawsuits is correlated with the level of US trading, because available damages in a typical "10b-5" lawsuit, based on misdisclosure, are proportional to the losses suffered by US investors, which in turn are proportional to US trading volume. Thus, more actively traded firms might be more tightly bonded to US disclosure rules, because they suffer larger potential damages if they fail to comply with those rules. In measuring potential damages for this litigation-based theory, the absolute dollar value of US trading matters, not the ratio of US to worldwide trading.

In Table 10, the dependent variable is the Tobin's q of a cross-listed firm. Regressions (1)-(2) (regressions (3)-(4)) are limited to level-23 (level-14) firms. All regressions use firm random effects, country and month fixed effects, and firm clusters. In regressions (1) and (3), the ratio of US/total trading volume predicts Tobin's q for level-23 firms, but not for level-14 firms. Similarly, the NASDAQ index predicts Tobin's q for level-23 firms, but not level-14 firms. These results and reinforce my earlier findings on which firms have premia, and which firms' premia correlate with NASDAQ.

In regression (2), I ask whether the level of US trading alone predicts the Tobin's q of level-23 firms. It does not. I also find no predictive power of US trading among level-14 firms, even though those firms are also exposed to US litigation, albeit to a lesser extent than level-23 firms.

Another important factor which correlates with securities litigation risk is the volatility of a firm's returns. Firms with more volatile share prices are more likely to suffer the large price drops that can trigger securities suits. Both trading volume and volatility enter into standard models of securities litigation risk. Returns volatility is not a significant predictor of Tobin's q in any of the regressions in Table 10. Firm size, which is often thought of as affecting lawyers' litigation incentives, since larger firms are more likely to have the financial ability to pay large awards, is a negative predictor of premia, significantly so for level-23 firms. I return to the litigation-based variant of bonding theory below.

3.3. Cross Listing Premia and Country Governance

[to be added]

4. Evolution of Cross-Listing Premia In Event Time

My third set of main results concerns the evolution of cross-listing premia in event time, relative to the time of cross-listing. I conduct a cohort analysis, in which I group firms by year of observation, and then classify the firms in each the observation year, by years since cross-listing. Gozzi, Levine and Schmukler (2006) study premia shortly before and after cross-listing, and find that premia rise (fall) in fall in the year before (after) cross-listing. To my knowledge, no prior paper studies the longer-term evolution of premia.

4.1. Graphical Results

I begin with a graphical overview. In Figure D, I display mean cross-listing premia for level-23 firms, from 2 years before listing to 8 years after listing (sample size drops severely if I try to extend the sample period to more than 8 years after cross-listing. Each colored line represents a different "observation" year (year for which the premia was recorded). For example, the navy line shows the mean pair premia of level-23 firms

which, as of 1995, will be listed within 2 years, will be listed within one year, were listed within the last year, were listed 1-2 years ago, etc. I compute the premium in each year as the average of the monthly premia. The individual cohort lines fluctuate quite a bit, but tend to decline during the post-listing period.

In Figure E, I summarize figure D by taking an average value for each year since cross-listing across all observation years. One can see that mean premia increase prior to cross-listing and then decline steadily thereafter, dropping to just over 10% by year 8.

In the next set of Figures, I separate level-23 firms into above and below median, based on the ratio of US/total trading volume. In Figure F, I present results by observation year for firms with above-median US trading. Instead of the sustained decline we see for all level-23 firms in Figures D and E, the premia appear to level off at about 4-5 years after cross-listing. Figure G summarizes Figure F by averaging across all observation years. We see again that premia peak around the time of cross-listing, with the peak higher (at around 0.8) than the peak at 0.5 for all level-23 firms. Premia then decline, but level off at a premium of 0.4 or so after about 5 years.

In Figures H and I, I do the same for firms with below-median US/total trading volume. These firms' initial premia also peak around the time of cross-listing, but the peak is significantly lower than for high-US-trading firms, and is followed by a sustained decline, with premia dropping to essentially zero by year 7 since cross-listing.

These figures provide a more nuanced view of the cross-listing premium, and how it varies with US trading volume. Firms which later turn out to have high US/total trading volume have higher premium before cross-listing, higher premia at the time of cross listing, and retain part of their initial premia. Firms which later turn out to have low US/total trading volume have initial premia, albeit lower, but lose these premia entirely over time after cross-listing.

4.2. Cross-Listing Premia in Event Time: Regressions

I next assess whether these results survive in regressions. In Table 11, Panel A, I look at the evolution of level-23 pair premia relative to level-14 premia, in event time relative to the time of listing. Each column represents a separate regression, with a sample limited to the indicated period relative to the cross-listing date. For example, in

Column (4), the sample is pairs where the cross-listed company was listed 0 to 12 months before the month of observation; in Column (5), from 13 to 24 months, and so forth. The first three columns show premia in the third, second, and first year prior to cross-listing. All regressions use firm random effects and clusters, and period and country fixed effects. The coefficient of interest is that on the dummy-23 variable.

The main result is that if all level-23 firms, taken together, have a significant premia over level-14 firms, but only for the first six years after cross-listing. After that, the difference disappears. The level-23 versus level-14 premium emerges in the year prior to cross-listing; there is no relative premium before that.

In unreported robustness checks, I obtain similar results if I put all observations in a single regression and use plus event-time dummy variables for periods relative to cross-listing date, and interactions between the event-time dummies and the level-23 dummies. The interaction variables are significant and positive. With this approach, I also obtain similar results with firm fixed effects instead of random effects. I also obtain similar results if I remove firm random effects, and including or excluding various firm- or country-level variables.

In Panel B, I ask whether the correlations between pair returns and the NASDAQ index exhibit similar decay after cross-listing. The answer is no. The coefficient of interest is on the fractional-change in the NASDAQ index. The NASDAQ index remain a significant predictor of level-23 pair returns throughout the years from cross-listing.

4.3. Cross-Listing Premia Over Time and Trading Volume

Next, I ask whether there are event-time patterns in the relationship between the US trading volume and the pair premium for level-23 firms, relative to level-14 firms. In Table 12, I break down the first ten years after cross-listing on three parts: 4 years + 3 years + 3 years. I find that the ratio of US/total trading volume becomes a stronger predictor of premia in later years, and remains strong as far out as I can measure (about a decade after cross-listing).

Finally, in Table 13, I provide additional evidence on the litigation-based version of the bonding hypothesis. law-based bonding theory. In general, level-2 and level-3 firms are subject to similar disclosure rules. But level 3 firms face some additional

disclosure requirements when they complete a public offering in the US. More centrally, they face much higher litigation risk in the first couple of years after a public offering, because shareholders can bring a claim under Securities Act § 11 based on material misstatements or omissions in the offering prospectus, and the company is strictly liable.[6] In contrast, in later years for level-3 firms, and in all years for level-2 firms, the principal source of liability is Exchange Act Rule 10b-5, which requires shareholders to (i) show that the company's managers had "scienter" (basically, severe recklessness, bordering on conscious knowledge) as to a misstatement or omission; and (ii) plead facts with great specificity tending to show scienter *before* they obtain legal "discovery" which might help them prove their case. Therefore, litigation-based bonding theory might predict that level-3 firms will enjoy higher premia, compared to level-2 firms, in the years immediately following capital raising, but not many years later.[7]

I test this prediction in Table 13. Only level-23 pairs are included here; in columns (1) and (3), the sample is limited to the period from 0 to 5 years after cross-listing; in columns (2) and (4), to 6 to 10 years after cross-listing. The regressions use firm random effects, firm clusters, and month and country fixed effects. The dependent variable is the pair premium. In a basic specification (regressions (1) and (2)), I find no evidence that the level-3 premium is higher, relative to level-2 firms, in the early years after cross-listing. If anything, there is mild evidence that the level-3 premium rises in later years, and also becomes more sensitive to the ratio of US/total trading volume (regressions (3) and (4)). .

In robustness checks, I obtain similar results without firm random effects, and if I limit the early period shown in regression (1) to 0-2 or 0-3 years after cross-listing.

5. Discussion: Consistency with Theories of Cross-Listing Premia

We still know relatively little about why firms receive a cross-listing premium. My results, in big picture, add to that puzzle by calling into question some of what we thought we knew about the premiums enjoyed by level-23 firms. In this section, I first

[6] The statute of limitations is the earlier of one year after discovery of the misstatement or omission, or 3 years from the date of the offering. Securities Act of 1933, § 13.

[7] This implication of litigation-based bonding was suggested in audience discussion when I presented this paper at the Association of American Law Schools annual meeting.

discuss a simple behavioral explanation for my results, and then discuss how they support, or weaken, other explanations that have been offered in the literature.

5.1. A Behavioral Explanation

This paper begins with a striking result: Level-23 firms, taken as a whole, go through what appears to be a bubble in cross-listing pair premia (Tobin's q of a cross-listed company, relative to a non-cross-listed firm, matched on propensity to cross-list), which coincides with the NASDAQ bubble which peaked in early 2000. Level-14 firms do not. More generally, the pair premia and pair returns of level-23 firms correlate with major US indices, while the premia and returns of level-14 firms do not. These correlations arise only at the time of cross-listing.

On closer examination, these results are driven by level-23 firms which are above the median (measured alternately for all cross-listed firms, and for all level-23 firms) in ratio of US/worldwide trading volume. Premia and returns for level-23 firms with below median trading ratios show no bubble around 2000 and no significant association with US indices.

These results suggest a simple story, albeit one rooted more in behavioral finance than in pristinely efficient markets. Some firms, for whatever reason (the possible reasons are beyond the scope of this paper), attract high US investor interest, relative to home market interest. A level-23 listing appears to be necessary but not sufficient to generate this interest, perhaps because it provides greater investor recognition.

US market and home market prices are locked together by inter-market arbitrage. US investors trade the shares of cross-listed firms with an eye in part to what else is happening to domestic shares. Investors who trade these shares in the firm's home country presumably do not. If there is a sufficiently high ratio of US/total trading, the views of US investors will affect trading prices, which will correlate with both US and domestic indices.

That correlation is inefficient, but there is no clean arbitrage strategy that can compensate for it. To be sure, some foreign firms' share prices may correlate with US indices due to economic fundamentals. However, this separate, "efficient" correlation should not depend on cross-listing or the level of US trading.

The behavioral story resonates with evidence from other types of companies. "Siamese twin" companies, with related shares that trade in different markets, most notably Royal Dutch Petroleum and Shell Transport and Trading, each comove, in part, with their local market (e.g., Rosenthal and Young, 1990; Froot and Dabora, 1999). Similarly, public real estate investment trusts comove in part with overall share indices, not only real estate markets (e.g., Ling and Naranjo, 1999).

5.2. Bonding to US Securities Laws

Bonding theory has become the dominant explanation for the level-23 premium, relative to level-14 firms, because it provides a simple, intuitive story, that is consistent with the evidence to date. Cross-listing scholars understand, of course, that level-23 listing also carries with it other benefits besides US regulation, including greater investor recognition, greater access to US capital, greater analyst coverage, and greater liquidity, and that disentangling these effects is hard (Bris, Cantale, and Nishiotis, 2007). Still, bonding is thought to be a large part of the explanation, partly because other explanations seem likely to have weakened over time, as capital markets become increasingly integrated.

My results, taken as a whole, fit poorly with bonding theory. They thus push us toward greater reliance on other explanations, including the behavioral story advanced above.

First, bonding theory, as developed to date, does not directly explain the apparent bubble in cross-listing, nor why the share prices of cross-listed firms should correlate with US prices. To be sure, an explanation for these results can be developed, consistent with bonding theory. Assume that bonding to US securities laws reduces a firm's cost of capital by a constant amount gov. Consider a simple growing perpetuity formula for firm value without cross-listing:

$$PV_{non-XL} = \frac{C}{r-g}$$

By cross-listing on level-23, a firm reduces its cost of capital to $PV_{XL} = \frac{C}{r-g-gov}$. The fractional cross-listing premium is given by:

$$premium = \frac{PV_{XL}}{PV_{non-XL}} - 1 = \frac{gov}{r - g - gov}$$

Suppose now that market discount rates fall or growth expectations rise. Share prices will rise, but so will the governance premium. The comparative statics are:

$$\frac{\partial premium}{\partial r} = -\frac{gov}{(r-gov-g)^2}$$

$$\frac{\partial premium}{\partial g} = +\frac{gov}{(r-gov-g)^2}$$

In this simple model, both premia and returns for cross-listed firms will vary with overall share prices.

Bonding theory, however, is customarily understood to predicts that all or most level-23 firms should gain a reduction in cost of capital. Nothing in the theory predicts that this reduction should depend on the ratio of US/total worldwide trading.

To be sure, the value added by US governance could plausibly depend on the level of home governance. If (unmeasured) US value added correlates with (measured) US/total trading ratio, then US/total trading ratio will correlate with US value added. Thus, to rule out this indirect channel, one must control for home country governance and for other factors that may predict premia directly.

[discussion to come based on results of tests in § 3.3]

Finally, a litigation-based variant of bonding theory predicts that firms which are more exposed to US securities litigation should be more tightly bonded than other cross-listed firms. I do not find support for this variant. Proxies for litigation risk do not predict higher premia.

5.3. Market Segmentation, Investor Recognition, and All That

My results are generally consistent with the early cross-listing literature, which provides a number of possible sources for a cross-listing premium (Karolyi, 1998, provides a survey). All rely on some degree of market segmentation. If US investors cannot readily invest abroad, or can do so only with significant transaction costs, then bringing shares to them could increase the pool of potential investors. If short selling is

constrained, then adding more potential investors, some of whom will be optimistic about the company's prospects, could increase the market price.

Listing abroad could also reduce information asymmetry, by attracting greater press and analyst coverage. If trading largely moves to a foreign market, that market could have lower trading costs and greater liquidity (whether measures by depth or bid-asked spreads) than the domestic market.

For all of these stories, it is plausible that level-23 firms benefit more than level-14 firms, and plausible that some level-23 firms benefit more than others. Firms that attract investors will attract analysts, and vice versa. These firms' shares will be traded actively in the US, which should improve US liquidity. Enhanced US liquidity might more than offset any decline in home country liquidity.

It will take further work to see whether it is possible to untangle these various explanations. None, however, can explain a bubble in cross-listing premia, if a bubble there truly was. Thus, my speculation is that they will be incomplete, and the behavioral story offered above will need to be part of a mix of explanations, each partial, for which firms earn cross-listing premia and which do not.

6. Conclusion

This paper uses long-term panel data to investigate the sources of cross-listing premia. I find that level-23 firms receive premia, while level-14 firms do not. I also find that premia are concentrated among level-23 firms with an above median ratio of US/total trading volume. These high-US-trading firms (and only these firms) also: experience an apparent bubble in premia which coincides with the NASDAQ bubble, and have pair premia and pair returns which correlate with US indices (but only after cross-listing). These findings support a behavioral explanation for at least part of the cross-listing premium, are consistent with market segmentation and investor recognition theories, and tend to weaken bonding theories of the source of cross-listing premia.

Adding these results to those in prior work we know more than before about which firms earn premia, and about comovement between share prices of cross-listed firms and US indices, but, if anything, know less than we thought we knew about the sources of premia.

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Figure A. **Overview of apparent bubble in cross-listing premia**. Median pair premium (Tobin's Q of a cross-listed company minus Tobin's Q of its non-cross-listed match) from 1995 through 2005 for level-23 firms (blue line), level-14 firms (red line); and the NASDAQ index divided by 4,000 (green line) . Correlation between Level-23 premia and NASDAQ = 0.83; between Level-14 premia and NASDAQ = 0.49.

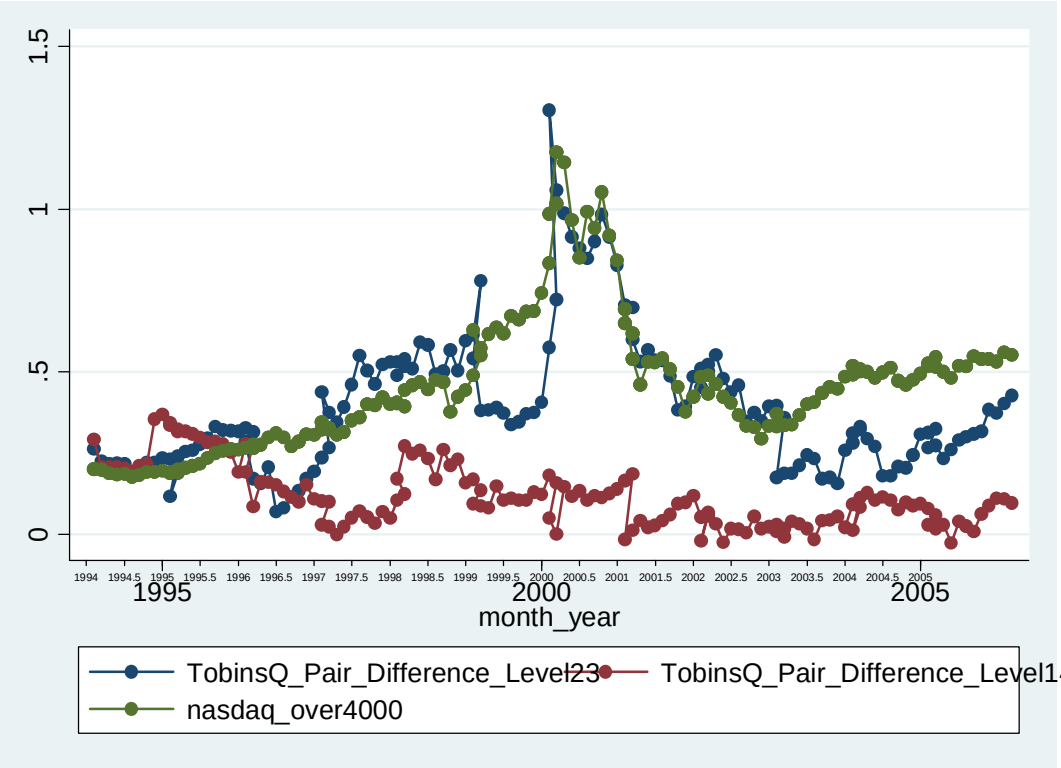


Figure B. ***Expanded view of bubble period for level-23 firms***. Median pair premium for January 1998 through December 2002 for level-23 firms (blue line) and the NASDAQ index over 5,000 (red line). Correlation = 0.81.

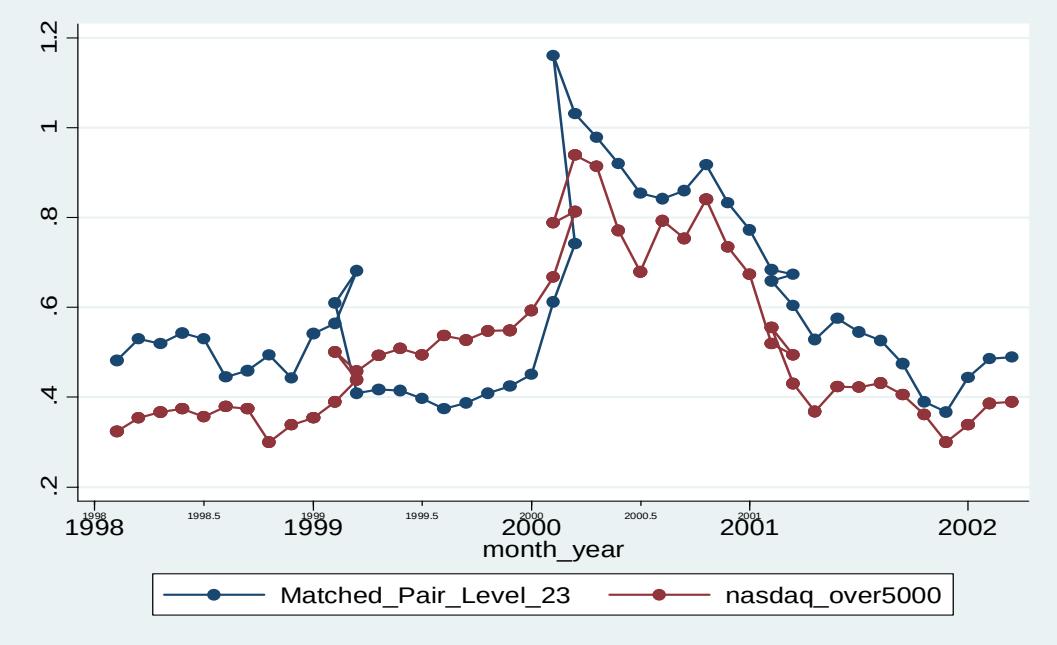


Figure C. **Expanded view of bubble period for level-14 firms**. Median pair premium for January 1998 through December 2002 for level-14 firms (blue line) and the NASDAQ index over 2,000 (red line). Correlation = -0.29.

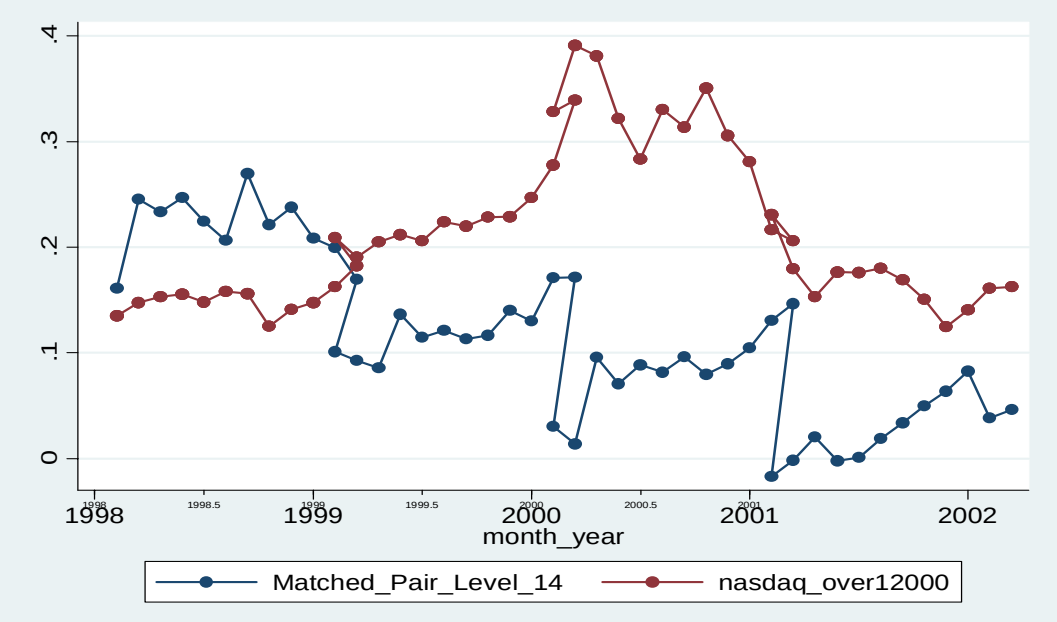


Figure D: Premia Decay Since Cross-Listing: All Level-23 Firms

Mean pair premia for level-23 firms (Tobin's Q of cross-listed company minus Tobin's Q of its non-cross-listed match), separately for each year of observation, by years since cross-listing.

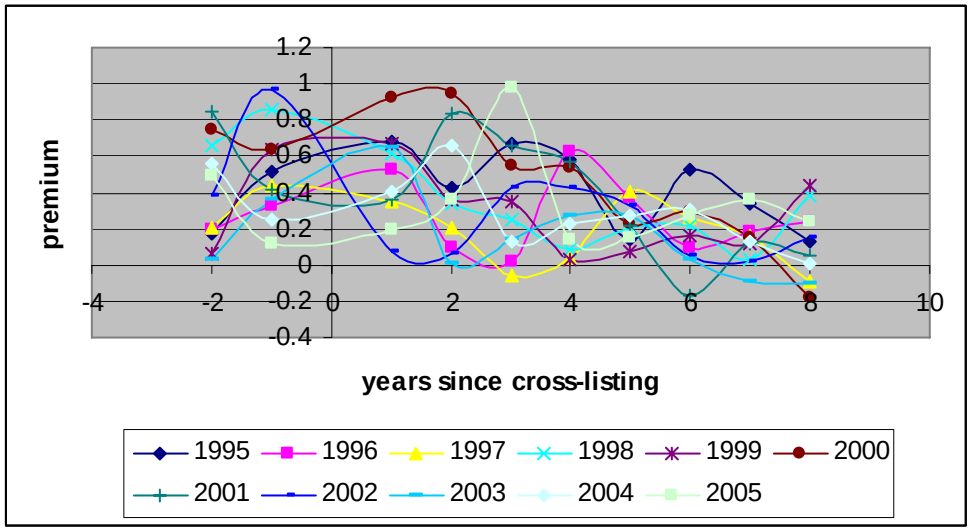


Figure E: Premia Decay Since Cross-Listing: All Level-23 Firms

Mean pair premia for level-23 firms, averaged across all observations from 1995 through 2005; by years since cross-listing.

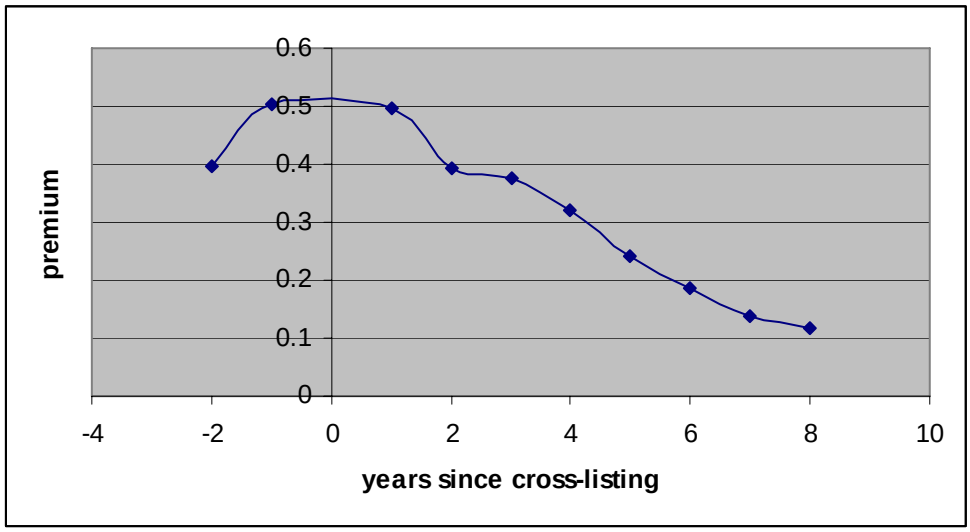


Figure F: Premia Decay Since Cross-Listing: High-US-Trading Firms

Mean pair premia, separately for each year of observation, by years since cross-listing, for level-23 pairs with above-median ratio of US/total trading volume.

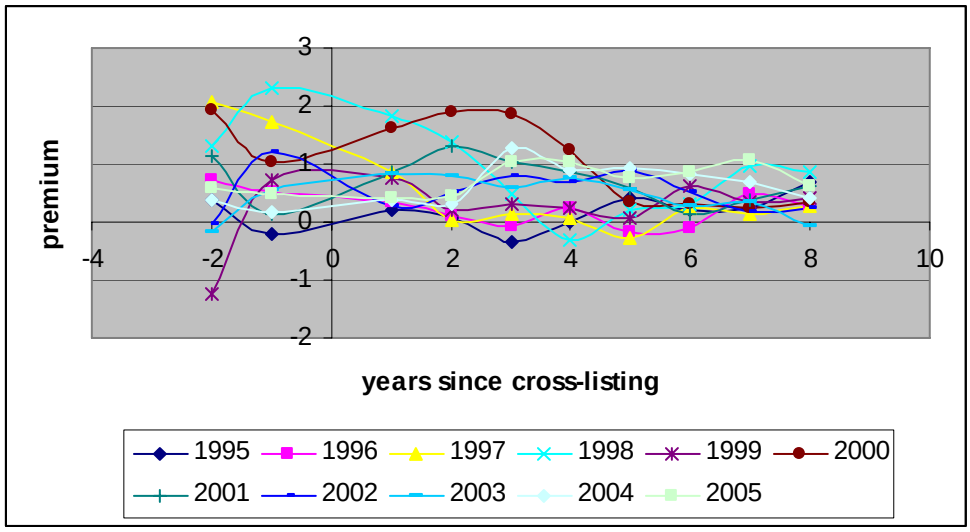
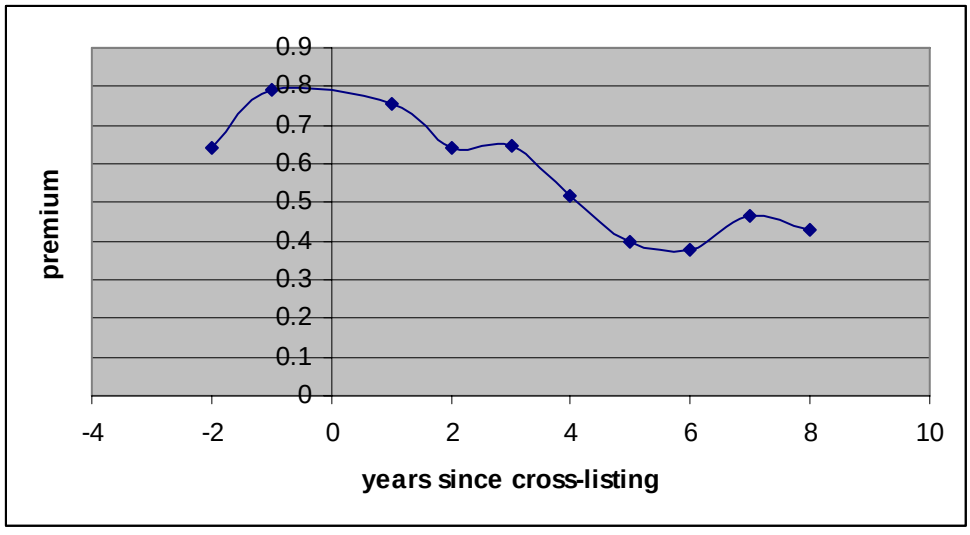


Figure G: Premia Decay Since Cross-Listing: High-US-Trading Firms

Mean pair premium, averaged across all years of observation; by years since cross-listing., for level-23 pairs with above-median ratio of US/ total trading volume.



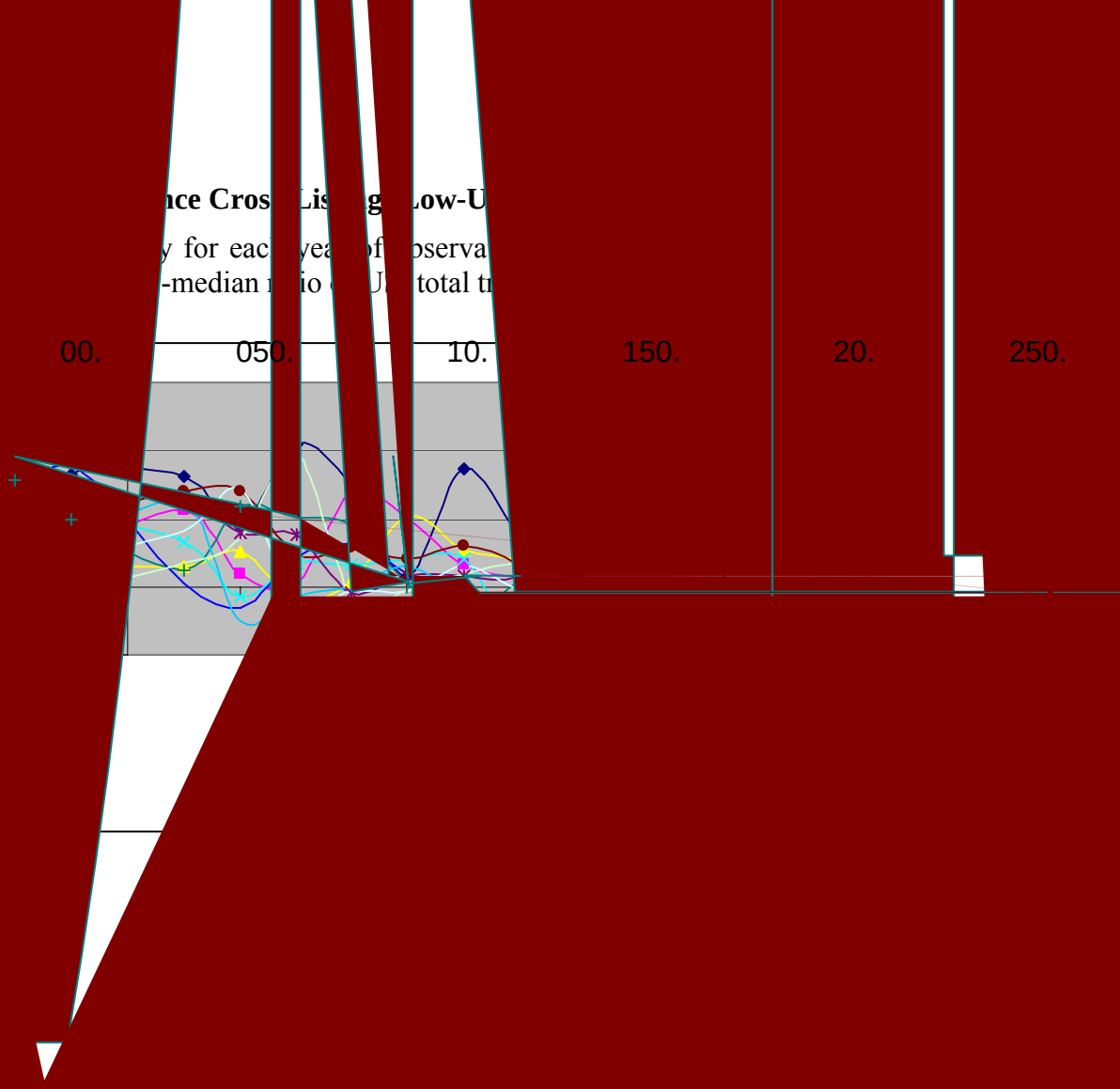

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Table 1 Summary Statistics for Sample Firms

Panel A. Summary financial data. Variables are measured as of year-end of 2001; winsorized at 1%/99% level. Assets in US $ millions. Unsystematic risk is monthly variance

	Firms	Mean	Std. Dev.
Level-23 Cross-Listed Firms			
Tobin's Q	331	1.366251	0.846759
Assets	349	1,000	3,760
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	622	2,330
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	333	1,150
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

Panel B. Distribution of Cross-Listed Firms By Country

[table to come]

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							
	(0.221)								
Sales Growth	-0.065	**0.516**	1						
	(0.247)	**(0.00)**							
ROA	**-0.130**	0.011	0.050	1					
	(0.022)	(0.838)	(0.381)						
Leverage	**-0.126**	-0.001	0.033	**-0.207**	1				
	(0.022)	(0.991)	(0.545)	**(0.000)**					
Unsystematic Risk	0.055	-0.015	-0.022	-0.049	-0.074	1			
	(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		
	(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	
	(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
	(0.041)	(0.338)	(0.234)	(0.136)	(0.203)	(0.053)	(0.542)	**(0.00)**	
Spamann Index	0.015	0.003	0.043	0.047	-0.089	0.071	-0.039	**-0.173**	**-0.436**
	(0.795)	(0.962)	(0.441)	(0.408)	(0.106)	(0.192)	(0.506)	**(0.001)**	**(0.00)**

Table 3. Pair Premia Correlation with NASDAQ Index

Table shows that level-23 pair premia correlate with the NASDAQ index more strongly than level-14 pair premia. Sample is all cross-listed firms, on all levels, during period of cross-listing. Dependent variable is monthly fractional change in pair premium (Tobin's Q of a cross-listed company minus Tobin's Q of its non-cross-listed match), over 1995 through 2006. Independent variables are: monthly fractional change in the NASDAQ index; level-23 dummy (=1 for level-23 firms during cross-listing period, 0 otherwise); their interaction; ln(sales of the cross-listed company in a pair); sales growth of the cross-listed company; global industry Tobin's Q; ln(GDP per capita of firm's home country); Spamann's corporate and securities law index. The coefficient of interest is on the interaction of dummy-23 and NASDAQ Index. Regressions (1) and (2) use firm and period (month) fixed effects; regression (3) uses firm random effects to preserve the coefficient on the time-invariant Spamann index. All non-dummy independent variables are normalized. All regressions use firm clusters and White's robust standard errors. *T*-statistics are reported under regression coefficients. *, **, *** indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface** for variables of interest.

dependent variable	Monthly change in pair premium		
	(1)	(2)	(3)
Dummy-23 * NASDAQ Index return	**0.023**	**0.022**	**0.022**
	(2.97)* **	**(2.78)*** **	**(2.84)*** **
Dummy-23	0.003	-0.005	0.005
	(0.28)	(0.45)	(1.06)
NASDAQ Index return	-0.052	-0.006	-0.058
	(1.29)	(0.28)	(1.27)
Ln Sales		-0.009	
		(0.65)	
Sales Growth		-0.071	
		(5.20)***	
Global Industry Tobin's Q		0.005	
		(1.33)	
GDP/Capita			-0.001
			(0.56)
Spamann Index			-0.002
			(1.05)
Constant	-0.187	-0.031	-0.208
	-1.41	-0.43	-1.4
Fixed or Random Effects	Firm and Month FE	Firm and Month FE	Firm RE; Month FE
Observations	36,499	35,081	33,357
Pairs	651	623	593
R^2	0.02	0.03	

Table 4: Correlation of Pair Returns with NASDAQ

Panel A. Table shows that returns of level-23 firms correlate with the NASDAQ index after cross-listing, but not before; returns of level-14 pairs don't correlate with NASDAQ at all. Sample of cross-listed firms is level-23 firms, level-14 firms, or all firms, as shown. Dependent variable is monthly pair return (return of a cross-listed company minus return of its non-cross-listed match), over 1995 through 2006. Independent variables are: monthly returns on the NASDAQ index; level-23 dummy (=1 for level-23 firms during cross-listing period, 0 otherwise) interacted with NASDAQ index returns (level-23 dummy drops out because of firm fixed effects); ln (sales of the cross-listed company in a pair); sales growth of the cross-listed company; global industry Tobin's Q. The coefficient of interest is that on the interaction of the dummy-23 and NASDAQ. All regressions use firm and period (month) fixed effects, firm clusters, and White's robust standard errors. All non-dummy independent variables are normalized. *T*-statistics are reported under regression coefficients. *, **, *** indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface** for variables of interest.

	Listing Period	Non-Listing Period	Listing Period	Non-Listing Period	Listing Period	Non-Listing Period
sample	Level-23 Pairs		Level-14 Pairs		All Pairs	
dependent var.	monthly pair returns					
	(1)	(2)	(3)	(4)	(5)	(6)
NASDAQ Index Return	**0.087**	-0.005	0.01	-0.076	0.014	-0.02
	(5.61)* **	(0.09)	(0.29)	(0.41)	(0.45)	(0.39)
Dummy-23 * NASDAQ Index return					**0.014**	0.01
					(4.17)* **	(1.59)
Ln Sales	-0.021	-0.016	-0.015	-0.008	-0.016	-0.011
	(2.30)**	(0.89)	(2.30)**	(0.40)	(2.95)***	(0.82)
Sales Growth	0.005	0.002	-0.001	-0.006	0	-0.002
	(1.57)	(0.30)	(0.61)	(0.76)	(0.18)	(0.39)
Global Industry Tobin's Q	-0.004	0.006	0.001	0.003	0	0.004
	(1.27)	(1.18)	(0.64)	(0.50)	(0.05)	(0.99)
Constant	-0.016	0.049	-0.03	-0.262	0.039	-0.071
	(0.74)	(0.71)	(0.98)	(0.44)	(0.39)	(0.41)
Firm & Month FE	yes	yes	yes	yes	yes	yes
Observations	13632	4845	35532	4432	49164	9277
Pairs	234	98	454	113	688	211
R^2	0.03	0.04	0.01	0.03	0.01	0.03

Panel B. The table shows that NASDAQ movements explain more variation in stock prices of level-23 firms than level-14 firms, but only after cross-listing. Prior to cross-listing, firms that ultimately ended up listing on major US exchanges did not correlate more strongly with US markets than firms that later started trading on OTC or PORTAL. Sample is all cross-listed firms, on all levels. Dependent variable is the Baruch-Karolyi-Lemmon (2007) measure of the sensitivity of a firm's stock price to US market information, over 1995 through 2006. In Columns (1) and (3), this sensitivity is measured during periods of cross-listing, and in Columns (2) and (4), before cross-listing. Independent variables are: fixed level-23 dummy (=1 for level-23 firms both during and before cross-listing), and separate fixed dummies on NYSE or NASDAQ (=1 for firms listed on each exchange both during and before cross-listing); ln (sales of the cross-listed company in a pair); sales growth of the cross-listed company; global industry Tobin's Q. The coefficients of interest are those on the dummy-23, dummy-NYSE, and dummy-NASDAQ. All regressions use country fixed effects, country clusters, and White's robust standard errors. All non-dummy independent variables are normalized. *T*-statistics are reported under regression coefficients. *, **, *** indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface** for variables of interest.

Sample period	During Cross-Listing	Before Cross-Listing	During Cross-Listing	Before Cross-Listing
dependent variable	BKL measure of sensitivity to US information			
	(1)	(2)	(3)	(4)
Fixed Dummy-23	**2.435**	0.817		
	(3.17)* **	(1.26)		
Fixed Dummy-NYSE			**1.882**	0.768
			(2.30) **	(1.05)
Fixed Dummy-NASDAQ			**4.131**	1.265
			(4.03)* **	(1.32)
Ln Sales	0.062	0.226	0.338	0.29
	(0.22)	(0.88)	(1.32)	(0.73)
Sales Growth	0.151	-0.059	0.139	-0.08
	(1.41)	(0.31)	(1.25)	(0.45)
Global Industry Tobin's Q	0.448	0.476	0.401	0.459
	(2.89)***	(1.55)	(2.70)***	(1.53)
Constant	2.574	1.681	2.616	1.675
	(8.90)***	(4.63)***	(9.19)***	(4.83)***
Country Fixed Effects	yes	yes	yes	yes
Observations	728	245	728	245
Countries	43	30	43	30
R^2	0.04	0.05	0.05	0.05

Table 5. Correlation between pair returns and same-market index

The table shows that (a) returns of level-23 cross-listed firms are correlated with the indices of the platforms on which those firms are traded, and sometimes with indices of similar platforms, but not with indices of dissimilar platforms; and (b) cross-listed OTC-traded firms (level 1) are not correlated with any of the US indices. Sample is NYSE-listed foreign firms, NASDAQ-listed foreign firms, or OTC-traded (non-BB) foreign firms, as shown, during period of cross-listing. Dependent variable is pair return (return of a cross-listed company minus return of its non-cross-listed match) , over 1995 through 2006. Independent variables are: monthly returns on the three indices (NYSE, NASDAQ, and OTC); ln sales of the cross-listed company in a pair); sales growth of the cross-listed company; global industry Tobin's Q. The coefficient of interest is that on the indices. All regressions use firm and month fixed effects., firm clusters, and White's robust standard errors. . All non-dummy independent variables are normalized. *T*-statistics are reported under regression coefficients. *, **, *** indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface** for variables of interest.

Sample:	NYSE Pairs			NASDAQ Pairs			OTC Pairs		
Dependent var.	monthly pair return								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
NYSE Index return	**0.019**			-0.006			0.004		
	(2.08)**			(0.53)			(0.81)		
NASDAQ Index return		**0.091**			**0.176**			-0.053	
		(4.49)***			**(3.24)*****			(1.45)	
OTC Index return			0.000			0.010			0.001
			(0.07)			(1.08)			(0.22)
Ln Sales	-0.001	0	0.003	-0.037	-0.037	-0.035	-0.019	-0.019	-0.021
	(0.08)	(0.05)	(0.26)	(2.75)***	(2.70)***	(2.55)**	(2.89)***	(2.89)***	(2.90)***
Sales Growth	0.003	0.002	0.002	0.008	0.008	0.008	-0.002	-0.002	-0.002
	(0.53)	(0.46)	(0.47)	(1.83)*	(1.73)*	(1.80)*	(0.51)	(0.48)	(0.55)
Global Industry Tobin's Q	0.002	0.002	0.002	-0.013	-0.013	-0.013	0.002	0.002	0.002
	(0.55)	(0.52)	(0.53)	(1.82)*	(1.81)*	(1.96)*	(0.85)	(0.87)	(0.78)
Constant	-0.006	-0.053	-0.055	-0.057	-0.291	-0.009	0.007	0.023	-0.014
	(0.28)	(2.38)**	(2.69)***	(1.71)*	(3.10)***	(0.34)	(0.59)	(0.69)	(1.85)*
Firm & Month FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	9105	9105	8951	4395	4395	4246	24922	24922	23725
Pairs	166	166	166	67	67	67	312	312	312
R^2	0.03	0.03	0.03	0.07	0.07	0.07	0.01	0.01	0.01

Table 6: Relative Trading Volume and Correlation with US Indices

The table shows that only level-23 firms with above-median ratio of US trading volume/ total trading volume have pair premia and pair returns correlated with the NASDAQ index. Sample is all cross-listed firms, on all levels, during period of cross-listing, divided as shown based on US/total trading volume. Dependent variables are: in Columns (1) and (2), monthly fractional change in pair premium (Tobin's Q of a cross-listed company minus Tobin's Q of its non-cross-listed match); in Columns (3) and (4), monthly pair return (return of a cross-listed company minus return of its match), in each case over 1995 through 2006. Independent variables are: level-23 dummy (=1 for level-23 firms during cross-listing period, 0 otherwise); monthly return on the NASDAQ index; their interaction; ln (sales of the cross-listed company in a pair); sales growth of the cross-listed company; global industry Tobin's Q. The coefficient of interest is that on the interaction variable. All regressions use firm and month fixed effects, firm clusters, and White's robust standard errors. All non-dummy independent variables are normalized. *T*-statistics are reported under regression coefficients. *, **, *** indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface** for variables of interest.

Dependent Variable:	Monthly Change in Pair Premium		Monthly Pair Return	
Sample (based on US/Total Trading Volume)	Above Median	Below Median	Above Median	Below Median
	(1)	(2)	(3)	(4)
Dummy-23 * NASDAQ Index return	**0.026**	-0.005	**0.013**	0.013
	(2.82)* **	(0.16)	**(2.92)*** **	-1.44
Dummy-23	-0.004	-0.004	-0.017	-0.008
	(0.27)	(0.17)	(2.44)**	-1.03
NASDAQ Index return	0.02	-0.024	0.002	0.02
	(0.50)	(1.52)	-0.04	-0.57
Ln Sales	-0.039	0.008	-0.018	-0.016
	(1.72)*	(0.43)	(2.69)***	(2.40)**
Sales Growth	-0.043	-0.091	-0.002	0.002
	(2.91)***	(4.62)***	-0.59	-0.69
Global Industry Tobin's Q	0.009	0.003	0.002	0
	(1.34)	(0.60)	-0.71	-0.29
Constant	0.011	-0.054	0.032	-0.03
	(0.08)	(0.95)	-0.73	-0.97
Observations	15173	19908	24248	34193
Level-23 Pairs	296	327	338	380
Firm and Month Fixed Effects	yes	yes	yes	yes
R^2	0.04	0.03	0.02	0.01

Table 7. US Trading Volume and Correlation with US Indices

Panel A. The table shows the factors predicting the correlation between NASDAQ movements and stock prices of cross-listed firms. Sample is all cross-listed firms, on all levels, during period of cross-listing. Dependent variable is the Baruch-Karolyi-Lemmon (2007) measure of the sensitivity of a firm's stock price to US market information, measured over 1995 through 2006. Independent variables are: level-23 dummy (=1 for level-23 firms during cross-listing period, 0 otherwise); a firm's US (total worldwide) trading volume; the ratio of a firm's US/total trading volume, measured monthly; ln (sales of the cross-listed company in a pair); sales growth of the cross-listed company; global industry Tobin's Q; ln(GDP/capita) of home country; Spamann's securities and corporate law index, and home country median liquidity. All regressions use country random effects, country clusters, and White's robust standard errors. All non-dummy independent variables are normalized. *T*-statistics are reported under regression coefficients. *, **, *** indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface** for principal variables of interest.

dependent variable	BKL measure of sensitivity to US information			
	(1)	(2)	(3)	(4)
Dummy-23	**1.979**	**1.817**	1.504	1.69
	(2.21)**	**(1.99)****	(1.37)	(1.89)*
Firm's Total Trading Volume		0.195		
		(0.67)		
Firm's US Trading Volume		**1.345**		
		(2.75)***		
Ratio: US/Total Trading Volume			**0.914**	**0.823**
			(2.07)**	**(2.00)****
Ln Sales	0.57	0.463	0.564	0.763
	(1.81)*	(1.56)	(1.69)*	(2.93)***
Sales Growth	0.144	0.091	0.219	0.246
	(1.10)	(0.73)	(1.54)	(1.79)*
Global Industry Tobin's Q	0.328	0.282	0.411	0.484
	(2.03)**	(1.81)*	(2.57)**	(2.43)**
Firm's Unsystematic Risk	1.129	1.083	0.691	0.548
	(3.01)***	(2.89)***	(1.64)	(1.39)
Ln GDP/Capita	1.308	1.32	1.258	
	(2.65)***	(2.66)***	(2.48)**	
Spamann Index	0.547	0.61	0.373	
	(1.30)	(1.44)	(0.81)	
Home Country Median Liquidity				0.207
				(1.61)
Constant	3.26	3.313	3.225	2.883
	(4.62)***	(4.51)***	(4.39)***	(6.18)***
Country Fixed Effects	yes	yes	yes	yes
Observations	639	639	578	655
Countries	32	32	32	42

Panel B. The table shows the factors predicting the correlation between NASDAQ movements and stock prices of cross-listed firms. Sample is all cross-listed firms, on all levels, during period of cross-listing. Dependent variable is the Baruch-Karolyi-Lemmon (2007) measure of the sensitivity of a firm's stock price to information in the US relative to information in the home market, measured over 1995 through 2006. during period of cross-listing. Independent variables are defined in Panel A, also include interactions of these variables with level-23 dummy. The sample includes only cross-listed companies. All regressions use country random effects, country clusters, and White's robust standard errors. 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.

Dependent variable	BKL measure of sensitivity to US information		
	(1)	(2)	(3)
Dummy-23 * Ln Sales	0.219	0.245	0.126
	(0.30)	(0.32)	(0.18)
Dummy-23 * Firm's Unsystematic Risk	**1.873**	**1.866**	**1.757**
	(2.39)**	**(2.43)****	**(2.19)****
Dummy-23 * Ln GDP/Capita	**1.688**	**1.67**	**1.712**
	(2.21)**	**(2.17)****	**(2.26)****
Dummy-23 * Spamann Index	**1.75**	**1.803**	**1.816**
	(2.61)***	**(2.67)*****	**(2.76)*****
Dummy-23 * Firm's US Trading Volume	**3.75**	**3.774**	**3.672**
	(2.02)**	**(2.03)****	**(2.04)****
Dummy-23 * Firm's Total Trading Volume	0.296	0.281	0.342
	(0.73)	(0.69)	(0.85)
Dummy-23 * Tobin's Q		2.334	
		(1.01)	
Dummy-23 * Sales Growth			-0.382
			(1.46)
Dummy-23 * Global Industry Tobin's Q			**0.738**
			(2.43)**
Dummy-23	**1.681**	**1.71**	**1.655**
	(2.61)***	**(2.63)*****	**(2.46)****
Ln Sales	0.205	0.143	0.220
	(0.43)	(0.28)	(0.49)
Sales Growth	0.06	0.033	0.275
	(0.41)	(0.22)	(1.75)*
Global Industry Tobin's Q	**0.301**	**0.313**	-0.041
	(2.22)**	**(2.31)****	(0.27)
Firm's Unsystematic Risk	-0.145	-0.15	-0.133
	(0.51)	(0.51)	(0.47)
Ln GDP/Capita	0.81	0.848	0.806
	(1.60)	(1.62)	(1.60)
Spamann Index	-0.34	-0.353	-0.358
	(0.71)	(0.73)	(0.74)
Firm's Total Trading Volume	-0.072	-0.053	-0.107
	(0.38)	(0.29)	(0.56)
Firm's US Trading Volume	-3.962	-3.996	-3.880
	(1.64)	(1.66)*	(1.64)
Tobin's Q		-2.248	
		(1.08)	
Constant	2.957	2.974	2.908
	(4.53)***	(4.37)***	(4.36)***
Country Fixed Effects	yes	yes	yes
Observations	578	578	578
Countries	32	32	32

Table 8. US Regulation and Correlation with US Indices

The table shows that the switch of Bulletin-Board firms from non-SEC-regulated to SEC-regulated status did not affect the correlation between the BB Index and the returns of foreign cross-listed firms. This suggests that US regulation does not drive the correlation between pair returns and indices. Sample includes all cross-listed firms, on all levels, during period of cross-listing. Dependent variable is monthly pair return (return of a cross-listed company and the return of its non-cross-listed match. Independent variables are: monthly returns on three US indices (Bulletin Board, NASDAQ, and NYSE); their interactions with level-23 dummy (=1 for level-23 firms during cross-listing period, 0 otherwise); (level-23 dummy-drops out because of firm fixed effects); ln (sales of the cross-listed company in a pair); sales growth of the cross-listed company; global industry Tobin's Q. The coefficient of interest is that on the interaction between dummy-23 and the indices. In Columns (1), (3), and (5), the sample is limited to pre-BB-switch years (1994 through 1998). In columns (2), (4), and (6), the sample is post-BB-switch years (2001 through 2005). All regressions use firm and month fixed effects, firm clusters, and White's robust standard errors. All non-dummy independent variables are normalized. *T*-statistics are reported under regression coefficients. *, **, *** indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface** for variables of interest.

Sample:	1995-1998 (pre-switch)	2001-2005 (post-switch)	1995-1998 (pre-switch)	2001-2005 (post-switch)	1995-1998 (pre-switch)	2001-2005 (post-switch)
Dependent variable			monthly pair return			
	(1)	(2)	(3)	(4)	(5)	(6)
Dummy-23 * Bulletin Board (US) Index return	0.011	0.002				
	(1.28)	(0.74)				
Dummy-23 * NASDAQ Index return			**0.014**	**0.014**		
			(2.00)**	**(3.41)*****		
Dummy-23 * NYSE Index return					**0.016**	**0.013**
					(2.99)***	**(3.57)*****
Bulletin Board (US) Index return	0.002	0.002				
	(0.41)	(0.47)				
NASDAQ Index return			0.074	0.009		
			(5.96)***	(0.25)		
NYSE Index return					0.003	0.002
					(0.76)	(0.37)
Ln Sales	0	-0.012	-0.006	-0.011	-0.005	-0.011
	(0.02)	(1.30)	(0.37)	(1.27)	(0.35)	(1.25)
Sales Growth	-0.012	0.005	-0.009	0.005	-0.009	0.005
	(1.69)*	(1.86)*	(1.37)	(1.94)*	(1.44)	(1.85)*
Global Industry Tobin's Q	0.003	-0.001	0.002	-0.001	0.002	-0.001
	(0.64)	(0.38)	(1.21)	(0.31)	(1.23)	(0.29)
Constant	-0.011	-0.018	-0.072	-0.012	0.004	0.002
	(1.81)*	(2.51)**	(5.12)***	-0.2	-0.38	-0.28
Firm & Month Fixed Effects	yes	yes	yes	yes	yes	yes
Observations	7026	32575	8696	32575	8696	32575
Number of pairs	263	684	263	684	263	684
R^2	0.01	0.01	0.01	0.01	0.01	0.01

Table 9. Cross-listing premia and US/Total Trading Volume

The table shows that cross-listing premia exist only for firms with above-median ratio of US trading volume/ total trading volume. Firms with below-median portion of US trading have no premia, regardless of level of US regulation. Sample is all cross-listed firms, on all levels, during period of cross-listing. Dependent variable is the monthly pair premium (Tobin's Q of a cross-listed company minus Tobin's Q of its non-cross-listed match) , over 1995 through 2006. The sample is limited as follows: columns (1), (3), and (5) include only pairs with above-median ratio of US/total trading volume; columns (2), (4), and (6) include pairs with below-median ratio of US/total trading volume. In columns (1) through (4), "median" is for all pairs in the sample, including level-1 pairs. In columns (5) and (6), "median" is for the level-23 pairs in the sample (and is therefore higher, so above median sample is smaller). Independent variables are: level-23 dummy (=1 for level-23 firms during cross-listing period, 0 otherwise), similar dummies for trading only on level-2 or level-3; NASDAQ index; ln (sales of the cross-listed company in a pair); sales growth of the cross-listed company; global industry Tobin's Q, and ln (GDP of company's home country). The coefficients of interest are on the level-23, level-2 and level-3 dummies. All regressions use firm and month fixed effects, firm clusters, and White's robust standard errors. All non-dummy independent variables are normalized. *T*-statistics are reported under regression coefficients. *, **, *** indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface** for variables of interest.

Sample: US/total trading volume	Above-median	Below-median	Above-median	Below-median	Above-median	Below-median
Median based on	All firms		All firms		Level-23 firms	
Dependent variable	Monthly pair premium					
	(1)	(2)	(3)	(4)	(5)	(6)
Dummy-23	**0.368**	0.053				
	(2.62)* **	(0.40)				
Dummy-2			0.188	0.117	**0.522**	-0.031
			(1.30)	(0.79)	**(2.56)** **	(0.26)
Dummy-3			**0.702**	-0.242	**0.55**	0.41
			(3.29)* **	(0.70)	**(2.69)*** **	(1.52)
NASDAQ Index	0.072	0.016	0.073	0.017	0.105	0.022
	(1.64)	(0.69)	(1.71)*	(0.71)	(1.79)*	(0.90)
Ln Sales	-0.169	-0.148	-0.175	-0.147	-0.183	-0.145
	(1.66)*	(2.04)**	(1.71)*	(2.04)**	(1.55)	(2.10)**
Sales Growth	0.355	0.18	0.356	0.181	0.386	0.237
	(3.44)***	(1.48)	(3.47)***	(1.50)	(2.38)**	(2.48)**
Global Industry Tobin's Q	0.386	0.276	0.38	0.277	0.382	0.304
	(5.00)***	(5.04)***	(4.94)***	(5.05)***	(5.55)***	(5.43)***
Ln GDP	-0.658	0.223	-0.674	0.26	2.136	0.156
	(1.91)*	(1.54)	(1.96)**	(1.70)*	(17.25)***	(1.00)
Constant	-0.982	0.177	-1.231	0.276	-0.004	-0.104
	(4.00)***	-1.03	(4.05)***	-1.29	-0.01	-0.51
Firm and Month FE	yes	yes	yes	yes	yes	yes
Observations	2150	2862	2150	2862	1106	3906
Pairs	358	382	358	382	207	533

Table 10. Factors Which Predict Company Tobin's q's

The table shows predictors of Tobin's Q of cross-listed companies. The dependent variable is the Tobin's Q of each company, calculated monthly, over 1995 through 2006. The sample is split as follows: level-23 firms (Columns 1 and 2), level-14 firms (Columns 3 and 4). Independent variables are: the NASDAQ index; firm's US trading volume; ratio of firm's US-based volume over its worldwide trading volume; firm's returns volatility (standard deviation of returns); ln (firm sales), firm sales growth, and global industry Tobin's Q. All regressions use firm random effects, firm clusters, month and country fixed effects, and White's robust standard errors. All non-dummy independent variables are normalized. *T*-statistics are reported under regression coefficients. *, **, *** indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface** for variables of interest.

Sample:	Level-23 firms		Level-14 firms	
Dependent variable	Monthly Tobin's q			
	(1)	(2)	(3)	(4)
NASDAQ Index	**0.14**	**0.131**	0.026	0.025
	(3.59)* **	**(3.57)*** **	(1.31)	(1.36)
Firm's US Trading Volume		0.068		-0.111
		(0.95)		(1.41)
Ratio US/Total Trading Volume	**0.096**		0.018	
	(2.59)* **		(0.58)	
Firm's Returns Volatility	0.03	0.023	-0.01	-0.011
	(1.08)	(0.82)	(1.06)	(1.44)
Ln Sales	-0.273	-0.275	-0.066	-0.109
	(2.66)***	(2.69)***	(0.95)	(1.75)*
Sales Growth	0.021	0.022	-0.023	-0.01
	(1.49)	(1.52)	(1.47)	(0.79)
Global Industry Q	0.235	0.238	0.141	0.137
	(4.08)***	(4.06)***	(4.61)***	(5.08)***
Constant	0.399	0.699	0.651	0.576
	(2.39)**	(5.22)***	(6.54)***	(6.37)***
Firm RE, Period & Country FE	yes	yes	yes	yes
Observations	13758	13759	33248	35877
Pairs	234	234	421	454

Table 11. Cross-Listing Premia and Years Since Cross-Listing

Panel A. The table shows that level-23 firms have a significant cross-listing premium only for the first six years of cross-listing. Sample is all cross-listed firms, on all levels, during indicated periods both before and after cross-listing. Dependent variable in all regressions is the monthly pair premium (Tobin's Q of a cross-listed company minus Tobin's Q of its non-cross-listed match), over 1995 through 2006. In each column, the sample is limited to the indicated months relative to date of cross-listing. The coefficient of interest is that on the fixed level-23 dummy (=1 for level-23 firms, 0 otherwise),. Other dependent variables are: NASDAQ index; ratio of a firm's US/total trading volume; ln (sales of the cross-listed company in a pair); sales growth of the cross-listed company, global industry Tobin's Q. All regressions use firm random effects, firm clusters; country and month fixed effects, and White's robust standard errors. Removing firm random effects does not significantly change the results. All non-dummy independent variables are normalized. *T*-statistics are reported under regression coefficients. *, **, *** indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface** for variables of interest.

Months Since Cross-Listing:	-36 tru -24	-23 tru -12	-11 tru 0	1 tru 12	13 tru 24	25 tru 36	37 tru 48	49 tru 60	61 tru 72	73 tru 84	85 tru 96	97 tru 108	109 tru 120	121+
Dependent var.	monthly pair premium													
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Fixed Dummy-23	-0.111	0.096	0.492	**1.067**	**0.757**	**0.607**	**0.491**	**0.607**	**0.717**	0.161	0.098	-0.069	-0.067	0.12
	(0.57)	(0.33)	(1.61)	**(3.65)*** **	**(3.10)*** **	**(2.64)*** **	**(2.26)** **	**(2.92)*** **	**(2.58)*** **	(0.65)	(0.51)	(0.28)	(0.24)	(0.69)
NASDAQ Index	0.278	-0.22	0.218	0.019	0.166	0.048	0.179	-0.174	-0.03	-0.024	-0.173	-0.025	0.135	-0.02
	(1.83)*	(1.27)	(1.68)*	(0.18)	(1.68)*	(0.42)	(2.41)**	(1.31)	(0.21)	(0.30)	(0.85)	(0.31)	(1.37)	(0.33)
US/Total TradingVolume	0.119	0.167	-0.043	0.031	0.025	0.031	0.118	0.113	0.036	0.134	0.044	0.007	0.064	0.07
	(1.79)*	(2.13)**	(0.36)	(0.52)	(0.86)	(0.59)	(1.87)*	(2.20)**	(0.97)	(3.31)***	(0.80)	(0.16)	(1.86)*	(0.93)
Ln Sales	-0.355	-0.179	-0.21	-0.351	-0.03	-0.18	-0.189	-0.007	-0.213	-0.168	-0.036	0.054	-0.071	0.048
	(2.70)***	(0.83)	(1.17)	(1.54)	(0.19)	(1.33)	(1.44)	(0.07)	(1.27)	(1.70)*	(0.42)	(0.64)	(0.77)	(0.56)
Sales Growth	0.116	0.025	0.045	0.012	-0.006	-0.069	-0.043	0.017	0.02	-0.041	-0.001	-0.008	0.021	0.008
	(2.28)**	(0.52)	(0.99)	(0.36)	(0.24)	(2.87)***	(1.35)	(0.62)	(0.63)	(1.12)	(0.05)	(0.31)	(0.65)	(0.38)
Global Industry Tobin's Q	0.549	0.459	0.282	0.149	0.107	0.347	0.287	0.261	0.245	0.259	0.006	0.566	0.162	0.131
	(5.65)***	(4.16)***	(3.12)***	(1.95)*	(1.45)	(3.16)***	(3.08)***	(1.53)	(2.41)**	(3.12)***	(0.03)	(3.01)***	(2.11)**	(2.93)***
Constant	-1.225	-0.093	-0.934	-0.64	-0.299	-0.531	-1.525	-1.172	-0.442	-0.925	-0.487	0.149	-0.315	-0.534
	(2.61)***	(0.15)	(1.99)**	(1.47)	(0.89)	(1.39)	(3.45)***	(2.41)**	(0.65)	(2.72)***	(1.25)	(0.38)	(0.88)	(1.17)
Firm RE, Period & Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1470	1716	1961	2621	3209	3641	3845	3795	3467	3275	3120	3126	2655	14127
Pairs	134	164	203	252	311	342	353	359	339	321	294	298	256	258

Panel B. The table shows that returns of level-23 firms are significantly correlated with the NASDAQ index, and this correlation does not dissipate over time after cross-listing. Sample includes all cross-listed pairs, on all levels, during period of cross-listing. Dependent variable is pair return (return of a cross-listed company minus return of its non-cross-listed match) , over 1995 through 2006. In each column, the sample is limited to the indicated months since cross-listing. Independent variables are monthly fractional return on NASDAQ index, other independent variables are defined in Panel A. The coefficient of interest is that on the indices. All regressions use firm random effects, firm clusters, country and month fixed effects, and White's robust standard errors. All non-dummy independent variables are normalized. *T*-statistics are reported under regression coefficients. *, **, *** indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface** for variables of interest.

Months Since Cross-Listing:	0-12	13-24	25-36	37-48	49-60	61-72	73-84	85-96	97-108	109-120	121+
Dependent variable						monthly pair return					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
NASDAQ Index return	**0.102**	**-0.087**	0.013	**0.466**	-0.031	**0.134**	0.031	**0.05**	**0.088**	**0.06**	**-0.045**
	(4.99)* **	**(3.71)*** **	(0.66)	**(2.75)*** **	(0.19)	**(8.26)*** **	(0.49)	**(3.53)*** **	**(4.63)*** **	**(3.90)*** **	**(2.66)*** **
Firm's US/Total Trading Volume	0.01	0.007	0.005	-0.006	0.003	0	-0.003	0	-0.012	0.002	-0.003
	(1.31)	(1.29)	(1.08)	(1.10)	(0.59)	(0.01)	(0.43)	0.00	(1.86)*	(0.16)	(0.96)
Ln Sales	0.006	0.015	-0.007	-0.008	-0.015	-0.021	-0.012	0.019	-0.006	0.01	0.002
	(0.48)	(2.35)**	(0.79)	(1.06)	(2.99)***	(1.98)**	(1.34)	(2.01)**	(0.47)	(0.43)	(0.65)
Sales Growth	0.006	-0.006	0.011	0.001	0.006	-0.003	0.042	0.007	-0.041	0.019	0.004
	(0.57)	(0.51)	(0.80)	(0.26)	(1.28)	(0.22)	(2.04)**	(0.26)	(1.54)	(1.26)	(0.68)
Global Industry Tobin's Q	-0.01	-0.014	0.004	-0.008	-0.005	-0.011	-0.016	0.011	0.017	-0.018	-0.007
	(1.38)	(2.24)**	(0.53)	(1.04)	(0.92)	(1.41)	(1.16)	(1.13)	(1.38)	(1.44)	(2.04)**
Constant	0.093	0.127	-0.029	-0.716	0.221	0.213	0.054	0.17	0.131	-0.049	-0.045
	(1.64)	(2.44)**	(1.01)	(3.13)***	(0.99)	(6.77)***	(0.32)	(3.84)***	(2.67)***	(0.65)	(0.49)
Firm RE, Period & Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1235	1407	1469	1485	1382	1123	913	757	604	455	2920
Pairs	119	133	137	134	138	117	96	74	63	45	53

Table 12. Cross-Listing Premium, Trading Volume, and Years Since Cross-Listing

The table shows that the firm's ratio of US trading volume/ total trading volume predicts the firm's cross-listing premium, but in a way poorly consistent with litigation-based bonding theory. In early years after cross-listing (most favorable to litigation), the correlation between US trading volume and premium is low; it increases sharply beginning 5 years after cross-listing. Sample is all cross-listed firms, on all levels, during period of cross-listing, limited as shown based on period since cross-listing. Dependent variable is the monthly pair premium (Tobin's Q of a cross-listed company minus Tobin's Q of its non-cross-listed match) , over 1995 through 2006. In column (1), the sample is limited to pairs where the cross-listed firm is listed between 0 and 4 years; in column (2), between 5 and 7 years; in column (3), between 8 and 10 years. The coefficient of interest is that on the interaction variable between dummy -23 and above-median level of US/total trading volume. Other independent variables are: level-23 dummy; dummy for above-median ratio of US trading volume/total volume; the NASDAQ index; ln (sales of the cross-listed company in a pair); global industry Tobin's Q. All regressions use firm random effects; firm clusters, country and month fixed effects; and White's robust standard errors. All non-dummy independent variables are normalized. *T*-statistics are reported under regression coefficients. *, **, *** indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface** for variables of interest.

Sample:	0-4 years since listing	5-7 years since listing	8-10 years since listing
Dependent variable	Monthly pair premium		
	(1)	(2)	(3)
Dummy-23 * Above-Median US Trading Dummy	0.436	**0.943**	**0.68**
	(1.70)*	**(5.98)*** **	**(3.44)*** **
Dummy-23	0.269	-0.052	-0.421
	(2.22)**	(0.48)	(3.19)***
Above Median US/total Trading Volume Dummy	-0.059	-0.23	-0.049
	(0.29)	(1.85)*	(0.50)
NASDAQ Index	0.047	-0.039	-0.046
	(0.86)	(0.63)	(0.64)
Ln Sales	(0.1)	(0.004)	(0.07)
	(2.70)***	(0.08)	(1.77)*
Global Industry Tobin's Q	0.375	0.347	0.352
	(7.12)***	(5.77)***	(7.57)***
Constant	0.156	0.142	0.453
	(1.1)	(1.24)	(2.10)**
Firm Random Effects & Month Fixed Effects	yes	yes	yes
Observations	13994	11416	9675
R^2	0.09	0.08	0.06

Table 13. Level-3 versus Level-2 Premia

The table shows that level-3 firms do not receive additional premia, relative to level-2 firms, in years immediately following listing. Sample is level-23 pairs, during indicated period after cross-listing. Dependent variable is the monthly pair premium (Tobin's Q of a cross-listed company minus Tobin's Q of its non-cross-listed match) , over 1995 through 2006. Coefficient of interest is that on level-3 dummy (=1 if firm is cross-listed on level 3, 0 otherwise). Other independent variables are: NASDAQ index; ln (sales of the cross-listed company in a pair); sales growth of the cross-listed company; ratio of US/total worldwide trading volume. All regressions use firm random effects; firm clusters, country and month fixed effects; and White's robust standard errors. All non-dummy independent variables are normalized. *T*-statistics are reported under regression coefficients. *, **, *** indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface** for variables of interest.

Sample period, following date of cross-listing	0 to 5 years	6 to 10 years	0 to 5 years	6 to 10 years
Dependent variable	Monthly pair premium			
	(1)	(2)	(3)	(4)
Dummy-3	0.223	**0.379**	0.229	0.311
	(1.00)	**(1.97)****	(0.96)	(1.57)
NASDAQ Index	0.143	0.11	0.115	0.137
	(1.69)*	(0.58)	(1.27)	(0.62)
Ln Sales	-0.272	-0.109	-0.142	-0.119
	(1.81)*	(0.79)	(0.98)	(0.85)
Sales Growth	-0.018	0.022	-0.016	0.015
	(0.61)	(0.98)	(0.62)	(0.62)
Firm's US/Total Trading Volume			-0.045	**0.151**
			(0.58)	**(2.89)*****
Constant	0.532	0.783	0.524	0.572
	(2.72)***	(1.77)*	(2.45)**	(1.20)
Firm RE, Month & Country FE	yes	yes	yes	yes
Observations	8893	4764	8124	4384
Pairs	231	171	206	157