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The long-term effects of cross-listing, investor recognition, and ownership structure on valuation

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We show that investor recognition and bonding associated with a U.S. cross-listing are distinct effects using a sample of Canadian firms. In contrast to the post-listing decline documented in the literature, we find that cross-listed firms with a single class of shares enjoy a permanent increase in valuation if they attract and maintain investor recognition over time. Valuations of firms that fail to widen their U.S. shareholder base return to pre-listing levels within two years. Cross-listed firms with dual-class shares exhibit a permanent increase in valuation regardless of the level of U.S. investor holdings, consistent with firm-level bonding. (*JEL* G12, G15)

The literature on cross-listing documents a number of benefits to listing on a foreign stock exchange—benefits that are now seen as the conventional wisdom (Karolyi, 2006). Foreign firms that cross-list in the United States have higher valuations, a lower cost of capital, and increased liquidity. The literature provides a number of explanations for the valuation premium. Two leading hypotheses are the investor recognition hypothesis of Merton (1987) and the bonding hypothesis of Coffee (1999, 2002) and Stulz (1999). We test and try to distinguish between these competing explanations in this paper.

Foerster and Karolyi (1999) and Baker, Nofsinger, and Weaver (2002) attribute part of the increase in a cross-listed firm's valuation to the broadening of its U.S. investor base and the greater visibility of the firm, as predicted by Merton's (1987) investor recognition hypothesis. Merton develops a capital asset pricing model under incomplete information where an increase in the

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number of investors aware of a firm lowers the expected returns on the firm's stock, resulting in a contemporaneous increase in valuation. This theory provides an incentive for Foreign firms that are either neglected or have a low number of investors have an incentive to cross-list on a U.S. stock exchange if this action would increase their overall shareholder base. Indeed, surveys of managers confirm that one of the reasons behind their decision to cross-list is to broaden their shareholder base by attracting U.S. investors (Mittoo, 1992; Fanto and Karmel, 1997; and Bancel and Mittoo, 2001).

Coffee (1999, 2002) and Stulz (1999) suggest that a foreign firm from a jurisdiction featuring potentially weaker investor protection can increase its valuation by bonding itself to the U.S. securities regime through cross-listing. The bonding hypothesis suggests that companies with poor protection of minority shareholders signal their desire to respect the rights of shareholders by listing in a jurisdiction with higher scrutiny by reputational intermediaries, tougher regulation, and better enforcement. Better investor protection through greater monitoring of controlling shareholders is seen as one of the factors that explain the increase in stock returns following cross-listing, as U.S. and home-country investors are more willing to invest in a foreign firm that has tied its hands in this way. Doidge (2004), Doidge, Karolyi, and Stulz (2004), and Reese and Weisbach (2002) find empirical results that support the bonding hypothesis.

While the literature provides empirical support for both hypotheses, there are two issues that have not yet been resolved. First, Merton's (1987) theory predicts a permanent increase in valuation post-cross-listing assuming that investor recognition does not dissipate over time. The evidence in the literature, however, documents a postlisting decline in valuations within a year of cross-listing. Foerster and Karolyi (1999) show positive abnormal returns during the year prior to the actual listing followed by negative abnormal returns in the years following a U.S. listing. Similarly, Mittoo (2003) finds that Canadian cross-listed firms outperform the market by 30–40% in the year prior to listing, but underperform the market by 13–30% over the three years subsequent to listing.[1] These empirical results do not support the prediction of permanent gains from Merton's model. One potential explanation for these findings is that these studies failed to control for changes in the level of investor recognition both cross-sectionally and over time.

Second, there is little evidence on the link between the investor recognition hypothesis and the bonding hypothesis, as prior studies have examined these effects in isolation. Specifically, there is not enough evidence to determine whether the two effects can be distinguished from each other as both are related to an improvement in the information environment of a firm. Hence, the bonding effect may be indistinguishable or completely subsumed by the

[1] Sarkissian and Schill (forthcoming) provide further country-level evidence of this pattern in an event study of firms that were cross-listed as of 1998. Gozzi, Levine, and Schmukler (2005) document a similar pattern in a firm's Tobin's q ratio.

investor recognition effect and vice versa. Bris, Cantale, and Nishiotis (2007) try to disentangle the two effects using an event study of 21 dual-class firms that list one of their share classes on the U.S. stock exchanges. They find that improved liquidity and access to foreign investors are the most important effects, while the effects of improved investor protection are economically small. Doidge et al. (2006) provide additional evidence by showing that foreign firms with concentrated ownership that cross-list on a U.S. stock exchange benefit more than widely held firms in terms of increased valuations and analyst coverage.[2] Nonetheless, the evidence in Bris, Cantale, and Nishiotis (2007) is based on a very limited sample, while Doidge et al. (2006) is a cross-sectional study that does not control for changing firm-level characteristics that may condition the longer horizon effects. A large panel dataset covering a cross-section of cross-listed firms over time may provide a new perspective on these hypotheses and their relative importance.

Canadian firms provide a unique opportunity to examine the long-term effect of cross-listing on valuation and to disentangle these two hypotheses. Canadian firms make up the single largest group of foreign firms listed on U.S. stock exchanges, providing a large sample with considerable time-series and cross-sectional variation in firm-level characteristics, while controlling for country-level differences. In addition, Canada and the United States share the same legal, regulatory, and market institutions. Canada is geographically close, has the same English common-law legal system, and offers similar levels of shareholder protection as the United States. Furthermore, a significant number of Canadian firms (close to 20%) have dual-class shares.[3] Dual-class shares allow the divergence of control and cash-flow rights, creating a more acute agency conflict between controlling and minority shareholders. Gompers, Ishii, and Metrick (2006) show how this ownership structure creates lower valuations for U.S. firms, even though the level of investor protection in the United Statets is considered to be among the highest in the world. Given the similarities between Canada and the United States, we expect that bonding would have little if any impact on the valuation of Canadian firms with a single class of shares as these firms have no inherent conflict between controlling and minority shareholders. Further, we expect that any valuation premium would be attributed primarily to investor recognition. At the same time, the large sample of dual-class firms allows us to examine whether the valuation premium from cross-listing for these firms is attributed to a bonding effect, an investor recognition effect, or both. Specifically, we test for a firm-level bonding effect by examining whether the valuation premium of cross-listed dual-class firms with few or no U.S. investors is positive and different from zero, after controlling for other firm characteristics. The impact of investor recognition can then be measured by

[2] Morck, Wolfenzon, and Yeung (2005) provide a recent summary of the literature on concentrated ownership.

[3] Amoako-Adu and Smith (1995) and Attig (2005) document the widespread use of dual-class shares in Canada.

examining the difference in valuation premium of cross-listed dual-class firms with high and low investor recognition.

This paper makes three contributions to the literature. First, we confirm cross-sectionally that the magnitude of the increase in valuation at the time of cross-listing is conditional on the widening of the firm's U.S. shareholder base. Firms that fail to attract U.S. investors do not experience an increase in valuation and are valued similarly to non-cross-listed firms. Second, we show that increased valuations associated with cross-listing are permanent only for firms that maintain a broader U.S. shareholder base as predicted by Merton's (1987) hypothesis. Third, we show that investor recognition and bonding are separate effects. Canadian firms that use dual-class shares are valued at a discount to widely held firms, suggesting that the agency conflicts between minority and controlling shareholders are acute for these firms. In contrast to the findings for other firms, cross-listed firms with dual-class shares exhibit a permanent increase in valuation independently of the level of U.S. investor holdings; dual-class firms with few or no U.S. investors experience a similar increase in valuation as dual-class firms with high investor recognition. These results suggest that better monitoring of controlling shareholders and a reduced risk of expropriation of minority shareholders is the main effect explaining the increase in valuation for cross-listed dual-class firms, consistent with the firm-level bonding proposed by Doidge, Karolyi, and Stulz (2004).[4]

The remainder of this paper is organized as follows. Section 1 develops the hypotheses. Section 2 describes the data and methodology, and presents descriptive statistics of our sample. Section 3 presents the empirical results. Section 4 concludes.

1. Hypothesis Development

The impact of cross-listing on a foreign stock exchange is a much-researched phenomenon (Karolyi, 1998, 2006). While studies have generated a number of explanations for the benefits of cross-listing, there is little consensus on which effect dominates. The evidence in the literature suggests three main drivers, among others: increased liquidity as the foreign firm's shares become more accessible to U.S. investors (the liquidity hypothesis), increased investor recognition associated with a widening of the cross-listed firm's shareholder base and an improvement in its information environment (the investor recognition hypothesis), and better investor protection (the bonding hypothesis). In this paper, we focus on the investor recognition and bonding hypotheses, as previous studies such as Mittoo (2003) rule out liquidity as an explanation of longer term performance.[5]

[4] We term this effect firm-level bonding to distinguish it from legal bonding, which depends on country-level improvements in the legal regime governing these firms.

[5] Foerster and Karolyi (1999) and Mittoo (2003) provide comprehensive discussions of the liquidity hypothesis.

1.1 Merton's (1987) investor recognition hypothesis

Merton (1987) modifies the Sharpe-Lintner capital asset pricing model to include a factor, the "shadow cost of information," which proxies for incomplete information about the securities available for investment. The assumption behind the model is that some stocks are known to relatively few investors, and investors in these "neglected" securities require a return premium for bearing idiosyncratic risk. The model has two main implications. First, the value of a security is positively associated with the number of investors who know about the security. Second, the expected return on a security is decreasing in the number of investors who know about the security. In the setting of cross-listing, the implication is that foreign firms have an incentive to cross-list on a U.S. stock exchange if this action will increase their overall shareholder base, which in turn will result in an increase in valuation.

Consistent with the investor recognition hypothesis, Foerster and Karolyi (1999) find that cross-listed firms experience close to a 30% increase in their number of shareholders. The firms that widen their shareholder base the most exhibit the greatest increase in stock price in response to the listing announcement. Baker, Nofsinger, and Weaver (2002) and Lang, Lins, and Miller (2003) also show that cross-listed firms experience an increase in media visibility and analyst following, both of which are associated with a decrease in the cost of equity capital after the listing. Hence, our first hypothesis is:

> *H1: The valuation premium of cross-listed Canadian firms relative to non-cross-listed Canadian firms is positively related to the level of investor recognition.*

Although the aforementioned studies examine the impact of investor recognition on stock returns around the cross-listing event, they do not examine the duration or longevity of the valuation effects associated with investor recognition beyond a one-year horizon. While Merton's (1987) general equilibrium theory predicts a permanent increase in the valuation of cross-listed firms, several studies provide evidence that the increase in valuation is transitory. Mittoo (2003) finds that Canadian cross-listed firms outperform the market by 30–40% in the year prior to listing, but underperform the market by 13–30% over the three years subsequent to listing. Sarkissian and Schill (forthcoming) provide further country-level evidence of a prelisting run-up and postlisting decline in returns, while Gozzi, Levine, and Schmukler (2005) show a similar pattern in Tobin's q ratio.[6] These studies do not support, however, the prediction of permanent gains from Merton's model, potentially because they do not control for the level of investor recognition after cross-listing. Hence, our second hypothesis focuses on the effect of investor recognition over time:

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[6] Rather than testing the investor recognition hypothesis, Sarkissian and Schill (forthcoming) focus on home bias and examine the impact on residual returns of country-level variables, such as the size of exports, industry structure, culture, and distance.

H2: The valuation premium of cross-listed Canadian firms relative to non-cross-listed Canadian firms in the years following cross-listing is conditional on the level of investor recognition.

Merton's (1987) model focuses specifically on the size of the firm's investor base under incomplete information relative to the total investor base for the complete information case when all investors are aware of the security. One cannot directly observe, however, how many potential investors are aware of each firm. In this study, we use two related proxies for investor recognition—the number of U.S. institutional investors holding the stock, and the proportional ownership by U.S. institutional investors of the stock—both measured post-cross-listing.[7] While these measures are imperfect proxies for investor recognition, it is reasonable to assume that they are highly correlated with investors' awareness of the stock.

1.2 Firm-level bonding hypothesis

The investor recognition hypothesis suggests that all firms stand to benefit from the increased visibility and broader investor base associated with cross-listing. The evidence suggests, however, that ownership structure may qualify this prediction. The literature on concentrated ownership focuses on two dimensions of ownership structure: the presence and control stake of a blockholder and the use of mechanisms that enhance control, such as dual-class shares. Given the lack of reliable data on ownership stakes for the time period covered by this study, we focus on firms with dual-class shares, defined as a firm that has two or more classes of common shares with different voting rights.[8] By separating cash-flow rights from voting rights, the dual-class share structure allows controlling shareholders to escape the wealth consequences of their own decisions.[9] This separation weakens their alignment with minority shareholders and potentially increases the risk of expropriation. Thus, the incentives to indulge in wealth diversionary behavior or extract private benefits are higher in dual-class firms compared to firms with a one-share-one-vote structure (DeAngelo and DeAngelo, 1985; and Grossman and Hart, 1988).

The bonding hypothesis of Coffee (1999, 2002) and Stulz (1999) proposes two channels by which a U.S. listing reduces the ability of controlling shareholders to extract private benefits from a foreign firm, thereby increasing the firm's valuation (Benos and Weisbach, 2004; and Karolyi, 2006). Bonding may occur either through the courts or through monitoring by reputational

[7] While analyst coverage is an important proxy used in other studies, I/B/E/S data on analyst coverage of Canadian firms is limited to only a small sample (see Leuz, 2003). For this reason, we do not test this variable in this analysis.

[8] Identifying controlling blockholders requires reading the annual filings and proxy statements of each firm, which are not available prior to 1997. In a sensitivity analysis, we use a smaller number of firms and find that controlling for concentrated ownership does not affect any of the results.

[9] Nenova (2003) provides a rigorous analysis for measuring the private benefits of control.

intermediaries, such as U.S. underwriters, auditors, credit-rating agencies, equity analysts, and stock exchanges. Coffee terms the first channel *legal* or liability-based bonding, and the second channel *reputational* bonding.

Legal bonding refers to U.S. securities laws that allow minority shareholders to pursue class action suits and derivative actions against foreign managers, backed by the enforcement powers of the Securities & Exchange Commission (SEC). Licht (2001, 2003) and Siegel (2005) are critical of legal bonding, and provide evidence that the SEC and minority shareholders have not effectively enforced U.S. securities laws against foreign firms. Nevertheless, legal bonding through the fear from litigation by U.S. authorities may still serve as a deterrent of managers from expropriating the firm's assets, thereby providing protection of minority shareholders.

Reputational bonding refers to the activities of financial intermediaries who monitor the foreign firm and improve the information environment, thereby reducing the information asymmetry between controlling and minority shareholders. Doidge, Karolyi, and Stulz (2004) provide theoretical support for the reduction in information asymmetry. They argue that a U.S. listing increases the quality and/or the quantity of information available to minority shareholders and reduces the extent to which controlling shareholders can engage in expropriation. Listing on a U.S. exchange, however, increases the firm's ability to take advantage of growth opportunities. Hence, controlling shareholders have an incentive to cross-list if the benefits that accrue to them of exploiting valuable growth opportunities exceed the costs of greater monitoring and lower consumption of the private benefits of control. This firm-level bonding hypothesis is supported by Doidge et al. (2006), who find that foreign firms with a large controlling shareholder are less likely to cross-list on a U.S. stock exchange. At the same time, firms with a large controlling shareholder that decide to cross-list experience a greater increase in valuation and in analyst coverage than the average cross-listed firm.

This firm-level bonding effect may be particularly important for firms where controlling shareholders use dual-class shares to separate cash-flow rights from control rights. Doidge (2004) finds that while both share classes benefit from a U.S. listing, the minority shareholders benefit proportionately more as the voting premium between share classes narrows. The reduced premium, he argues, proxies for the greater protection offered to minority shareholders by a U.S. listing.[10] Doidge et al. (2006) note that firms with a separation of control and cash-flow rights have lower valuations on average, but experience a greater increase in valuation when they cross-list on a U.S. stock exchange than widely held firms.

Investor recognition and firm-level bonding may be complementary effects as both are related to an improvement in the information environment of a firm.

[10] Doidge (2004) does not consider whether this effect is related to investor recognition, and does not look at the valuation of these firms.

In both cases, cross-listing on a U.S. exchange reduces the firm-specific risk premium charged by outside investors, lowers the cost of capital, and increases valuations. Whereas the investor recognition hypothesis focuses on the higher risk premium charged to firms that are not widely known, firm-level bonding focuses on the risk premium demanded by existing investors who have incomplete information about the actions of controlling shareholders. Cross-listing increases the quantity and/or quality of information about the foreign firm, reducing the shadow cost of incomplete information on one hand, and reducing the information asymmetry between controlling and minority shareholders on the other. Given these complementary effects, the bonding effect may be indistinguishable or completely subsumed by the investor recognition effect. One way to distinguish between the two effects is to focus on a sample that consists of two groups of firms: Canadian firms with a single share class that have a similar alignment of shareholder interests as U.S firms, and Canadian firms with dual-class shares that have more acute agency conflicts between controlling and minority shareholders. Given that the first group faces the same principal-agent problems as U.S. firms, we expect the valuation premium of cross-listing to be primarily related to investor recognition. Conversely, the valuation premium of firms with agency conflicts is expected to be related both to investor recognition and to firm-level bonding effects, but the latter effect can be identified for firms that fail to widen their U.S. shareholder base. In these cases, the effect of firm-level bonding should dominate. Hence, our third hypothesis consists of three parts:

H3A: Cross-listed firms with dual-class shares trade at a premium relative to non-cross-listed firms with dual-class shares.

H3B: Investor recognition has a greater impact relative to firm-level bonding on the valuation premium of cross-listed Canadian firms with a single class of shares.

H3C: Firm-level bonding has a similar impact to the investor recognition effect on the valuation premium of cross-listed firms with dual-class shares.

2. Data

We study Canadian firms over the eighteen-year period from 1988 to 2005.[11] We collect annual financial statement data from Canadian and U.S. Compustat databases. Stock prices are collected from the CRSP and the TSX-Canadian Financial Markets Research Center (CFMRC) monthly databases. U.S. institutional ownership data are obtained from the 13F regulatory filings reported on

[11] We exclude firms that are traded on the OTC Bulletin Board or the NASD Pink Sheets.

the CDA/Spectrum database.[12, 13] We identify cross-listed firms and the listing date using past issues of the *TSX Review*, trading data in CRSP, news searches on Factiva, and data from U.S. stock exchanges.

The full sample consists of all Canadian firms that meet the following criteria: nonmissing total assets (DATA6 on Compustat), sales (DATA12), book value of equity (DATA60), and income before extraordinary items (DATA18). We exclude financial firms and small firms with a market capitalization less than C$10 million to make our sample comparable with other studies. Firms that delist due to a takeover, bankruptcy, or other reason are present in our sample until the year of delisting. These restrictions result in a final sample size of 7,070 firm-year observations (of which 1,890 are of cross-listed firms) from 1,265 firms (of which 287 are cross-listed). Manufacturing and service firms make up 43% of the sample, followed by natural resource firms at 28%, high technology firms at 22%, and transportation and utility stocks at 7%.

We use Tobin's q as the valuation measure.[14] We compute Tobin's q as the ratio of market value of equity plus book value of debt scaled by total assets as of the end of the fiscal year. We use the following control variables in all regressions: firm size, future growth opportunities, leverage, and profitability. Firm size is computed as the log of total assets. We proxy future growth opportunities using past sales growth computed as the two-year average growth rate in sales.[15] Leverage is calculated as total debt divided by total assets. Profitability is measured by the return on assets (ROA), calculated as earnings before interest and taxes scaled by total assets. We winsorize these variables at the 1% and 99% levels to reduce the impact of outliers.

Panel A of Table 1 provides summary statistics of the control variables used in this study. We compare non-cross-listed firms with cross-listed firms, and test whether the difference in the mean (median) is statistically significant using a parametric *t*-test (nonparametric sign-rank test). Consistent with previous studies, cross-listed firms have a significantly higher Tobin's q ratio; the mean (median) ratio for the cross-listed firms is 1.787 (1.301), as compared with the mean (median) for the non-cross-listed firms of 1.526 (1.187). Cross-listed firms are much larger than non-cross-listed firms, with total assets at the mean (median) that are five (four) times larger, and mean (median) market value of equity that is eight (four) times larger. Both types of firms have similar

[12] The 13F data cover primarily companies that are listed on a U.S. exchange. Because there is no regulatory requirement for Canadian institutional investors to report their holdings or for U.S. institutional investors to report their foreign holdings, we do not have similar data for non-cross-listed Canadian firms. It is possible that U.S. institutions hold some of the firms in our sample that are not cross-listed or held shares in cross-listed companies before cross-listing, and hence our measure of investor recognition can be noisy. Nonetheless, we do not have data on institutional ownership prior to cross-listing, and therefore must rely on the 13F data.

[13] Cross-listed firms for which there was no information in CDA/Spectrum are treated as having no U.S. institutional investors.

[14] Doidge et al. (2006); Doidge, Karolyi, and Stulz (2004); Gozzi, Levine, and Schmukler (2005); and Lang, Lins, and Miller (2003) use Tobin's q to assess the impact of cross-listing.

[15] If the two-year growth rate is not available, one-year growth in sales is used.

Table 1
Descriptive statistics

	Non-*XLIST*			*XLIST*			Mean difference	Median difference
	N	Mean	Median	*N*	Mean	Median	*t*-test	Sign-rank test
	Panel A: Mean (median) summary statistics by *XLIST*							
Tobin q	5, 180	1.526	1.187	1, 890	1.787	1.301	0.260***	0.114***
Total assets	5, 180	395.5	103.9	1, 890	2, 015.8	439.5	1, 620.3***	335.6***
Market value	5, 180	291.6	90.6	1, 890	2, 536.4	442.0	2, 244.8***	351.4***
Sales growth	5, 180	0.330	0.105	1, 890	0.314	0.128	−0.015	0.023**
Return on assets	5, 180	−0.005	0.033	1, 890	−0.024	0.020	−0.019***	−0.013***
Leverage	5, 180	0.258	0.236	1, 890	0.251	0.232	−0.006	−0.004
Foreign sales (%)	5, 180	0.019	0.000	1, 890	0.410	0.348	0.391***	0.348***
	One-share-one-vote			Dual-class			Mean difference	Median difference
	N	Mean	Median	*N*	Mean	Median	*t*-test	Sign-rank test
	Panel B: Mean (median) summary statistics by ownership structure							
Tobin q	5, 742	1.680	1.264	1, 328	1.231	1.026	−0.449***	−0.238***
Total assets	5, 742	798.3	108.3	1, 328	960.1	279.3	161.9***	170.9***
Market value	5, 742	961.7	113.2	1, 328	588.9	156.2	−372.8***	43.0***
Sales growth	5, 742	0.355	0.118	1, 328	0.197	0.093	−0.158***	−0.025***
Return on assets	5, 742	−0.017	0.028	1, 328	0.024	0.034	0.042***	0.006***
Leverage	5, 742	0.244	0.220	1, 328	0.307	0.297	0.063***	0.077***
Foreign sales (%)	5, 742	0.130	0.000	1, 328	0.095	0.000	−0.036***	0.000

	Panel C: Summary statistics on U.S. institutional ownership for cross-listed firms				
Category	*N*	Mean	1st quartile	Median	3rd quartile
Number of investors	1, 890	36	1	12	41
Percentage holdings	1, 890	0.163	0.001	0.089	0.269

Panel A provides summary statistics for the sample of cross-listed and non-cross-listed Canadian firms. The final two columns show the difference between the mean (median) summary statistics across samples based on a *t*-test (sign-rank test). Tobin's q is computed as (total assets + market value of equity − book value of equity)/total assets. Total assets are shown in U.S. dollars in millions, converted to U.S. dollars using the fiscal year-end exchange rate. Market value is total shares outstanding times price at calendar year-end. Sales growth is the two-year average growth rate in sales. If two-year data are not available, one-year growth in sales is used. Return on assets is earning before interest and taxes/total assets. Leverage is total debt/total assets. Foreign sales is the percentage of total sales outside of Canada. Panel B provides statistics for single-share class and dual-class firms. Panel C provides statistics on U.S. institutional ownership as reported in 13F filings. Number of investors is the raw number of U.S. investors that report holdings in a stock. Percentage holdings is the sum of the U.S. holdings as a percentage of shares outstanding. *,**,*** indicate significance at the 1%, 5%, and 10% levels, respectively.

mean sales growth rates, although the median sales growth rate of cross-listed firms is higher than the non-cross-listed firms. Non-cross-listed firms have a statistically higher ROA at both the mean and the median than cross-listed firms. Leverage is comparable across samples. Finally, cross-listed firms have much higher foreign sales, consistent with Pagano, Röell, and Zechner (2002).

Panel B of Table 1 compares the same firm characteristics across single-class and dual-class firms. Consistent with existing studies, we find that firms with dual-class shares on average have a lower Tobin's q ratio, higher assets, lower market value of equity, and higher leverage.[16] Firms with dual-class shares have lower sales growth but higher profitability, implying that the discount rate applied to their earnings must be higher to generate lower valuations. Finally, dual-class firms have statistically lower foreign sales at the mean but not at the median than one-share-one-vote firms.

Panel C of Table 1 provides summary statistics on U.S. institutional holdings of the cross-listed firms in our sample. We use two measures of investor recognition: the number of U.S. institutional investors that report a holding in a stock for a given year, and the percentage of outstanding shares held by U.S. institutional investors. The mean (median) number of institutional investors is 36 (12). The mean percentage holdings are 16.3% while the median is 8.9%. Figure 1 shows how the mean value for these variables increases each year following cross-listing, suggesting that cross-listing does widen the average foreign firm's U.S. investor base.

3. Results

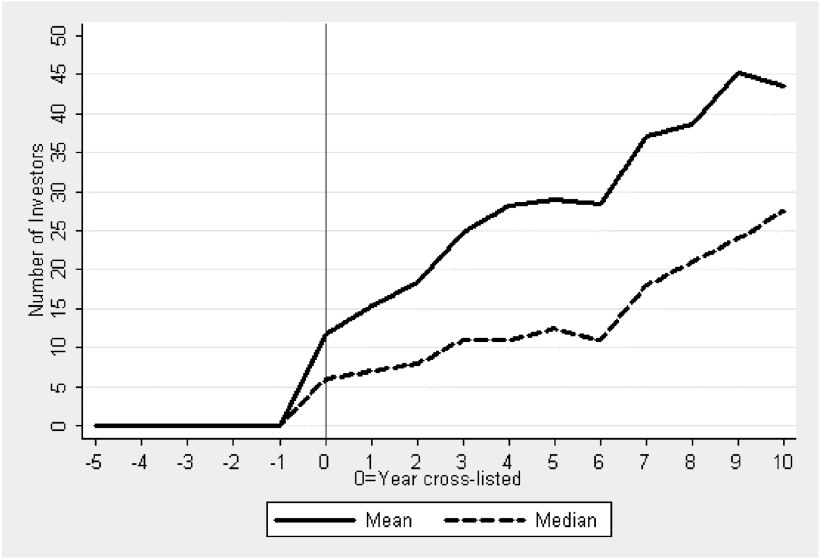
In this section, we discuss the potential endogeneity among the valuation measure, the decision to cross-list, and the investment decision of institutional investors. We use a three-stage least-squares approach, where we estimate the probability of cross-listing on a U.S. stock exchange, predict the level of holdings of U.S. investors based on firm characteristics, and use these predicted values in regressions on Tobin's q.

3.1 Predicting the decision to cross-list

A significant methodological issue facing cross-listing studies is the possible endogeneity between valuation and the decision to cross-list on a U.S. stock exchange. While theory may suggest the direction of causation runs from cross-listing to higher firm valuations, an alternative explanation is that firms with higher valuations list on a U.S. stock exchange following a period of strong performance. A failure to deal with endogeneity may lead to a biased coefficient on the cross-listing variable generating misleading results. To address this potential endogeneity, we follow Doidge, Karolyi, and Stulz (2004) and estimate

[16] For studies of firms with dual-class shares outside North America, see Claessens et al. (2002); Cronqvist and Nilsson (2003); Faccio, Lang, and Young (2001); Lemmon and Lins (2003); and Lins (2003).

Panel A: Number of U.S. Investors



Panel B: Percentage Holdings of U.S. Investors

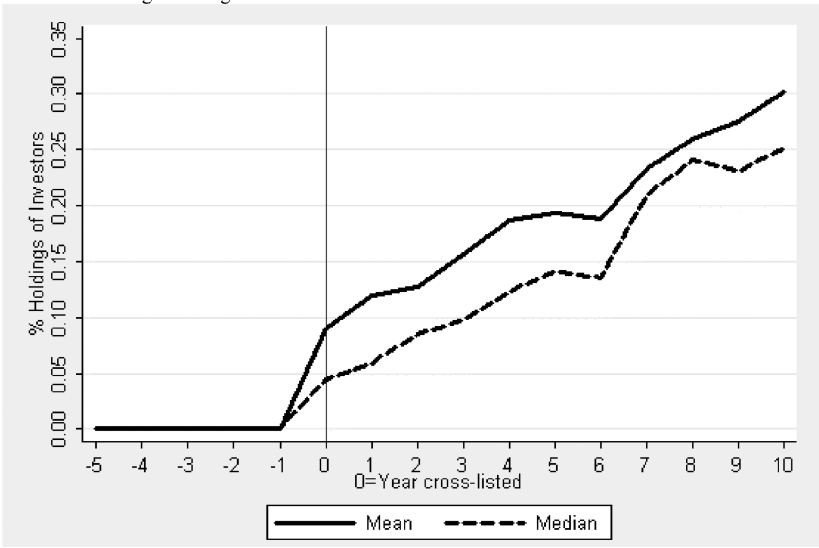


Figure 1
Change in U.S. investor holdings around cross-listing

a treatment-effects model for the decision to cross-list, where a firm is coded 1 if cross-listed and 0 otherwise.[17] The first-stage equation is estimated as a

[17] An alternative approach is to use matching methods, whereby observations of cross-listed firms for a given year are matched with non-cross-listed firms based on observable characteristics, such as firm size and industry membership. We discuss this approach in Section 3.6.

probit, where the output is the predicted probability of being cross-listed in a given year. We then use the predicted probability of cross-listing in subsequent regressions that estimate the impact of cross-listing on a firm's valuation.

We use the following variables to estimate the probability of cross-listing: firm size, foreign sales, sales growth, ownership structure, industry membership, profitability, and leverage. Pagano, Röell, and Zechner (2002) find that the proportion of foreign sales and firm size are the two most important variables explaining the decision of European firms to list abroad. Doidge, Karolyi, and Stulz (2004) show that firms with growth opportunities are more likely to list abroad, with U.S. investors assigning the highest value to growth opportunities. Mittoo (2003) and Sarkissian and Schill (2004) suggest that industry membership is an important characteristic affecting the decision to cross-list. We therefore include industry dummies identifying firms in four broad categories: high-tech firms, natural resources, utilities and transportation, and manufacturing and service industries.

Doidge, Karolyi, and Stulz (2004) also predict that ownership structure affects the decision to cross-list. Controlling shareholders have an incentive to cross-list if the benefits that accrue to them of exploiting valuable growth opportunities exceed the costs of greater monitoring and lower consumption of the private benefits of control following cross-listing. These monitoring costs will be highest for blockholders that use dual-class shares to maintain control, as the private benefits of control are higher. We identify these firms using a dummy variable, *DUALCLASS*, coded 1 if the firm has dual-class shares and 0 otherwise. Because the size of unexploited growth opportunities must be large enough to offset the higher costs of monitoring, we also construct a dummy variable, *HIGROW*, that takes a value of 1 for firms with higher than the median sales growth, and 0 otherwise. We interact *HIGROW* with *DUALCLASS* to identify those dual-class firms that have the greatest incentive to cross-list.

Panel A of Table 2 presents the results of the probit model of the decision to cross-list. The pseudo-R squared is close to 40%, and a chi-squared test confirms the statistical significance of the overall specification. Consistent with prior research, larger firms and firms with high foreign sales are more likely to cross-list. We find a negative relation between cross-listing and leverage and ROA. The coefficient on sales growth and *HIGROW* are positive but not statistically significant; the coefficient on *DUALCLASS* is negative but not significant. However, the interaction of *DUALCLASS* with *HIGROW* is positive, implying that firms where the benefits of exploiting growth opportunities appear large are more likely to bear the costs of greater monitoring associated with a U.S. listing, consistent with the predictions of Doidge, Karolyi, and Stulz (2004).[18]

[18] Following Pagano, Röell, and Zechner (2002), we check the robustness of our results by estimating a Cox proportional hazard model. This model uses duration analysis to investigate which company characteristics are associated with a foreign listing. The estimated model shows that firm size, foreign sales, and *HIGROW* are positively associated and leverage is negatively associated with cross-listing.

Table 2
Prediction equations

Variable	Number of U.S. investors	Percentage holdings of U.S. investors
	Panel A: Predicting the decision to cross-list	
Constant	−2.639***	
Log of assets	0.299***	
Foreign sales	2.992***	
Sales growth	0.015	
HIGROW dummy	0.057	
Leverage	−1.026***	
ROA	−1.525***	
DUALCLASS	−0.248	
DUALCLASS∗*HIGROW*	0.458***	
Industry dummies	Yes	
N	7, 070	
Pseudo R^2	0.396	
Chi-squared	360.825	
	Panel B: Investment decision of U.S. institutional investors	
Constant	1.128***	0.206***
Log of assets	0.387***	0.024***
Sales growth	0.003	0.006
Leverage	−0.696***	−0.027
ROA	−0.081	−0.004
TSE 300	0.184**	0.020**
Share turnover	0.278***	0.045***
Loss dummy	−0.023	−0.006
R&D intensity	−0.015	−0.009
Dividend yield	−0.214	−0.082
DUALCLASS	−0.715***	0.018
Industry dummies	Yes	Yes
Year dummies	Yes	Yes
N	1, 890	1, 890
Overall R^2	0.412	0.359
Chi-squared	1478.078	1499.519

Panel A reports results of a probit that estimates the probability of cross-listing on a U.S. stock exchange over the period from 1988 to 2005. The sample is cross-listed and non-cross-listed Canadian firms. Log of assets is total assets in millions converted to U.S. dollars using the fiscal year-end exchange rate. Foreign sales is the percentage of total sales outside of Canada. Sales growth is the two-year average growth rate in sales. If two-year data are not available, one-year growth in sales is used. *HIGROW* is a dummy variable set equal to 1 for firms with past sales growth that is above the median for the sample, and 0 otherwise. Leverage is total debt/total assets. ROA is earning before interest and taxes/total assets. *DUALCLASS* is a dummy equal to 1 for firms with two or more share classes with different voting rights. Industry dummies are included but not shown. Standard errors are adjusted for clustering by firm. *, **, *** indicate statistical significance at the 1%, 5%, and 10% levels, respectively.
Panel B reports results of random-effects regressions of the number of U.S. investors or the percentage holdings of U.S. investors in cross-listed Canadian firms from 1988 to 2005. *TSE 300* is a dummy set equal to 1 if the firm is a member of the TSE 300 index, and 0 otherwise. Share turnover is annual trading volume/shares outstanding. Loss is a dummy set equal to 1 for firms with negative earnings before extraordinary items. R&D intensity is research & development expense/sales. Dividend yield is the yield on common shares. The other variables are defined above. Industry and year dummies are included but not shown. *, **, *** indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

3.2 Endogeneity in the investment decision of U.S. institutional investors

The relationship between investor recognition and the valuation of cross-listed firms may also suffer from an endogeneity problem. For example, Ammer et al. (2005), Bushee (1998), and Ferreira and Matos (2006) find that U.S.

institutional investors tend to hold firms that have higher valuations. It is not clear, therefore, whether the widening in a cross-listed firm's shareholder base causes the increase in Tobin's q around cross-listing, or U.S. investors prefer foreign firms that have high valuations. To address this endogeneity, we instrument for the number (or percentage holdings) of U.S. investors and use the predicted values in subsequent regressions on Tobin's q.

We predict the holdings of U.S. investors based on firm-level characteristics. Ammer et al. (2005), Bailey, Kumar, and Ng (2005), Edison and Warnock (2004), and Ferreira and Matos (2006) find that U.S. investors hold more stock in foreign firms with the following characteristics: large size, higher liquidity of trading, higher profitability, higher growth opportunities, lower financial leverage, higher visibility through membership in a major stock index, and lower dividend payout.[19] We therefore include controls for firm size, profitability, growth opportunities, and leverage. We proxy for liquidity using share turnover, measured as total shares traded in a given year divided by shares outstanding. To control for higher visibility and membership in an index, we use a dummy variable to identify Canadian firms whose shares are included in the Toronto Stock Exchange 300 composite index (TSE 300) for a given year.[20] We measure dividend payout as dividends paid to common shareholders divided by book value of common equity. Ammer et al. (2005), Edison and Warnock (2004), Ferreira and Matos (2006), and Leuz, Lins, and Warnock (2005) find that U.S. institutional investors avoid foreign firms controlled by a large blockholder, particularly where owners use dual-class shares to separate cash-flow rights from control rights. We therefore control for ownership structure by including the *DUALCLASS* dummy. Finally, we include factors identified by Bushee (1998), Dahlquist and Robertsson (2002), and Frieder and Subrahmanyam (2005) that explain the domestic holdings of U.S. institutional investors: a *LOSS* dummy set equal to 1 if the firm reports negative earnings and 0 otherwise, and research and development (R&D) intensity, measured as R&D expense divided by total sales.

Panel B of Table 2 presents the regression results for the sample of cross-listed firms. We present two specifications: one where the dependent variable is the natural logarithm of the number of U.S. institutional investors (*INS_NUM*) and the other where the dependent variable is the percentage ownership of U.S. institutional investors (*INS_HOL*). Column 1 reports the results of regressions on *INS_NUM*, where the fit of the regression is above 40%. Consistent with the literature, we find that *INS_NUM* is positively associated with firm size, membership in the TSE 300 index, and share turnover, and negatively associated

[19] These studies also identify country-level characteristics affecting U.S. holdings of foreign stocks that are controlled for in our study, namely, close geographical proximity, high number of U.S. listings, credible accounting information, high disclosure requirements, and low transaction costs on the home exchange.

[20] The TSE 300 index identifies the largest Canadian firms by market capitalization in a given year. The TSE 300 index was replaced by the S&P/TSX composite index in May 2002, at which time the number of firms was reduced to remove smaller, more illiquid firms.

Table 3
Cross-sectional impact of investor recognition on Tobin's q

Variable	1	2	3	4	5
Constant	3.228***	3.310***	3.303***	3.321***	3.302***
Log of assets	−0.290***	−0.323***	−0.307***	−0.323***	−0.306***
Sales growth	0.101***	0.105***	0.101***	0.104***	0.101***
Leverage	−0.214***	−0.186**	−0.205**	−0.194**	−0.208***
ROA	0.103	0.078	0.083	0.068	0.069
DUALCLASS	−0.210***	−0.174***	−0.186***	−0.261***	−0.226***
Predicted *XLIST*	0.200**	0.012	0.109	−0.054	0.029
INS_NUM		0.150***		0.163***	
INUMHI			0.342***		0.397***
INUMLO			−0.003		0.035
XDC				0.474**	0.412**
INS_NUM∗DUALCLASS				−0.112**	
INUMHI∗DUALCLASS					−0.343**
INUMLO∗DUALCLASS					−0.208
Industry dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
N	7, 070	7, 070	7, 070	7, 070	7, 070
Overall R^2	0.169	0.204	0.185	0.206	0.184
Chi-squared	872.335	958.815	914.449	966.016	921.991

This table reports results of three-stage least-squares regressions that estimate the impact of cross-listing on Tobin's q, controlling for the decision to cross-list and investor recognition. *DUALCLASS* is a dummy equal to 1 for firms with two or more share classes with different voting rights. Predicted *XLIST* is the predicted probability of cross-listing and *INS_NUM* is the predicted number of U.S. investors from Table 2. *XDC* is the interaction of *DUALCLASS* and predicted *XLIST*. *INUMHI* (*INUMLO*) is a dummy equal to 1 for cross-listed firms in the upper (lower) half of the predicted number of U.S. investors in a given year. All other variables are defined in Tables 1 and 2. Industry and year dummies are included but not shown. The regressions are estimated using panel data with firm random effects. *, **, *** indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

with leverage. *INS_NUM* is negatively associated with *DUALCLASS*, confirming that U.S. institutional investors are less willing to invest in firms where the risk of wealth diversionary behavior is greater. Other characteristics such as past sales growth, profitability, and dividend policy are not statistically significant. Column 2 reports the results of regressions on *INS_HOL*, where the fit of the regression is 36%. Firm size, TSE 300 membership, and share turnover are positively correlated with percentage holdings, but leverage and *DUALCLASS* are not statistically significant. We use the predicted values of *INS_NUM* and *INS_HOL* from these specifications in the regressions on Tobin's q below as proxies for investor recognition.

3.3 Cross-sectional impact of investor recognition on Tobin's q

Table 3 examines the cross-sectional impact of investor recognition on Tobin's q estimated using panel regressions with firm-level random effects.[21] The standard errors are adjusted for clustering by firm. Column 1 of Table 3 presents the base regression of the effect of cross-listing on Tobin's q. Consistent with

[21] The panel regressions throughout the paper are estimated using firm random effects because a number of our variables of interest are either time invariant, such as our industry dummies, or exhibit few changes over time, such as the dummy for firms with dual-class shares. A fixed-effects regression would drop these time-invariant dummies, as their effect could not be distinguished from the firm-specific error term that is also time invariant.

the literature, Tobin's q is positively related to sales growth and negatively related to firm size and leverage. The coefficient on ROA is not significant. The coefficient on *DUALCLASS* is negative and significant, indicating that firms with dual-class shares are valued at a discount relative to firms with a one-share-one-vote structure. This result confirms the findings of other studies that document a negative relationship between firm value and the separation of cash-flow rights from control rights (Claessens et al. 2002; Lemmon and Lins, 2003; Lins, 2003; and Cronqvist and Nilsson, 2003). The coefficient on the predicted probability of cross-listing (*XLIST*) is positive (0.200) and statistically significant at the 1% level, indicating that cross-listed firms enjoy a higher valuation than non-cross-listed firms on average. This finding is consistent with the ubiquitous evidence in the cross-listing literature (Karolyi, 1998, 2006).

Column 2 of Table 3 repeats the regression from column 1 but adds the predicted number of U.S. investors (*INS_NUM*) to the independent variables. The control variables have the same magnitudes, signs, and statistical significance. However, the coefficient on *XLIST* is no longer significant, while the coefficient on *INS_NUM* (0.150) is positive and significant. This coefficient implies that the cross-listed firms that have the average number of U.S. investors have Tobin's q ratios that are higher by 0.538, or a 16% premium relative to non-cross-listed firms. The change in statistical significance of *XLIST* suggests that controlling for the increase in investor recognition explains much of the unexplained valuation premium. Put differently, it appears that the premium in valuation of cross-listed companies is attributed primarily to increased investor recognition. Cross-listed firms that do not succeed in widening their U.S. investor base are not valued at a premium relative to non-cross-listed companies. The fit of the regression also increases from 16.9 to 20.4%, suggesting that the *INS_NUM* variable explains considerable cross-sectional variation.

We examine threshold effects of the impact of investor recognition on valuation by separating the number of investors into two dummy variables: one identifying cross-listed firms that have more than the median predicted number of U.S. investors in a given year (*INUMHI*), and one identifying cross-listed firms with less than the median predicted number of U.S. investors (*INUMLO*). Column 3 of Table 3 shows that the coefficient on *INUMHI* (0.342) is positive and significant while the coefficient on *INUMLO* (−0.003) is not different from zero. In addition, the coefficient on *XLIST* remains not significant. These findings further suggest that the valuation premium to cross-listed companies accrues primarily to firms with increased investor recognition. Cross-listed firms that fail to widen their U.S. shareholder base exhibit similar valuations to non-cross-listed firms.

Column 4 of Table 3 examines the cross-sectional impact of investor recognition controlling for ownership structure by including two interaction terms: one between *DUALCLASS* and *XLIST*, termed *XDC*, and one between *DUALCLASS* and *INS_NUM*. As before, the coefficient on *XLIST* is not significant, the coefficient on *INS_NUM* (0.163) is positive and significant, and the

coefficient on *DUALCLASS* (−0.261) is negative and significant. The coefficient on *XDC* (0.474) is positive and significant and the sum of *XDC* and *XLIST* (0.420) is positive and significant. These two findings suggest that cross-listed firms with dual-class shares trade at a premium relative to dual-class firms that are not cross-listed. This valuation premium is consistent with the firm-level bonding hypothesis of Doidge, Karolyi, and Stulz (2004) that suggests part of the benefit associated with cross-listing may reflect better monitoring of controlling shareholders. Further, a chi-squared test does not reject the hypothesis that the linear combination of the coefficients *DUALCLASS* + *XLIST* + *XDC* (0.159) is equal to zero, implying that firms with dual-class shares are no longer valued at a discount relative to firms with one-share-one-vote structures following cross-listing.

The interaction of *DUALCLASS* with *INS_NUM* (−0.112) is negative and significant, implying that the benefit of increased investor recognition is lower for dual-class firms relative to other cross-listed firms. This finding is consistent with investors assigning a higher risk premium to dual-class firms, consistent with Claessens et al. (2002), Cronqvist and Nilsson (2003), Lins (2003), and Lemmon and Lins (2003). In addition, the sum of *INS_NUM* and its interaction with *DUALCLASS* (0.051), which measures the overall impact of investor recognition on the valuation of dual-class firms, is not significantly different from zero. This finding suggests that the valuation premium for the average dual-class firm is not related to the degree of investor recognition.

Finally, column 5 of Table 3 shows the regression results of Tobin's q on *INUMHI* and *INUMLO* and their interaction with the *DUALCLASS* dummy. As before, *XLIST* is not significant and *XDC* (0.412) is positive and significant, and the coefficients and statistical significance on *INUMHI* (0.397) and *INUMLO* (0.035) are relatively unchanged. The interaction of *INUMHI* with *DUALCLASS* (−0.343) is negative and significant, confirming that the valuation benefit of greater investor recognition is lower for cross-listed dual-class firms. The coefficient on the interaction variable of *DUALCLASS* and *INUMLO* (−0.208) is negative but not significant. In addition, the linear combinations of the interaction coefficients with either *INUMHI* or *INUMLO* are not statistically different from zero, confirming that the increase in valuation associated with cross-listing for dual-class firms does not vary with the level of investor recognition.

Overall, the findings in Table 3 suggest that the increase in valuation associated with cross-listing may be explained by the two competing hypotheses: the investor recognition hypothesis and the firm-level bonding hypothesis. Cross-listed firms with a one-share-one-vote structure exhibit higher valuations relative to non-cross-listed firms, and the valuation premium is increasing in the degree of investor recognition. Further, it appears that the entire valuation premium from cross-listing is explained by investor recognition after controlling for firm-level characteristics. Firms with dual-class shares, however, exhibit a valuation premium following cross-listing

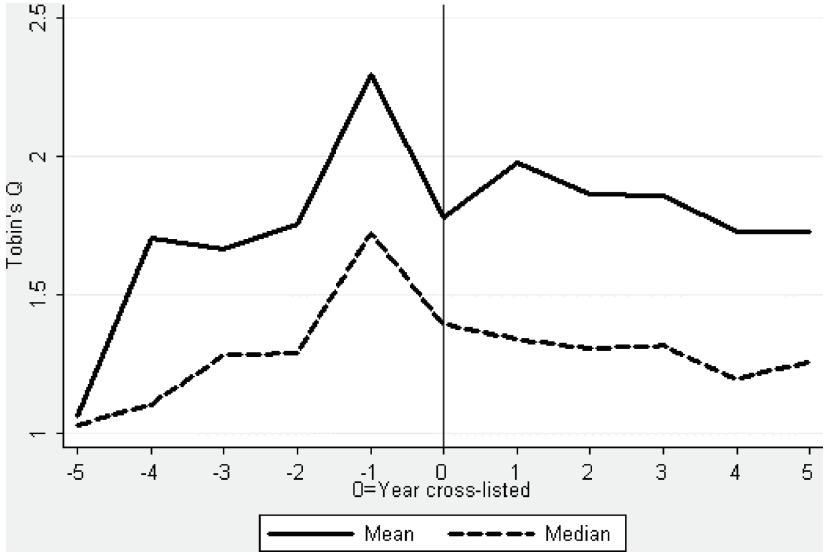


Figure 2
Change in Tobin's q around cross-listing

independently of investor recognition, consistent with a firm-level bonding effect due to greater monitoring of controlling shareholders. Furthermore, when there is a potential impact of both firm-level bonding and investor recognition for firms with agency problems (i.e., dual-class firms), we find that the firm-level bonding effect dominates; in fact, the valuation premium for cross-listed dual-class firms does not vary with the degree of investor recognition.

3.4 Times-series impact of investor recognition on Tobin's q

The regressions in Table 3 show that the cross-sectional valuation premium of cross-listing depends in part on investor recognition. These regressions, however, do not address whether the effects of cross-listing on a firm's valuation are permanent or transitory. In this section we examine how the valuation premium due to investor recognition varies over time.

To motivate this analysis, Figure 2 shows the evolution of the mean and median Tobin's q ratio over the five years before and after cross-listing for 148 Canadian firms that first cross-listed on a U.S. exchange between 1988 and 2005. Both the mean and median valuation peak in the year prior to cross-listing (*XLIST* year $= -1$), then decline monotonically in subsequent years. While an announcement effect of cross-listing may explain part of the run-up close to the event, the outperformance appears to begin several years prior to cross-listing, suggesting that firms decide to cross-list following a period of strong performance.

Table 4
Time series impact of investor recognition on Tobin's q

Sample	All firms			*DUALCLASS* only	
Variable	1	2	3	4	5
Constant	3.236***	3.326***	3.323***	2.952***	2.952***
Log of assets	−0.294***	−0.328***	−0.329***	−0.291***	−0.288***
Sales growth	0.101***	0.101***	0.103***	−0.019	−0.025
Leverage	−0.213***	−0.172**	−0.159**	0.345***	0.346***
ROA	0.080	0.068	0.059	−0.181	−0.162
DUALCLASS	−0.264***	−0.235***	−0.239***		
Predicted *XLIST*	0.001	−0.029	−0.074	0.610***	0.676***
XDC	0.191	0.253	0.245		
CYR −2	0.310**	0.281**	0.367***	0.218	0.131
CYR −1	0.722***	0.681***	0.772***	0.459***	0.356***
CYR 0	0.199**	−0.187**		0.109	
CYR 1	0.379***	−0.017		0.215∗	
CYR 2	0.204**	−0.218**		0.157	
CYR 3+	0.305***	−0.199**		0.125	
INS_NUM		0.224***			
INS_NUM in *CYR* 0			0.207***		0.034
INS_NUM in *CYR* 1			0.189***		0.010
INS_NUM in *CYR* 2			0.132***		−0.025
INS_NUM in *CYR* 3+			0.195***		−0.004
Industry dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
N	7, 070	7, 070	7, 070	1, 328	1, 328
Overall R^2	0.190	0.207	0.201	0.160	0.166
Chi-squared	936	1, 025	1, 022	179	189

This table reports results of three-stage least-squares regressions that estimate the impact of cross-listing on Tobin's q over time, controlling for the decision to cross-list and investor recognition. The sample consists of cross-listed and non-cross-listed Canadian firms from 1988 to 2005 in columns 1–3, and dual-class firms only in columns 4 and 5. *CYR* −2 to *CYR* 3+ are dummy variables based on the year relative to cross-listing, where *CYR* 0 is the year of listing on a U.S. stock exchange. *CYR* 3+ takes the value of 1 if the year post-cross-listing is 3 and so on. The variables *INS_NUM* in *CYR i* ($i = 0, 1, 2, 3$) are coded as the predicted value of *INS_NUM* in *CYR i* post-cross-listing and 0 otherwise. All other variables are defined in Table 3. Industry and year dummies are included but not shown. The regressions are estimated using panel data with firm random effects. *, **, *** indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 4 presents regressions quantifying the valuation premium over time. Column 1 shows the regression results of Tobin's q on the control variables and a dummy variable for each year relative to the year of cross-listing.[22] For example, *CYR* 0 is the actual year of cross-listing, *CYR* 1 is the first year following cross-listing, and so on.[23] The regression includes the *CYR* dummies from two years before cross-listing, and so on. Thus, the valuation in year 3 or earlier prior to cross-listing is captured by the intercept. The control variables have the same sign, magnitude, and statistical significance as in Table 3. The coefficients on the *CYR* dummies are positive and significant, suggesting a prelisting run-up that starts at *CYR* −2 (0.310), peaks in *CYR* −1 (0.722), and then declines post-cross-listing. The positive and significant coefficients on *CYR* 1 through *CYR* 3 imply a higher valuation on average relative to

[22] We code these dummy variables based on the actual year of cross-listing, as the predicted values of *XLIST* only provide a probability of being listed in a given year and cannot be used to generate these dummies.

[23] To conserve space, we group years 3 and higher under one dummy variable (*CYR* 3+).

three or more years prior to cross-listing.[24] The coefficient on *CYR* 3 (0.305) implies that there is a permanent gain in valuation of 9.4% for cross-listed firms relative to their valuations three years prior to cross-listing. This conclusion is reinforced by the observations that *CYR* 3 (which includes the third year and on post-cross-listing) identifies the average effect for almost three-quarters of the observations of cross-listed firms in our sample. The *XLIST* variable identifying the predicted probability of cross-listing is not significant as the explanatory power is picked up by the *CYR* dummies. While the interaction with dual-class (*XDC*) is not significant, the linear combination of *DUALCLASS*, *XLIST*, and *XDC* is not significantly different from zero, confirming the valuation premium to cross-listed firms with dual-class shares. The sum of *DUALCLASS*, *XLIST*, and *XDC* is not significantly different from zero throughout the following regressions.

In column 2 of Table 4, we examine how increased investor recognition affects this pattern over time. We include the predicted number of U.S. investors, *INS_NUM*, and find that it is positive and significant (0.224), confirming the results in Table 3. Interestingly, the *CYR* dummies change signs, and are negative and significant in *CYR* 0, *CYR* 2, and *CYR* 3+. These negative coefficients must be interpreted carefully, as they imply that firms that do not widen their shareholder base (where $INS\_NUM = 0$) experience a post-listing decline in valuation consistent with the pattern found in Foerster and Karolyi (1999), Gozzi, Levine, and Schmukler (2005), Mittoo (2003), and Sarkissian and Schill (forthcoming). In contrast, firms that succeed in widening their shareholder base experience permanent gains. For example, a cross-listed firm that attracts the mean number of U.S. investors has a premium valuation in *CYR* 3+ of 18.2% on average, consistent with the predictions of Merton's (1987) investor recognition hypothesis.[25] This premium is similar in magnitude to the premium reported in Doidge, Karolyi, and Stulz (2004).

In column 3 of Table 4, we replace the *CYR* dummies and *INS_NUM* with threshold variables that measure the degree of investor recognition in each year after cross-listing. Specifically, these variables are coded as the predicted value of *INS_NUM* in the ith year ($i = 0, 1, 2, 3$) after cross-listing and zero otherwise. Consistent with the view that widening the U.S. shareholder base leads to increases in valuation, the coefficients are positive and significant in each year, suggesting higher investor recognition is associated with higher valuations postlisting. A similar pattern emerges when we replace the number of investors in each year after cross-listing with the *INUMHI* and *INUMLO* dummies (results not shown). Firms that have more than the median predicted number of U.S. investors have positive and significant valuation premium

[24] Note that the overall premium in each year post-cross-listing is computed as the sum of the *CYR* dummy and *XLIST*, which are all positive and significant.

[25] The mean predicted number of U.S. investors is 36. The average premium on Tobin's q in *CYR* 3+ is therefore $\ln(36)*0.224-0.199 = 0.604$, which implies an 18.2% premium over the constant in this regression of 3.326.

in each year post-cross-listing, whereas cross-listed firms that fail to attract higher than the median predicted number of U.S. investors do not trade at a premium.

Column 4 of Table 4 replicates the analysis in column 1 using only dual-class firms. The coefficient on *XLIST* (0.610) is positive and significant, and the *CYR* 0 through *CYR* 3 dummies are all positive. The sums of the *CYR* dummies and *XLIST* are all positive and significant, indicating that cross-listed dual-class firms enjoy permanent valuation gains relative to non-cross-listed dual-class firms. Finally, column 5 replicates the analysis in column 3 using only dual-class firms. The *XLIST* variable is positive and significant (0.676), implying that Tobin's q ratios of cross-listed dual-class firms are 20.1% higher on average without taking into account the increase in the U.S. investor base. The pre-listing run-up for dual-class firms is also positive and significant. Unlike the case in column 3, however, all of the coefficients on the predicted value of *INS_NUM* in the years after cross-listing are not significant, implying that there is no systematic variation in valuations for dual-class firms based on levels of investor recognition. This finding confirms the results in Table 3 that firms with dual-class shares get a valuation premium that does not vary based on the size of their U.S. investor base. Thus, the results imply that for these firms it is the impact of firm-level bonding following cross-listing and not investor recognition that is associated with higher valuations.

Overall, the results suggest that the permanent effect of cross-listing on a firm's valuation is conditional on firm characteristics, investor recognition, and ownership structure. First, firms with a one-share-one-vote structure appear to cross-list on U.S. exchanges following a prelisting run-up in their Tobin's q ratios. Second, consistent with the investor recognition hypothesis, only firms that succeed in widening their U.S. investor base significantly get a permanent increase in their valuations relative to non-cross-listed firms. Canadian firms that attract few or no U.S. investors experience a postlisting decline in Tobin's q and do not exhibit higher valuations relative to non-cross-listed companies. Third, the impact of cross-listing on firms with dual-class shares is different. These firms begin with lower valuations, consistent with investors charging a higher risk premium to offset the greater risk of expropriation by controlling shareholders. The decision to cross-list leads to a significant increase in valuation and this premium does not vary with the level of investor recognition. Further, the increase in valuation appears to be permanent, consistent with a firm-level bonding effect.

3.5 Robustness using only firms that cross-list between 1988 and 2005

The analysis thus far has addressed endogeneity in both the decision to cross-list and the foreign holdings of U.S. investors by predicting these variables and including them in the main regressions. In this section, we check the robustness of our results in Tables 3 and 4 by addressing the endogeneity issues differently. Rather than comparing cross-listed firms with

Table 5
Regressions using only firms that cross-listed between 1988 and 2005

Variable	1	2	3	4	5
Constant	3.596***	3.720***	3.921***	3.443***	3.542***
Log of assets	−0.340***	−0.353***	−0.289***	−0.246***	−0.357***
Sales growth	0.219***	0.217***	0.222***	0.244***	0.224***
Leverage	−0.697***	−0.719***	−0.846***	−0.966***	−0.745***
ROA	−0.031	−0.067	−0.016	0.07	−0.06
DUALCLASS	−0.274*	−0.523**	−0.520**	−0.516**	−0.493**
CYR −2	0.096	0.088	0.093	0.182	0.122
CYR −1	0.484***	0.493***	0.464***	0.585***	0.537***
XLIST dummy	−0.282**	−0.449***			−0.366**
LOGINS_NUM	0.264***	0.323***			
XDC		0.811***			0.852***
INS_NUM∗*DUALCLASS*		−0.244***			
INUMHI			0.281***		
INUMLO			−0.163		
INUMHI∗*DUALCLASS*			−0.041		
INUMLO∗*DUALCLASS*			0.441**		
CYR 0				0.058	
CYR 1				0.237	
CYR 2				0.078	
CYR 3				0.264∗	
CYR 0∗*DUALCLASS*				0.044	
CYR 1∗*DUALCLASS*				0.055	
CYR 2∗*DUALCLASS*				0.317	
CYR 3∗*DUALCLASS*				0.210	
INS_NUM in *CYR* 0					0.305***
INS_NUM in *CYR* 1					0.305***
INS_NUM in *CYR* 2					0.256***
INS_NUM in *CYR* 3					0.356***
INS_NUM in *CYR* 0∗*DUALCLASS*					−0.349***
INS_NUM in *CYR* 1∗*DUALCLASS*					−0.347***
INS_NUM in *CYR* 2∗*DUALCLASS*					−0.235***
INS_NUM in *CYR* 3∗*DUALCLASS*					−0.240***
Industry dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
N	1, 352	1, 352	1, 352	1, 352	1, 352
Overall R^2	0.318	0.330	0.289	0.27	0.340
Chi-squared	362	383	320	297	400

This table reports results of random-effects regressions that estimate the impact of cross-listing on Tobin's q. The sample is restricted to the observations of firms that first cross-listed from 1988 to 2005. *XLIST* is dummy variable equal to 1 if the firm is cross-listed on a U.S. stock exchange and 0 otherwise. *LOGINS_NUM* is the log of the actual number of U.S. institutional investors. All other variables are defined in Table 4. Industry and year dummies are included but not shown. The regressions are estimated using panel data with firm random effects. *, **, *** indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

non-cross-listed firms, we compare the cross-listed firms against their own history by looking at their valuation before and after cross-listing.

We identify all firms in our sample that cross-listed for the first time between 1988 and 2005. Firms that were cross-listed prior to 1988 are not included as we do not observe their valuation prior to cross-listing. We exclude firms that cross-list at the time of an initial public offering or following a spin-off for the same reason. These restrictions reduce our sample to 1,352 observations for 206 firms, where the median firm is in the sample for six years.

Table 5 repeats the main results from Tables 3 and 4, but with two key differences. First, instead of using the predicted probability of cross-listing

from Table 2, we use a dummy variable (*XLIST*) set to 1 if the firm is actually cross-listed and 0 otherwise. Second, we use the log of actual number of U.S. investors holding the stock as opposed to the predicted values.[26] We confirm that the results below are robust when using the predicted number of investors instead of the actual values.

Column 1 of Table 5 shows regressions of Tobin's q on the control variables, the dummy variable *DUALCLASS*, dummies for *CYR* −2 and *CYR* −1, the *XLIST* dummy, and the log of the actual number of U.S. investors, *INS_NUM*. The controls have the same sign and significance as before, with Tobin's q negatively related to firm size and leverage, and positively related to growth opportunities. The coefficient on *DUALCLASS* (−0.274) is negative and significant, corroborating our finding that firms with dual-class shares are valued at a discount. The coefficient on the dummy *CYR* −1 (0.484) is positive and significant, consistent with a prelisting run-up. The *XLIST* dummy (−0.282) is negative and significant, consistent with the postlisting decline shown in Foerster and Karolyi (1999), Gozzi, Levine, and Schmukler (2005), Mittoo (2003), and Sarkissian and Schill (forthcoming). The coefficient on *INS_NUM* (0.264) is positive and significant, implying that cross-listed firms with the mean number of U.S. investors have a Tobin's q ratio that is 8% higher on average post-cross-listing.

Column 2 of Table 5 considers how the effect of cross-listing on firm valuations varies based on ownership structure. We include the interaction of *XLIST* with *DUALCLASS*, *XDC*, and the interaction of *DUALCLASS* with *INS_NUM*. As in column 1, *XLIST* (−0.449) is negative and significant and *INS_NUM* (0.323) is positive and significant. The interaction term *XDC* (0.811) is positive and significant, implying that dual-class firms that cross-list exhibit significantly higher valuations than non-cross-listed dual-class firms. Also, the linear combination of the coefficients *DUALCLASS*, *XLIST*, and *XDC* is not significantly different from zero, implying that cross-listed firms with dual-class shares are valued similarly to one-share-one-vote firms prior to cross-listing. The interaction of *INS_NUM* with *DUALCLASS* (−0.244) is negative and significant, and the sum of the interaction term and *INS_NUM* is not significantly different from zero, implying that the valuation of cross-listed firms with dual-class shares does not vary based on the level of investor recognition, confirming our findings above.

Next we examine the impact of investor recognition and firm-level bonding on the valuation of cross-listed firms in column 3 of Table 5. We classify the cross-listed firms into two groups based on the level of investor recognition. We code *INUMHI* (*INUMLO*) as 1 if the firm has more (less) than the median

[26] The actual and predicted numbers of U.S. investors have a correlation of 86% with similar means (36 for actual *INS_NUM* versus 35 for predicted *INS_NUM*), but with greater dispersion and negative skewness in the actual *INS_NUM* as there are more observations with no U.S. investors.

number of institutional investors and 0 otherwise.[27] We also interact *INUMHI* and *INUMLO* with the *DUALCLASS* dummy to examine the effect of investor recognition on the valuation of dual-class firms. The coefficient on *INUMHI* (0.281) is positive and significant while the coefficient on *INUMLO* (−0.163) is not significant. These findings confirm that only cross-listed firms that are successful in attracting investor recognition get a valuation premium post cross-listing. We examine the impact of investor recognition on dual-class firms by computing the sum of *INUMHI* (*INUMLO*) and the interaction with *DUALCLASS*. The sum of *INUMHI* and its interaction with *DUALCLASS* (0.240) is positive and significant and the sum of *INUMLO* and its interaction with *DUALCLASS* (0.278) is also positive and significant. Further, the two sums are not statistically different from each other. These findings provide additional evidence that dual-class firms are valued at a premium post cross-listing relative to dual-class shares that are not cross-listed, and that the valuation premium does not vary with the level of investor recognition.

Column 4 of Table 5 shows the analysis of the valuation premium over time independently of investor recognition. As before, *CYR i*, ($i = 0, 1, 2$) is a dummy set to 1 in the *i*th year of cross-listing and 0 otherwise. *CYR* 3 is a dummy with 1 for all years after year 2 and 0 otherwise. The results show that the coefficients on the *CYR* dummies are positive; yet, only *CYR* 3 (0.264) is significant at the 10% level. Thus, given that most of the observations in our sample are cross-listed more than two years, there appears to be a permanent valuation premium to cross-listed firms. The interaction of the *CYR* dummies with *DUALCLASS* gives the marginal premium to dual-class firms, and the sums of the *CYR* dummies with their interactions give the overall premium to dual-class firms. Although the interaction terms are not significantly different from zero, the sum of *CYR* 3 and its interaction with *DUALCLASS* is positive and significant (at less than 5%), indicating that dual-class firms exhibit a permanent valuation premium following cross-listing.

Finally, column 5 of Table 5 considers the effect of investor recognition on the time-series property of the valuation premium. We regress Tobin's q on the control variables, *XLIST*, *XDC*, and the level of investor recognition in each of the years post-cross-listing. In addition, we interact the latter variables with the *DUALCLASS* dummy. As before, the coefficient on *XLIST* (−0.366) is negative and significant whereas the coefficient on *XDC* (0.852) is positive and significant. In addition, the sum of *XDC* and *XLIST* (0.486) is positive and significant, indicating that cross-listed dual-class firms have higher valuations post cross-listing. The coefficients on the level of investor recognition in each of the years post-cross-listing are all positive and significant, indicating a positive association between the level of investor recognition and the valuation premium post-cross-listing. The coefficients on the interactions of the levels of investor

[27] We do not include the *XLIST* dummy in the regression because the sum of *INUMHI* and *INUMLO* is 1 for cross-listed firms and 0 otherwise.

recognition with the *DUALCLASS* dummy are all negative and significant, and the sum of the coefficients on these interactions and the coefficients on the level of investor recognition are not significantly different from zero. These results again confirm that the higher valuations for dual-class firms do not vary based on the level of investor recognition.

3.6 Sensitivity analyses

We examine the robustness of our results in several ways. First, we replicate all the regressions using the predicted value of percentage holdings of U.S. institutional investors in Tables 3 and 4, and the actual values in Table 5. The results are very similar to those reported. Second, we examine whether our results are robust to the way we control for endogeneity in the decision to cross-list by using a matched sample. Specifically, the sample is constructed using one-to-one matching (without replacement) of cross-listed firms with non-cross-listed firms based on year, firm size measured by total assets, and industry membership using the first two digits of the North-American Industry Classification System codes. The results are similar with one important exception; the impact of investor recognition on the valuation premium wears off after two years, controlling for firm characteristics. There are two possible explanations for the divergence in the results: (1) the matched sample is much smaller—2,802 firm-year observations as opposed to 7,070—providing less power to these tests, particularly as the number of observations post-cross-listing declines; (2) the matching process does not control for other important variables that are related to the decision to cross-list, such as foreign sales, growth opportunities, and ownership structure. Third, we examine whether the results change in the matched sample analysis when we control for the presence of a controlling shareholder at the 20% threshold and a single class of shares. We find that controlling for concentrated ownership does not affect any of the results.

4. Conclusion

This study examines the cross-sectional and time-varying impact of investor recognition and firm-level bonding on the valuation of Canadian firms cross-listed on a U.S. exchange. Canada provides a unique setting to disentangle these competing hypotheses, as it features similar levels of investor protection and disclosure as the United States, but offers a larger cross-section of dual-class firms—both cross-listed on a U.S. exchange and listed exclusively in the home market—where the incentives of controlling and minority shareholders diverge. We show that increased valuations associated with greater investor recognition following a U.S. listing are conditional on the widening of the U.S. shareholder base. Consistent with the findings in Baker, Nofsinger, and Weaver (2002) and Foerster and Karolyi (1999), we find that the valuation of cross-listed Canadian firms increases with both the number and proportional holdings of U.S. institutional investors. We show cross-sectionally, however,

that not all firms exhibit higher valuations following a U.S. listing. The firms that benefit most are the ones that are the most successful in broadening their U.S. investor base. Canadian firms that cross-list and attract few or no U.S. investors are valued no differently than non-cross-listed firms after controlling for firm characteristics.

Using panel regressions, we examine the impact of cross-listing on valuation over time. In contrast to earlier studies, we find that the effects of greater investor recognition are permanent, not transitory. Canadian firms that attract and maintain a high level of U.S. institutional investor holdings experience a permanent increase in valuation. Canadian firms that fail to sustain a wider U.S. investor base experience a postlisting decline, with valuations similar to prelisting levels within two years of cross-listing. This result is robust when we examine the valuations of cross-listed firms before and after their U.S. listing.

We also provide evidence that investor recognition and firm-level bonding are distinct but related effects. We disentangle these effects by focusing on the impact of cross-listing on the valuation of firms that use dual-class shares to separate cash-flow rights from control rights. We find that Canadian firms with dual-class shares benefit relatively more from cross-listing. We also show that this premium from cross-listing does not depend on whether these firms succeed or not in expanding their U.S. shareholder base. In particular, dual-class firms that attract few or no U.S. investors exhibit higher valuations post-cross-listing, consistent with the firm-level bonding effect proposed by Doidge, Karolyi, and Stulz (2004). This result is consistent with a U.S. listing improving the monitoring of controlling shareholders and reducing the risk of expropriation of minority shareholders for firms where the agency conflicts are most acute.

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