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Department of Economics  
Tufts University  
Medford, MA 02155  
(617) 627-3560  
<http://ase.tufts.edu/econ>

# Cross-listing Premium in the US and the UK Destination

Marcelo Bianconi  
*Department of Economics*  
*Tufts University*

Liang Tan  
*Kellogg School of Management*  
*Northwestern University*

## Abstract

This paper tests the main hypothesis that firms that cross-list have higher valuations, and provides evidence on the valuation effect of cross-listing on a major non-US market, the UK compared to the US market from source countries in the Asia-Pacific region in 2003-2004. We find evidence that there is a cross-listing premium in both markets. However, the evidence on whether the premium is significantly different in the two countries is mixed. Using univariate, OLS and random effects methods, we find some evidence that the premium in the US is higher, but using a treatment effect methodology we find that the difference is not robust.

## Mailing Addresses:

Marcelo Bianconi  
Tufts University  
Department of Economics  
111 Braker Hall  
Medford, MA 02155 USA  
Ph. (617) 627-2677;  
Fax (617) 627-3917;  
E-Mail: [marcelo.bianconi@tufts.edu](mailto:marcelo.bianconi@tufts.edu)  
Web Page: [www.tufts.edu/~mbiancon](http://www.tufts.edu/~mbiancon)

Liang Tan  
Department of Accounting Information  
and Management  
Kellogg School of Management  
Northwestern University  
2001 Sheridan Road  
Evanston, IL 60208  
E-Mail:  
[liang-tan@kellogg.northwestern.edu](mailto:liang-tan@kellogg.northwestern.edu)

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## 1. Introduction

Over the past two decades, an increasing number of firms, especially those from the emerging market countries, has cross-listed their shares on the major foreign stock exchanges around the world. Based on the Annual Report and Statistics from the World Federation of Exchanges, Table 1 shows that up until 2004, there were 2,632 foreign listings in the world's 50 major stock exchanges. The total value of shares trading for foreign firms has increased to US\$4,987,018 million, which accounts for 12% of total value of share trading around the world. In 2004 alone, 253 new foreign stocks were issued to the international capital markets.

This trend has caused tremendous competition among major stock exchanges around the world.<sup>1</sup> However, not all stock exchanges have equal appeal and foreign listings cluster in the United States and the United Kingdom. There are three major stock exchanges in the two countries, NYSE, NASDAQ and LSE, which are the three largest stock exchanges in the world in terms of average daily turnover (Table 1). Figure 1 shows that those three stock exchanges had approximately a US\$25 billion value of share trading in 2004. This accounted for 61% of the total value of share trading around the world. About 1,150 foreign companies were listing on these two destinations in 2004, which accounted for 44% of the total foreign stock cross-listings.

A main motive for cross-listing is a firm's need for capital funds. Several important questions emerge: Why do some but not other foreign firms want to

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<sup>1</sup> E.g. Santos and Scheinkman (2001) provide a solid theoretical framework for this mechanism and its implications; see also Coffee (2002).

cross-list their shares overseas? What are the trade-offs for firms when choosing between the US and the UK as their cross-listing destinations?

In an important recent paper, Doidge et al (2004) find, for a sample of 40 countries, that "...at the end of 1997, foreign companies with shares cross-listed in the U.S. had Tobin's q ratios that were 16.5% higher than the q ratios of non-cross-listed firms from the same country." In this paper, we take a further step. We present evidence for a sample of 6 source countries in the Asia-Pacific region in 2003-2004 comparing the cross-listing premium in the US versus the UK destination. Our sample of source nations includes: Australia, China, India, Japan, Korea and Taiwan; e.g. Figure 2.<sup>2</sup> Our main idea is that source countries geography and proximity may matter for cross-listing destination premium. Firms may follow the leaders in a geographic region and follow the trends in cross-listing destination. For example, given the closer ties and proximity between Latin America and North America, firms in Latin America may choose the US destination. In the British sphere, firms may choose the UK destination. We chose the Asia-Pacific region, including China, where there is not a strict clear pattern of ties in terms of proximity to the US and the UK.<sup>3</sup>

One would expect that the more (less) stringent the corporate governance arrangement in the listing destination, the higher (lower) the increase in valuation for cross-listing firms. In particular, because the corporate governance standards are higher in both the US and the UK relative to the rest of the world, firms choosing to

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<sup>2</sup> Most notable in our study is the focus on the specific geographic region of source companies, and the inclusion of China in the sample.

<sup>3</sup> In our sample, 13 large companies, including Honda, Sony and Toyota in Japan cross-list both in the US and the UK destination, and are possibly trend setters in the region. Froot and Dabora (1999) show evidence of arbitrage opportunities in multi-listing cases.

cross-list in those two destinations should have a higher increase in valuation, i.e., a cross-listing premium. From an accounting perspective, the US has better investor protection than the UK; hence we would expect the cross-listing premium to be higher for firms listing in the US than those listing in the UK. A recent paper by Doidge, Karolyi and Stulz (2007) also provide, among other things, an analysis of the "cross-listing premium" differences between the US and London.<sup>4</sup> Their sample of source countries is very large and broad and they find a significant difference in favor of US cross-listing versus London cross-listing. Our results indicate that in the restricted Asia-Pacific geographic region, it is less clear whether or not a significant difference between US and UK premium remains, given that trend setters from the region cross-list in both destinations.

Based on a country panel dataset, which includes 4,491 firms' valuation observations from the six Asia-Pacific countries, we present empirical evidence on US and UK cross-listing premiums with univariate and multivariate econometric analysis. The empirical evidence presented is consistent with the hypothesis that cross-listing commands a premium both in the US and the UK. However, we find that the evidence on the difference in premium across the US and UK is mixed. Using univariate, OLS and random effects models we found a significant difference; with premiums in the US larger than the UK, consistent with Doidge et al (2007). However, using a treatment effects methodology, this difference is not robust. Hence, geography and proximity may be factors that mitigate the corporate governance effects of

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<sup>4</sup> After completion of this paper, we became aware of the paper by Doidge, Karolyi and Stulz (2007).

cross-listing. Our evidence indicates that, both in the US and UK unobserved factors account for a negative correlation between the likelihood of cross-listing and valuation, but observables show that cross-listing commands a premium on valuation.

The rest of the paper is organized as follows. In the next section, we review the previous research on international listing. In section 3, we compare the listing requirements and costs between the US and the UK. Then, in Section 4 we discuss a simple model based on Doidge et al (2004) and develop the main hypothesis. Section 5 describes the data and the empirical results are presented in Section 6. The last section offers concluding remarks; and an appendix provides details about the econometric methodology.

## **2. The reasons for international listing**

Why do firms want to cross-list? We summarize four common explanations here.<sup>5</sup>

### **2.1 Market Segmentation Hypothesis**

The market segmentation hypothesis is the most oft-cited reason for cross-listing. It is claimed that it allows investors to avoid cross-border barriers to investment. Those barriers may come from regulatory restrictions, information problems such as uninformative accounting practices or simply from the lack of knowledge about a security (e.g. Merton 1987). Removing the barriers and integrating markets would allow for more efficient diversification and lower the risk of a security. Based on this

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<sup>5</sup> Karolyi (1998, 2005) did a thorough review of the cross-listing literature; see also Tomunen and Tortsilla (2005) for a study of the relationship between cross-listing and mergers and acquisitions.

hypothesis, a firm's stock price will rise, and the cost of capital will decline in response to the cross-listing.

Two seminal studies of this literature are Foerster and Karolyi (1999) and Miller (1999). Foerster and Karolyi (1999) examine weekly abnormal returns for two years before and after the US cross-listing by establishing an American Depositary Receipt (ADR) program.<sup>6</sup> The result is firms that cross-list through ADR issuance eventually experience an unexpected increase in their stock price, of about 10% in the year before the listing. However, this unexpected increase is followed by a decrease of some 9% in the year after listing. Miller's (1999) study focuses on the 80 days around the cross-listing event and finds a positive 1.15% average abnormal return for 183 ADRs between 1985 and 1995. Other studies, like Alexander, Eun and Janakiramanan (1988), Foerster and Karolyi (1993), Jayaraman, Shastri and Tandon (1993), all use a similar approach to examine the stock price reaction when firms cross-list in the US. The evidence is of a positive price reaction to cross-listing. In addition, Alexander, Eun and Janakiramanan (1987), Foerster and Karolyi (1993, 1999), Jayaraman, Narayanan, Shastri and Tandon (1993), Karolyi (1998), and Errunza and Miller (2000) all find evidence that confirms the prediction that the cost of capital declines following the cross-listing.

## **2.2 Liquidity Hypothesis**

Cross-listing can also be explained by a liquidity argument. From a stock trader's perspective, the greater the liquidity the smaller the spread. Mittoo (1992) presents a

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<sup>6</sup> The ADR program permits individuals in US markets to invest in non-US firms in US dollar-denominated receipts redeemable by specialized US financial institutions (Depositories) in the underlying shares.

market survey, which shows that managers of foreign companies cite increased trading liquidity (28% of respondents) as a primary factor in their decision to cross-list. Cross-listing would help firms to get access to more investors, which would lead to higher volume. For instance, Tinic and West (1974) find that 112 Canadian stocks cross-listed on US exchanges have lower bid-ask spreads than their purely domestically traded counterparts. Amihud and Mendelson (1986) analyze asset pricing and the bid-ask spread using a theoretical model. They proxy the lack of liquidity as the cost of immediately executing a trade and, in their empirical test, they find evidence consistent with increased liquidity from multiple exchange listings. Foerster and Karolyi (1998), Domowitz, Glen and Madhavan (1998), and Smith and Sofianos (1997) all study the impact of US cross-listing on the costs of transacting a particular security, and generally find that spreads decrease and trading volume increases following a cross-listing, both of which reflect an increase in liquidity. Moel (2001) investigates the effect of ADRs on the liquidity as well as other attributes of domestic stock markets. He finds that ADR listings decrease liquidity in domestic stock markets due to increased ADR order flow in US markets.

Although there is mounting evidence that is consistent with the market segmentation hypothesis and the liquidity hypothesis, they face a number of challenges in explaining the trend of cross-listing. The most evident one is that if cross-listing were to overcome the market segmentation and improve liquidity, thus lowering the cost of capital and bid-ask spreads, every foreign firm should choose to



do so. Still, the majority of the public traded firms do not cross-list their shares overseas.

### **2.3 Information Environment**

The information disclosure requirements are often more stringent in the cross-listing destination countries, like the US and the UK. The information environment hypothesis assumes that some form of information asymmetry or market incompleteness exists. Cross-listing to a more stringent disclosure requirement regime allows firms to signal outside investors that they have better prospects than others. Earlier studies on this direction are Cantale (1996), Fuerst (1998) and Moel (1999). They develop theoretical models, which establish the signaling equilibrium in which firms that list on markets with high disclosure standards signal that they are high-value firms. In particular, Fuerst's (1998) model predicts that firms that cross-list in the US will experience abnormal operating performance, especially firms coming from less strict regulatory regimes.<sup>7</sup>

Evidence from empirical studies generally supports the predictions of those theoretical papers. Baker, Nofsinger and Weaver (2002) find that NYSE listings are associated with greater analyst coverage and media hits. Lang, Lins and Miller (2003) compare 235 US cross-listing firms with 4859 non-US cross-listing firms. They find that cross-listed firms have more than twice analysts' coverage than non cross-listed firms, and the accuracy of forecasts increases by 1.36% on average. Moreover, they find that Tobin's  $q$  is much higher for cross listed firms, and is positively associated

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<sup>7</sup> Moel (1999) develops a two-country and two-security market equilibrium model where the security price increases as a function of the level of information disclosure. This model predicts that firms with higher volatility, operating in a low disclosure and low information trading environment, will disclose more information.

with the increased analyst coverage and improved accuracy. Bailey, Karolyi and Salva (2005) use an event study to investigate 427 firms' cumulative absolute abnormal returns and abnormal trading volume before and after US cross-listings. They show that the three-day abnormal return volatility increases from 2.75% to 3.38%. This is significant after controlling for the number of analysts, the forecast surprise relative to the median analyst, and the dispersion of their forecasts.

#### **2.4 Corporate Governance and the “Bonding” Hypothesis**

Coffee (1999, 2002) and Stulz (1999) are the first to point out that corporate governance matters for cross-listing, the so-called “bonding” hypothesis. They argue that firms with poor home country corporate governance often cross-list their securities on stock markets located in countries with more rigorous governance standards. “Bonding” to more rigorous governance standards improves access to capital, which, in turn, lowers the cost of capital and increases the value of the firm. Firms outside the US are generally controlled by large shareholders and, from the perspective of the controlling shareholder, there are costs as well as benefits for cross-listing. Cross-listing limits the ability of the controlling shareholder to take private benefits from their firms, but it also provides external finance, and funds the investment opportunities available. Controlling shareholders are willing to “bond” themselves not to take private benefits when the value of having access to external capital is large relative to the size of private benefits. In such circumstances, firms often have investment opportunities that require external financing.

A sizable literature has tested the bonding hypothesis. Reese and Weisbach (2002), for example, examine the relation between the number of US cross-listings and the level of investor protection in the cross-listed firms' home countries. Their results show that: i. Equity issues increase following all cross-listings, regardless of shareholder protection; ii. The increase is larger for cross-listings from countries with weak protection; iii. Equity issues following cross-listings in the US will tend to be in the US for firms from countries with strong protection, and outside the US for firms from countries with weak protection. To avoid the limitations of event studies, Doidge, et al (2004) take another approach. They examine the firms' valuation premium with and without cross-listing, using Tobin's  $q$  as the measure of valuation. Using data from 40 countries on the valuation samples of 714 cross-listed and 4078 non cross-listed firms in 1997, they find a significant positive valuation premium for firms cross-listed in the US. Doidge (2004) estimates relationships between US cross-listings and the private benefits to insiders controlling the firm. His sample includes 745 firms domiciled in 20 countries over the 1994-2001 periods. A total of 137 of those firms are cross-listed in the US market. He finds that private benefits to insiders decline for firms cross-listed in the US.

### **3. Comparison of Listing Requirements and Costs between US and UK**

In this paper, we adopt the idea of "bonding" and present a theoretical model, followed by empirical tests to further explain how firms make cross-listing decisions, with particular focus on *where* to cross-list, thus comparing the US versus the UK. Listing requirements for the US and the UK stock markets differs greatly. The main

differences are on the accounting standards accepted by the exchanges and the level of disclosure requirements.

In the US, American Depositary Receipts (ADRs) is the primary way for non-US firms to list in the US. It is a negotiable certificate that usually represents a foreign company's publicly traded equity. Depositary Receipts are created when a broker purchases the company's shares on the home stock market and delivers them to the depository's local custodian bank, such as the Bank of New York, Citibank or Morgan Guaranty (now JP Morgan Chase). These financial intermediaries hold the foreign shares denominated in foreign currency and issue the US shares denominated in the US dollars, which are called an ADR. They can be traded freely, just like any other security, either on an exchange or on the over-the-counter market. Such trading alleviates certain obstacles associated with investing directly in the home market of non-U.S. companies. For instance, with ADRs, investors do not have to learn about unfamiliar foreign custody fees or carry out foreign exchange transactions.

There are three levels of ADRs in the US. Each of them represents a different level of disclosure requirement and costs. Table 2 shows the basic differences among the three. Level I ADRs are only traded over-the-counter as Pink Sheet issues. It does not require Generally Accepted Accounting Principles (GAAP) reconciliation. Firms are also exempt from SEC filing under Rule 12g3-2(b), which allows home country accounting statements with adequate English translation. But Level I ADRs are traded with limited liquidity. Level II ADRs require partial GAAP reconciliation for different accounting items. Level III ADRs require full GAAP reconciliation. Both Level II and

Level III require full SEC disclosure with Form 20-F and are the most prestigious and costly type of listing. As only Level II and Level III ADRs have stringent governance requirements, which are also confirmed by empirical studies, such as Doidge et al. (2004), we focus our study on these two types only.<sup>8</sup>

To cross-list in the UK, firms can list their equity directly on the London Stock Exchange's main market or through the Depositary Receipts (DRs), including Global Depositary Receipts (GDRs) and American Depositary Receipts (ADRs), and Euro Depositary Receipts (EDRs), which are denominated in euros. The disclosure requirements are more flexible compared with those in the US. Firms can adopt International Accounting Standards (IAS), US or UK Generally Accepted Accounting Principles (GAAP). And it is often believed that IAS gives managers more discretion to do earning management than US GAAP. Moreover, if firms' stocks are only traded by institutional investors, which are called Professional DRs, the requirements are even less demanding. Firms' financial accounting statements can be prepared under home country GAAP only, and no reconciliation between local GAAP and IAS, US or UK GAAP is required. Even the consolidation for multiple entities' financial statements is not required.

According to the above comparison, generally speaking, the listing requirements for cross-listing in the UK are less stringent than those in the US. Evidence from the previous cross-listing location studies is also consistent with this conclusion. Biddle and Saudagaran (1995), for example, study the reporting and regulatory costs of eight

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<sup>8</sup> There are also Reg S/Rule 144a and OTC pink sheets DRs in the US, but those are not used in our sample.

major listing locations around the world. In their study, they sent out a survey to 200 individuals who are actively involved in the foreign listing process. Those participants included corporate managers, investment bankers, public accountants, stock exchange officials, attorneys and academics. The survey asked them to rank several financial and regulatory factors in the eight countries. As reported in Table 3, the factors included statutory reporting requirements, exchange reporting requirements, capital market expectations, and overall disclosure levels. This study shows that the US has the highest disclosure level, which is higher than the UK.

As shown above, previous studies exclusively focused on the cross-listing destination to the US market.<sup>9</sup> In the UK, the London Stock Exchange (LSE) is one of the largest stock exchanges around the world. Including the LSE allows us to determine whether cross-listing can increase firm's valuation on a non-US market. The difference in the premium and the differential costs for cross-listing either in the US or the UK can help us to explain firm's cross-listing location preference.<sup>10</sup>

#### **4. Theoretical Models**

Recent ownership structure studies have shown that the ownership structure of firms is more concentrated in countries other than the US around the world (e.g. Prowse, 1992; Edwards and Fischer, 1994; La Porta *et al.*, 1998). In many countries, especially developing ones, the primary agency conflict for large corporations is the

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<sup>9</sup> Some new studies focus on cross-listings in Europe and UK and discuss the influence of geographical proximity on cross-listings, e.g. Pagano, Röell, and Zechner (2002), Sarkissian and Schill (2009).

<sup>10</sup> There are other recent papers on cross-listing premium including Gozzi, Levine, and Schmukler (2008), King and Segal (2008), Sarkissian and Schill (2009), Doidge, Karolyi, and Stulz (2008), Halling (2008), Buchanan and English (2007).

one restricting expropriation of minority shareholders by the controlling shareholders, rather than that of restricting empire building by unaccountable managers (Claessens *et al.*, 2002).

In the simple model of Doidge *et al.* (2004), it is assumed that a firm is fully controlled by a single shareholder who has the power to expropriate values from minority shareholders of the firm. The controlling shareholder has cash flow ownership in the firm denominated by  $\alpha > 0$ . It is exogenously determined by the history of the firm. The firm's cash flow is denoted by  $CF$ . The controlling shareholder expropriates share  $v \geq 0$  of the firm's cash flow. Because expropriation is costly, it has a deadweight cost to the firm's cash flow (La Porta *et al.*, 2002). This cost is increasing in both the level of investor protection and in the fraction of cash flow that is expropriated. The cost function is quadratic and given by  $\frac{1}{2}bv^2p$ , where  $b > 0$  is a constant and  $p > 0$  is the investor protection quality that applies to the minority shareholders of the firm from the country that the firm is listed. Thus, the total gain of the controlling shareholder is given by

$$\alpha(1 - v - \frac{1}{2}bv^2p)CF + vCF$$

where the first term is the share of cash flow that the controlling shareholder gets from his equity ownership and the second term is the proportion that he gets from expropriation. The firm has a growth opportunity, denoted by  $g$ . The distribution of growth opportunities across firms is assumed uniform over the interval  $(0, g^{max})$ .

When the controlling shareholder makes a cross-listing decision, she meets a tradeoff problem. On one hand, the firm will fulfill its growth opportunity and get

access to lower cost of capital, taking advantage of risk sharing opportunities. This will increase the firm's valuation and the controlling shareholder will benefit from it. On the other hand, it will become more costly to divert the firm's value in a more stringent corporate governance regime than in the firm's own country; thus decreasing the controlling shareholder's utility. The optimal proportion of cash flow to divert is<sup>11</sup>

$$v^* = \frac{1 - \alpha}{\alpha b p}.$$

Calculation of the firm's valuation using Tobin's  $q$ ; from the minority shareholder's perspective yields

$$q = (1 - v - \frac{1}{2} b v^2 p) CF \text{ if the firm is not cross-listed;}$$

$$q_{CL} = (1 - v_{CL} - \frac{1}{2} b v_{CL}^2 p_{CL})(CF + g), \text{ if the firm is cross-listed to a more stringent corporate governance regime; where the firm realizes its growth opportunity } g \text{ and } p_{CL} > p \text{ is the protection quality at the destination.}$$

First, the main hypothesis is that for  $p_{CL} > p$  ceteris paribus firms that choose to cross-list should command a positive valuation premium, regardless of where they cross-list. Second, ceteris paribus, the higher the corporate governance quality in the destination stock exchange, the higher the cross-listing premium for a firm. In particular, the premium of firms that cross-listed in the US should be higher than that

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<sup>11</sup> This is obtained by the controlling shareholder maximizing her total gain with choice of the share to divert; see eg. Doidge et al 2004. The optimal cross-listing premium is,

$$\phi^* = CF \left( \frac{1 - \alpha^2}{2\alpha^2 b} \left( \frac{1}{p} - \frac{1}{p_{CL}} \right) + g \left( 1 - \frac{1 - \alpha^2}{2\alpha^2 b p_{CL}} \right) \right);$$

and differentiating with respect to  $p_{CL}$ , we get

$$\frac{\partial \phi^*}{\partial p_{CL}} = \frac{1 - \alpha^2}{2\alpha^2 b} (CF + g) \frac{1}{p_{CL}^2} > 0; \text{ where } \phi^* \text{ is strictly concave in } p_{CL} \text{ for the domain } p_{CL} \geq p.$$



of firms cross-listed in the UK, as  $p_{U.S.} > p_{U.K.}$  it implies  $\phi_{U.S.} > \phi_{U.K.}$ . However, differences in the realized growth opportunities across countries may mitigate this effect, that is, even though  $p_{U.S.} > p_{U.K.}$ , in the case where the realized growth opportunity in the UK is large enough relative to the US, or  $\bar{g}_{U.K.} > \bar{g}_{U.S.}$ , the premium difference may be negligible, or  $\phi_{U.S.} \approx \phi_{U.K.}$ .

## 5. Data

In the empirical analysis, the most important variable is Tobin's  $q$ . It measures the valuation of firms and serves as the dependent variable. Following Doidge *et al.* (2004), we calculate the Tobin's  $q$  as follows:

$$TOBIN\_Q_i = \frac{Total\ Liability_i + Market\ Capitalization_i}{Total\ Assets_i},$$

where the denominator is the firm's book value of total assets and the numerator is the firm's book value of total liability plus its market capitalization. All the financial information used above is obtained at the fiscal year-end in 2004. For simplicity and data constraints, this measure does not use the market value of debt in the numerator and uses total assets instead of replacement cost in the denominator, which is the formal definition of Tobin's  $q$ . Another concern for the measurement of  $q$  is that because fast growing firms are more likely to acquire assets, they tend to have a relatively high book value of total assets. Following the work of Hirsch and Seaks (1993), we use the natural logarithm of  $q$  for the dependent variable in the regression analysis.

The independent variables are the two cross-listing dummy variables for the US and UK. They take the value of 1 if cross-listed in the country and 0 otherwise. The

estimated coefficient will represent the cross-listing premium in each destination. We also include several firm-level and country-level variables as controls. First, two firm level variables are used to control for firm's growth opportunities. SG2Y is the geometric mean of a firm's annual sales growth rate in year 2003 and year 2004. INDU\_Q is the median of Tobin's  $q$  level of the selected firms in a certain industry, which is defined by 2-digit SIC code.

COM\_LAW is defined to have the value of 1 if the firm comes from common law origin countries, 0 otherwise. It is the rough proxy for the quality of corporate governance in the source countries. LIQ is the liquidity ratio of the selected countries. It is the dollar value of shares traded in a country's equity markets divided by the country's average market capitalization for the time period. Liquidity ratio is used to control for the liquidity explanation of cross-listing. SIZE is the log of sales (in million US\$) of the firm at the fiscal year-end in 2004 and it captures the firm's size. GDPG is the GDP growth rate of the firm's source country in the year 2004 thus controlling for macroeconomic factors. Table 4 describes the definitions of all the variables used in the regression models.

The sample firms' financial information comes from the *WorldScope* database (July 2005 Edition). This database keeps the financial information of more than 25,000 public traded companies from 62 countries around the world. It represents approximately 95% of global market capitalization.

We focus on firms from the six Asia-Pacific countries, including Australia, China, India, Japan, Korea and Taiwan. The reason to choose those six countries is

geographic since they are all in the Asia-Pacific region, which controls for the proximity factor for cross-listing decisions, plus they have cross-listed firm samples in both the U.S. and the U.K. There are 9,656 such firms in the *WorldScope* database in 2004.

To make firms' characteristic variables more comparable, we select the sample in the following way. First, we only study large firms, which have total assets greater than 100 million (in US\$). According to LaPorta *et al.* (2002), shares of large firms are the most liquid, which undermines the concern that the differences in valuation are due to differences in liquidity.<sup>12</sup> By applying this rule, the sample decreases to 5,963 firms. Then, we exclude observations from the finance, insurance and real estate industries by eliminating firms that have two-digit SIC code from 60 to 67. This is because the valuation ratios of financial institutions are usually not comparable to those of non-financial firms. This leaves us with 5,318 observations. Then, firms should have financial statements in 2004 disclosed in the *WorldScope* database. This is the period in which Tobin's  $q$  is calculated. Firms should also have at least three years of sales data, so that we can calculate the average two-year sales growth rate.<sup>13</sup> Finally, we drop 13 firms that cross-list in both destinations. The final sample contains 4,491 firms. Then, we select the necessary financial information from each firm in the database to calculate *TOBIN\_Q*, *SG2Y*, *INDU\_Q*, and *SIZE*.

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<sup>12</sup> Large firms also have access to substitute mechanisms for limiting their expropriation of minority shareholders and increasing firms' valuation, including public scrutiny, reputation building (Gomes 2000), foreign shareholdings, etc. It may make the effect of cross-listing overseas difficult to observe, and the results more conservative.

<sup>13</sup> An average of sales growth rate gives us a more reliable measure of sales growth than just have one year sales growth rate.

The U.S. cross-listing information comes from the website of Bank of New York (Complete DR Directory). Bank of New York is one of the major custodians of ADR program in US. This bank discloses a complete ADR list. We restrict to Level II and III ADRs only, as the cross-listing literature has shown that only the Level II and III ADRs programs have a higher corporate governance quality (Doidge *et al.* 2004, Schrage and Vaaler 2005). We match the ADRs list from the website with our 4,504 sample firms and obtain the CL\_US dummy. There are totally 55 US only cross-listing observations. We then obtain the list of U.K. cross-listing firms from the London Stock Exchange. After applying the same match technique, we get the CL\_UK dummy, which shows 41 cross-listing records in the UK only.

Data for country-level variables are obtained from several other sources. They include the *World Development Indicator* from the World Bank for the *LIQ* and the *GDPG*, and LaPorta *et al.* (1998) and Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2005) for the *COM\_LAW* dummy.

To reduce the weight of outliers, we follow LaPorta *et al.* (2002) and censor *TOBIN\_Q* at the 2<sup>nd</sup> and 98<sup>th</sup> percentiles by setting extreme values to the 2<sup>nd</sup> and 98<sup>th</sup> percentile values, respectively.

Table 5 shows the descriptive statistics of the final sample. Table 6 provides the pairwise correlation coefficients of the variables.

### **5.1 Empirical Models: OLS and Country Random Effects**

The model predicts that all the cross-listed firms have higher valuation than those not cross-listed. Potentially, firms cross-listed in the US could have a higher valuation

than firms cross-listed in the UK due to better governance, for a given identical realized growth opportunity; however this effect can be mitigated by better realized growth opportunities in the UK for example. We test those hypotheses using both OLS and country random effects by first estimating the following regression model:

$$\begin{aligned}
 TOBIN\_Q_{ic} = & \beta_0 + \beta_1 CL\_US_{ic} + \beta_2 CL\_UK_{ic} \\
 & + \beta_3 SG2Y_{ic} + \beta_4 INDUS\_Q_i + \beta_5 COM\_LAW_c + \beta_6 LIQ_c + a_c + \varepsilon_{ic}
 \end{aligned} \quad (1)$$

where  $c$  indexes country and  $i$  indexes the industry within the country and  $q$  is in logs.

The primary focus is to examine the signs and size of coefficients  $\beta_1$  and  $\beta_2$ . The main hypothesis predicts that  $\beta_1 > 0$ ,  $\beta_2 > 0$  and  $\beta_1 > \beta_2$ . The variable  $SG2Y$  is used to control for the growth opportunity of a specific firm. The variable  $INDUS\_Q$  is used to control for the growth opportunity in a certain industry. Each of them should have a positive coefficient. If the high valuation of cross-listed firms is simply because they have better investment opportunities, controlling for growth opportunity in the regression should make the cross-listing premium disappear. The variable  $COM\_LAW$  separates the countries into two legal origin group, common law group or civil law group. La Porta et al. (2002) have shown that countries with the common law legal origin have better protection of minority shareholders than do countries with civil law legal origin. If this is the case, firms from common law origin countries should have higher valuation and we should observe a positive sign for  $\beta_5$ ,  $\beta_5 > 0$ . The variable  $LIQ$  is used to control for liquidity factor of the source countries. The more liquid a country's capital market, the higher the valuation of the firms that listed in that country, we predict  $\beta_6 > 0$ .

In order to study closely the valuation difference between the two destinations,

we take the difference of the two dummy variables. Let  $DIFF=CL\_US-CL\_UK$  and run regressions on the following specification:

$$\begin{aligned} TOBIN\_Q_{ic} = & \beta_0 + \beta_7 DIFF_{ic} + \beta_3 SG2Y_{ic} + \beta_4 INDUS\_Q_i \\ & + \beta_5 COM\_LAW_c + \beta_6 LIQ_c + a_c + \varepsilon_{ic} \end{aligned} \quad (2)$$

If the effect of an increase in valuation is significantly different between the two destinations, we would observe  $\beta_7 > 0$ .

For each specification, we ran OLS regressions, and then use the country random effects method. The variable  $a_c$  captures all unobserved country factors that affect Tobin\_ $Q_{ic}$ , which do not change across industries.<sup>14</sup> In the random effects case, following Wooldridge (2002), we need to assume  $a_c$  is uncorrelated with each explanatory variable in all industries, i.e.,  $Cov(x_{ic}, a_c) = 0$ , where  $x_{ic}$  stands for any explanatory variable in the previous regression functions. Define the composite error term as  $v_{ic} = a_c + \varepsilon_{ic}$ . As  $a_c$  is in the composite error in each industry, the  $v_{ic}$  are serially correlated across industries, hence we apply the GLS transformation.<sup>15</sup>

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<sup>14</sup> The fixed effects method is not applicable for this dataset, because the country characteristic variables  $COM\_LAW_c$  and  $LIQ_c$  are constant within a given country; if the fixed effects method is used, the two variables will be “differenced away” and the main source of corporate governance identification is lost.

<sup>15</sup> There is a positive serial correlation in the error term, where

$$Corr(v_{ic}, v_{is}) = \frac{\sigma_a^2}{\sigma_a^2 + \sigma_\varepsilon^2}, \quad c \neq s, \quad \sigma_a^2 = Var(a_c), \quad \sigma_\varepsilon^2 = Var(\varepsilon_{ic})$$

In order to avoid this problem, we apply the GLS transformation thus defining

$$\lambda = 1 - \left[ \frac{\sigma_\varepsilon^2}{\sigma_a^2 + T\sigma_a^2} \right]^{1/2}$$

Then, the transformed regression is

$$\begin{aligned} TOBIN\_Q_{ic} - \lambda TOBIN\_Q_c = & \beta_0(1 - \lambda) + \beta_1(x_{ic1} - \lambda \bar{x}_{c1}) + \dots \\ & + \beta_k(x_{ick} - \lambda \bar{x}_{ck}) + (v_{ic} - \lambda \bar{v}_c) \end{aligned}$$

where the bar denotes the average.  $\lambda$  is an unknown parameter, but can be estimated.  $\hat{\lambda}$  takes the form  $\hat{\lambda} = 1 - \{1/[1 + T(\hat{\sigma}_a^2/\hat{\sigma}_\varepsilon^2)]\}^{1/2}$ , where  $\hat{\sigma}_a^2$  is a consistent estimator of  $\sigma_a^2$  and  $\hat{\sigma}_\varepsilon^2$  is a consistent estimator of  $\sigma_\varepsilon^2$ .

## 5.2 Self-selection and Treatment Effects

In the regressions, the firm's Tobin's  $q$  is explained by whether or not the firm is cross-listed. However, because firms with better growth opportunities are more likely to list and better growth opportunities mean better valuation, it is highly likely that firms with higher  $q$  self-select themselves into the cross-listed group. Thus, the error in the regression will be correlated with the two cross-listing dummies and will cause bias. In turn, we apply the treatment effects method, e.g. Heckman (1979), Greene (1997), Wooldridge (2002). In particular, we can think of cross-listing as a treatment for the firm's valuation. Each firm has a valuation outcome with and without this treatment; see appendix for technical details.

Specifically, we use the treatment effect two-step method to investigate the valuation effect of cross-listing in the two destinations separately. We compare the US cross-listing group with the non cross-listing group to see the treatment effects of the US cross-listing. Then, we compare the UK cross-listing group with the non cross-listing group to investigate the cross-listing effect in the UK. We use the variable  $COM\_LAW$  as the main identifier; e.g. La Porta et al. (2002).

In the first step, the estimation of the decision equation uses probit:

$$CL\_US_{ic} = \gamma_0 + \gamma_1 LIQ_c + \gamma_2 SIZE_{ic} + \gamma_3 COM\_LAW_c + \gamma_4 GDPG_c + u_{ic} \quad (3a)$$

$$CL\_UK_{ic} = \gamma_0 + \gamma_1 LIQ_c + \gamma_2 SIZE_{ic} + \gamma_3 COM\_LAW_c + \gamma_4 GDPG_c + u_{ic} \quad (3b)$$

The independent variables included here are the key firm-level as well as country-level characteristics that influence the cross-listing decision. The country with

higher liquidity (LIQ) should be fertile ground for firms to expand and eventually cross-list. Also, larger firms, proxied by SIZE, are more likely to cross-list. Hence, we predict positive signs on parameters  $\gamma_1$  and  $\gamma_2$ . Firms from common law countries have better investor protection, thus are more likely to cross-list. And firms from fast growing developing countries will have better growth opportunity. They are more likely to cross-list. We predict positive signs on the parameters  $\gamma_3$  and  $\gamma_4$ . In the second step, after calculating  $\lambda_{ic}$  using the estimated results from the first step, the estimation of the valuation model uses  $\lambda_{ic}$  as a control variable and applies OLS:

$$\begin{aligned} TOBIN\_Q_{ic} = & \beta_0 + \beta_1 CL\_US_{ic} + \beta_3 SG2Y_{ic} + \beta_4 INDUS\_Q_i \\ & + \beta_5 SIZE_{ic} + \beta_8 \lambda_{ic} + v_{ic} \end{aligned} \quad (4a)$$

$$\begin{aligned} TOBIN\_Q_{ic} = & \beta_0 + \beta_2 CL\_UK_{ic} + \beta_3 SG2Y_{ic} + \beta_4 INDUS\_Q_i \\ & + \beta_5 SIZE_{ic} + \beta_8 \lambda_{ic} + v_{ic} \end{aligned} \quad (4b)$$

All the parameters have the same predicted signs as those in the random effects model. The coefficient of lambda,  $\beta_8$  measures the extent to which unobserved factors that make cross-listing more likely to occur are associated with valuations, if positive (negative) cross-listing is more likely to occur with higher (lower) valuations.<sup>16</sup>

## 6. Empirical Results

### 6.1 Univariate Analysis

Table 7 reports the mean level Tobin's  $q$  for firms in each country by three categories, not cross-listed, cross-listed in the US, and cross-listed in the UK. It also presents the number of firms in each country by each category. There are totally 4,491 firms in the dataset. Japan has the largest sample observations, which are 2,543 firms.

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<sup>16</sup> We are aware that variables that cause cross-listing may cause premium in valuations as well. We have proceeded with this identification scheme in an effort to examine the difference in premium between the US and UK destination.



Australia companies account for the smallest proportion, which are 198 firms.

The first column reports the number of firms that are cross-listed neither in the US nor the UK, and their mean level Tobin's  $q$  by each country. The mean level Tobin's  $q$  varies widely across countries, from a minimum of 0.91 in Korea to a maximum of 1.56 in India. The second column shows the number of firms and the mean level Tobin's  $q$  for firms that cross-listed in the US only. There are 55 US cross-listed firms in this sample. The proportion of firms that are listed in the US varies widely across-countries, from 4 and 7 firms in both Korea and Taiwan respectively, to 18 firms in Japan. It then shows the difference in Tobin's  $q$  between the US cross-listed firms and the non cross-listed firms. The difference in each country is positive, except for -0.02 in China, which is a small amount. The total difference is 1.51. The results indicate that the mean  $Q$  for firms that cross-listed in the US is significantly higher at the 0.01 level (with t-statistic=4.678) than that for non cross-listed firms.

Similarly, the third column provides information about the number of firm and the mean Tobin's  $q$  for firms cross-listed in the UK, and also calculates the difference in  $q$  between the UK cross-listed firms and the non cross-listed firms in each country. Here we have 41 UK cross-listing observations. Again, Japan has the largest proportion, 12 of them. Australia has only 3 firms. Two countries have negative  $q$  differences, India and Japan; all others have positive differences. The total difference is 0.62. It is smaller than the total difference in the US case. The mean  $q$  for firms that cross-listed in the UK is also significantly higher at the 0.05 level (with

t-statistic=1.724) than that for the non cross-listed firms. We do find evidence that a cross-listing premium exists in the unconditional univariate analysis.

## **6.2 Results from OLS and Random Effects Regressions**

We present evidence on whether or not cross-listing premium can be explained by firm and country level characteristics. Table 8 provides the regression results of models (1) and (2). In each specification, we use both OLS and Random Effects. The inferences on the coefficients that test the hypothesis do not vary by changing from OLS to Random Effects method.

In specification (1), we regress (log) Tobin's  $q$  on the two cross-listing dummies and the set of control variables. The OLS regression shows that the US cross-listing premium is significantly positive, an average increase of 17% in  $q$  value (from  $q=1$ ). The UK cross-listing premium is positive, but not statistically significant. The Random Effects case produces similar results even though the average increase for the US is under 15%. There is some evidence on the valuation effect of cross-listing. The last row shows the test of differences in the coefficient on US cross-listing versus UK cross-listing. In the OLS case, the US effect is marginally statistically larger than the UK effect, but not in the Random Effects case. For the control variables, except for the LIQ, all the coefficients of control variables are significantly positive and the estimated signs are consistent with the predictions. In particular, fast growing firms and firms in fast growing industries have higher Tobin's  $q$ ; and firms have higher  $q$  in common law countries because of better investor protection.

In specification (2), we run the regression model (2) to investigate whether the

difference of the cross-listing premium between the US and the UK is significant. In both OLS and Random Effects model, cross listing premiums in the US are significantly larger than those in the UK; although less so in the Random Effects case.

### **6.3 Results from Treatment Effect Regression**

After the above analysis, we mitigate the self-selection problem by applying the treatment effects method and Table 9 presents the results. We investigate the treatment effects of the US cross-listing and the UK cross-listing separately. In each treatment effect regression, we also provide the results of the first stage probit regression.

The probit model results demonstrate that firms are more likely to cross-list their shares in overseas capital markets, such as the US and the UK when they are i. Large firms; ii. Firms from countries with higher liquidity; iii. Firms from countries that have better investor protection; and iv. Firms from fast growing countries.

The specification of treatment effects corresponds to specification (1) in Table 8. After applying the treatment effects technique, the cross-listing premium in the US is still positive and significant and much larger in magnitude of the order of 90% in q value (from  $q=1$ ). The cross-listing premium in the UK is also positive, significant and even larger in magnitude. The empirical findings from the treatment effects regressions confirm the main hypothesis that cross-listing either in the US or in the UK has a positive effect on the firm's valuation. However, the magnitude of the coefficients and standard errors show that there is a difference across the US and UK, in favor of the UK.

All control variables, are significant and have the expected sign, except for SIZE

which has a negative sign. The sign of  $\beta_\delta$  (the coefficient of lambda) is negative indicating that the error term in the decision equation and the valuation equation are negatively correlated. Thus, *unobserved* factors that make cross-listing more likely to occur are associated with lower valuations, thus cross-listing may provide an opportunity for a firm to improve and achieve higher market valuations.

#### **6.4 Test for the Slope Effects of Cross-listing**

Previous regressions focused on the cross-listing dummies, and showed the intercept difference in firm's valuation due to the cross-listing. In table 10, we re-estimate the model (3)-(4) using the treatment effects regression, but at this time, we add several interaction terms. We interact the cross-listing dummies with all the other control variables allowing us to examine whether there are any differences in slopes due to cross-listing overseas.

For the US regression, the cross-listing effect continues to be statistically significance. The interaction terms for the sales growth rate with the listing dummy is significant and positive. This means there are valuation differences between the listing and non-listing firms, but the gap increases as the growth opportunities increase. The governance interaction is significantly positive. The sign of the latter interaction is not consistent with the previous literature. Doidge (2004) argues that firms listing in the US are more valuable, the lower the corporate governance quality is in the home countries; the coefficients for the variable should be negative. The reason is that the firm in a lower governance quality home country has a lower valuation. Everything equal, the firm should have a higher premium if it chooses to cross-list. In our

analysis, the signs of the liquidity, industry and gross domestic product growth interaction terms are consistent with Doidge (2004), but they are not statistically significant.

For the UK cross listing regressions, the cross-listing premium is also positive, significant and larger in magnitude. The signs for the interaction variables are qualitatively analogous to the US case and the difference across the US and UK cross-listing premium is again in favor of the UK. For the UK, the signs of the liquidity, industry and gross domestic product growth interaction terms are statistically significant.

In general, our evidence shows that growth opportunities significantly increase the cross-listing premium, but the effects in the US and the UK destination are mixed depending on the statistical method. Hence, the main finding that cross-listing commands a premium and growth opportunities further increase the premium remains, but the empirical differences between the US and the UK destination from Asia-Pacific source countries are mixed in this sample.

## **7. Summary and Conclusions**

In this paper, we test hypothesis that cross-listing firms have higher valuation than non cross-listing ones, in general, allowing for several controls. We use data on public traded firms from six Asia-Pacific countries in 2003-2004. We perform means difference tests, OLS, the random effects and treatment effects regressions. The results generally confirm the hypothesis that cross-listing commands a premium on valuation; and growth opportunities further increase the premium. However, the

evidence of a difference in premium between the US and UK is mixed. We found some evidence in favor of the US in the univariate, OLS and random effects models. But, the results are not robust when the treatment effect methodology is applied; even when interactions with growth opportunities are taken into account, in the treatment effect case. Our evidence on observables is that cross-listing firms command a statistically significant premium; but we find no evidence in favor of US commanding higher premiums in the Asia-Pacific source countries. We found that unobserved factors that make cross-listing more likely to occur either in the US or the UK are associated with lower valuations, hence cross-listing provides an opportunity for a firm to improve and achieve better market valuations.

The main contribution of this paper is to provide evidence on the valuation effect of cross-listing on a major non-US market compared to the US market when the source nations are in the Asia-Pacific region. Regional and other geography effects and growth opportunities could be potential sources of mitigating factors for the effects of better corporate governance on the cross-listing premium. One policy implication is that the pattern of cross-listing shows that better firms from the Asia-Pacific region enjoy the benefits from bonding and prefer to cross-list in overseas stock exchanges, such as the US and the UK. This may mitigate the growth in the home country capital markets. Policy makers should be aware of this trend and try to develop regulations and policies that reinforce the corporate governance arrangements in their domestic markets. The development of governance standards may help develop local capital market and prevent domestic firms from cross-listing

shares overseas, thus raising the liquidity of their markets.

The study also has several limitations. First, there are few firms cross-listed in the sample. Second, ideally, we should obtain Tobin's  $q$  before and after cross-listing for a specific firm, thus exploring the time dimension more fully. Also, a fruitful avenue for future research is to explore the effects of exogenous restrictions such as the Sarbanes-Oxley act in the US on firm's decision to cross-list and possibly the inclusion of nominal monetary factors.

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## Appendix

Let  $y_1$  denote the outcome with treatment and  $y_0$  the outcome without treatment. Because a firm cannot be in both states, we cannot observe both  $y_0$  and  $y_1$  simultaneously. Thus, we face the problem of missing data. Theoretically, the solution is to propose and estimate a model of the self-selection decision. That is to add a “decision equation” to the outcome equation. Formally, the model consists of the following two equations:

$$\log q_i = \underline{\beta}' \underline{X}_i + \delta CL_i + \varepsilon_i \quad (\text{Valuation equation}) \quad (\text{A1})$$

$$CL_i^* = \underline{\gamma}' \underline{w}_i + u_i \quad (\text{Cross-listing decision equation}), \quad (\text{A2})$$

where under bars denote vectors or matrices. Equation (A1) is called the valuation equation. It is basically the model in the previous section, where  $\underline{X}_i$  is the set of exogenous control variables and  $CL_i$  is the dummy variable that equals one for a firm that cross-lists, zero otherwise. Because the firms that cross-list are not random and because their decisions are related to  $\log q$ ,  $CL_i$  and  $\varepsilon_i$  are correlated. Equation (A2) is the cross-listing decision equation.  $CL_i^*$  is an unobserved latent variable;  $\underline{w}_i$

is a set of exogenous variables that affect the cross-listing choice, and  $\underline{w}_i$  and  $\underline{X}_i$  may include common variables or even be identical. We assume that the cross-listing decision is determined by

$$\begin{aligned} CL_i &= 1, \text{ if } CL_i^* > 0, \\ CL_i &= 0, \text{ if } CL_i^* \leq 0, \end{aligned} \quad (\text{A3})$$

Also, we assume  $\varepsilon_i$  and  $u_i$  are jointly normally distributed with means zero, and standard deviations  $\sigma_\varepsilon$  and  $\sigma_u$ , where  $\sigma_u$  is normalized to one,

$$\begin{pmatrix} \varepsilon \\ u \end{pmatrix} \approx N \left( \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \sigma_\varepsilon & \sigma_{u,\varepsilon} \\ \sigma_{\varepsilon,u} & 1 \end{pmatrix} \right), \quad (\text{A4})$$

and  $\rho$  is the coefficient of correlation.

First, we check the case where we just estimate the valuation equation directly. The expected valuation for the firms that choose to cross-list will be

$$\begin{aligned} E[\log q_i | CL_i = 1] &= \underline{\beta}' \underline{X}_i + \delta + E[\varepsilon_i | CL_i = 1] \\ &= \underline{\beta}' \underline{X}_i + \delta + \rho \sigma_\varepsilon \lambda_{11} (\underline{\gamma}' \underline{w}_i), \end{aligned} \quad (\text{A5})$$

where  $\lambda_{i1}(\underline{\gamma}'\underline{w}_i)$  is the “inverse Mills’ ratio” computed as  $\frac{\phi((\underline{\gamma}'\underline{w}_i))}{\Phi(\underline{\gamma}'\underline{w}_i)}$ , where  $\phi(\cdot)$  and

$\Phi(\cdot)$  are the density function and cumulative distribution function for the standard normal, respectively. The expected valuation for the firms that choose not to cross-list will be

$$\begin{aligned} E[\log q_i | CL_i = 0] &= \underline{\beta}'\underline{X}_i + E[\varepsilon_i | CL_i = 0] \\ &= \underline{\beta}'\underline{X}_i + \rho\sigma_\varepsilon\lambda_{i2}(\underline{\gamma}'\underline{w}_i), \end{aligned} \quad (A6)$$

where  $\lambda_{i2}(\underline{\gamma}'\underline{w}_i)$  is computed as  $\frac{-\phi((\underline{\gamma}'\underline{w}_i))}{1-\Phi(\underline{\gamma}'\underline{w}_i)}$ . Then, the difference in expected value

between cross-listed firms and non cross-listed firms (the cross-listing premium) is given by

$$E[\log q_i | CL_i = 1] - E[\log q_i | CL_i = 0] = \delta + \rho\sigma_\varepsilon\left[\frac{\phi_i}{\Phi_i(1-\Phi_i)}\right] \quad (A7)$$

So, the difference estimated by the least squares coefficient on the treatment dummy variables will be biased. The selection problem is apparent.<sup>17</sup>

Hence, we use the treatment effects two-step method to estimate (A1)-(A2) together. In the first step, the treatment effects method will use probit estimation to estimate  $\underline{\gamma}'$  in equation (A5). Those consistent estimates can be used to compute value

for  $\lambda_{i1}$  and  $\lambda_{i2}$ . Then, in the second step, it applies OLS to estimate equation (A1) by

adding an additional term,  $\lambda_i$ , which is calculated by

$$\lambda_{i1}(\underline{\gamma}'\underline{w}_i)CL_i + \lambda_{i2}(\underline{\gamma}'\underline{w}_i)(1-CL_i).$$

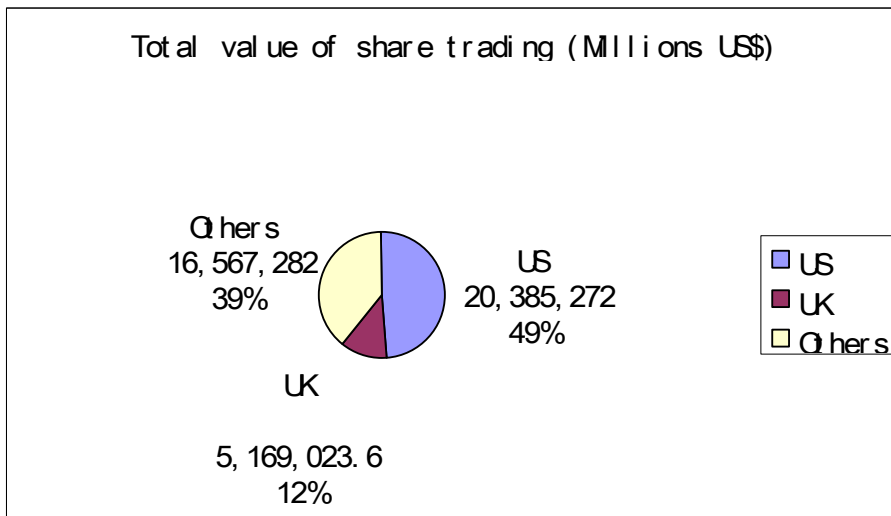
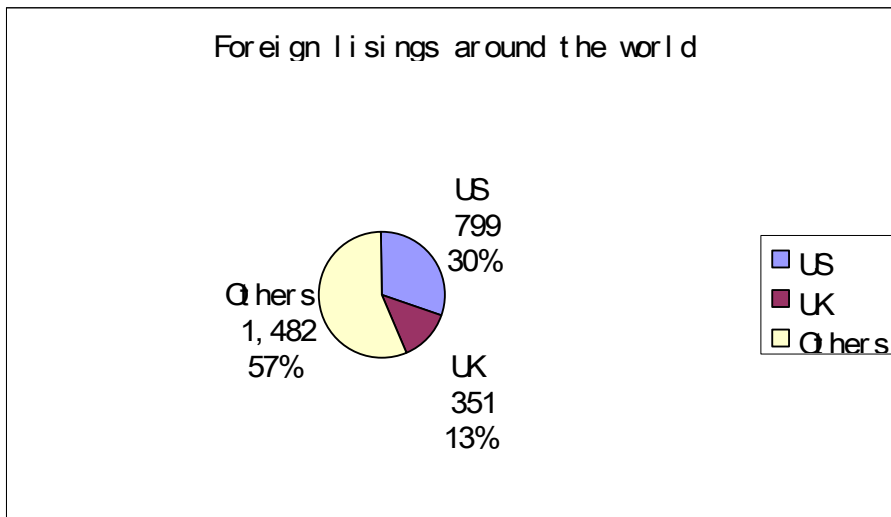
In sum, the corrected valuation equation should be estimated as follows:

$$\log q_i = \underline{\beta}'\underline{X}_i + \delta CL_i + \delta_\lambda \lambda_i + v_i \quad (\text{Corrected valuation equation}) \quad (A8).$$

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<sup>17</sup> There is an important issue of selection versus simultaneity in the problem examined in this paper, see Hajivassiliou and Ioannides (2007) for a discussion and application. In this paper, we focus on the selection problem using the Heckit methodology.

**Figure 1. Foreign Listings and Total Value of Share Trading Around the World**



Source: World Federations of Exchanges, Annual Report and Statistics (2004)



Figure 2. Source Countries in Pacific-Asia Region: Australia, China, India, Japan, Korea and Taiwan.



**Table 1. Summary Information of Listings and Exchanges Around the World**

| Exchange                         | Total Companies | Domestic Companies | Foreign Companies | Total Value of Share Trading (in Millions US\$) | Value of Share Trading-Foreign (in Millions US\$) | Foreign % | Newly Listed Foreign Companies 2004 | Market Capitalization (in Millions US\$) | Average Daily Turnover (in Millions US\$) |
|----------------------------------|-----------------|--------------------|-------------------|---|---|-----------|-------------------------------------|--|---|
| <b>AMERICAS</b>                  |                 |                    |                   |   |   |           |                                     |  |   |
| NYSE                             | 2,293           | 1,834              | 459               | 11,618,150.7                                    | 976,385.2   | 8%        | 20                                  | 12,707,578.3                             | 46,103.8                                  |
| Nasdaq                           | 3,229           | 2,889              | 340               | 8,767,121.2                                     | 617,773.5   | 7%        | 23                                  | 3,532,912.0                              | 34,790.2                                  |
| TSX Group                        | 3,604           | 3,572              | 32                | 651,059.1                                       | 744.0   | 0%        | 4                                   | 1,177,517.6                              | 2,578.5                                   |
| American SE                      | 575             | 502                | 73                | 590,652.0                                       | NA  |           | 20                                  | 83,018.9                                 | 2,352.2                                   |
| Sao Paulo SE                     | 388             | 386                | 2                 | 103,990.1                                       | 52.2  | 0%        | -                                   | 330,346.6                                | 417.6                                     |
| Mexican Exchange                 | 326             | 151                | 175               | 45,388.8  | 1,327.8   | 3%        | 108                                 | 171,940.3                                | 176.6                                     |
| Santiago SE                      | 240             | 239                | 1                 | 12,123.5  | -   | 0%        | -                                   | 116,924.3                                | 48.9                                      |
| Buenos Aires SE                  | 107             | 103                | 4                 | 4,832.1   | 238.5   | 5%        | -                                   | 40,593.8                                 | 19.2                                      |
| Colombia SE                      | 106             | 106                | -                 | 2,079.6   | -   | 0%        | -                                   | 25,222.9                                 | 8.5                                       |
| Lima SE                          | 224             | 192                | 32                | 1,560.4   | 238.1   | 15%       | -                                   | 17,974.8                                 | 6.2                                       |
| Bermuda SE                       | 58              | 21                 | 37                | 67.6  | -   | 0%        | 6                                   | 1,852.0                                  | 0.3                                       |
| <b>Regional Total</b>            | <b>11,150</b>   | <b>9,995</b>       | <b>1,155</b>      | <b>21,797,025.1</b>                             | <b>1,596,759.3</b>                                | <b>7%</b> | <b>181</b>                          | <b>18,205,881.5</b>                      | <b>86,502</b>                             |
| <b>EUROPE-AFRICA-MIDDLE EAST</b> |                 |                    |                   |   |   |           |                                     |  |   |
| London SE                        | 2,837           | 2,486              | 351               | 5,169,023.6                                     | 2,228,931.5                                       | 43%       | 10                                  | 2,865,243.2                              | 20,350.5                                  |
| Euronext                         | 1,333           | 999                | 334               | 2,472,131.7                                     | 47,561.9  | 2%        | 12                                  | 2,441,261.4                              | 9,544.9                                   |

|                       |              |              |              |                     |                    |            |           |                     |               |
|-----------------------|--------------|--------------|--------------|---------------------|--------------------|------------|-----------|---------------------|---------------|
| Deutsche Borse        | 819          | 660          | 159          | 1,541,122.7         | 137,001.0          | 9%         | -         | 1,194,516.8         | 5,996.6       |
| BME Spanish Exchange  |              |              |              | 1,203,360.2         | 8,093.0            | 1%         |           | 940,672.9           | 4,794.3       |
| Borsa Italiana        | 278          | 269          | 9            | 969,234.2           | 94,532.0           | 10%        | 1         | 789,562.6           | 3,771.3       |
| Swiss Exchange        | 409          | 282          | 127          | 791,371.5           | 737,999.0          | 93%        | 1         | 826,040.8           | 3,115.6       |
| OMX Stockholm SE      | 276          | 256          | 20           | 462,501.3           | 50,282.6           | 11%        | 5         | 376,781.1           | 1,828.1       |
| OMX Helsinki SE       | 137          | 134          | 3            | 223,686.9           | 4,146.5            | 2%         | -         | 183,765.4           | 884.1         |
| JSE South Africa      | 389          | 368          | 21           | 161,072.8           | 45,451.4           | 28%        | 1         | 442,525.5           | 641.7         |
| Istanbul SE           | 297          | 297          | -            | 146,604.9           | -                  | 0%         | -         | 98,298.9            | 588.8         |
| Oslo Bors             | 188          | 166          | 22           | 134,819.1           | 17,834.4           | 13%        | 4         | 141,624.2           | 532.9         |
| Copenhagen SE         | 183          | 176          | 7            | 106,058.2           | 2,243.9            | 2%         | 1         | 155,232.6           | 419.2         |
| Irish SE              | 65           | 53           | 12           | 45,143.7            | 1,021.1            | 2%         | 1         | 114,085.9           | 177.7         |
| Athens Exchange       | 341          | 339          | 2            | 44,383.3            | 218.3              | 0%         | 1         | 121,921.4           | 175.4         |
| Tel Aviv SE           | 578          | 573          | 5            | 33,066.7            | -                  | 0%         | 1         | 90,157.9            | 136.6         |
| Wiener Borse          | 120          | 99           | 21           | 24,158.6            | 405.7              | 2%         | 2         | 87,776.3            | 96.6          |
| Warsaw SE             | 230          | 225          | 5            | 16,269.3            | 273.5              | 2%         | 4         | 71,547.2            | 63.8          |
| Budapest SE           | 47           | 46           | 1            | 13,369.4            | 27.6               | 0%         | -         | 28,630.4            | 52.6          |
| Tehran SE             | 402          | 402          | -            | 12,125.2            | -                  | 0%         | -         | 42,600.4            | 50.1          |
| Ljubijana SE          | 140          | 140          | -            | 1,473.8             | -                  | 0%         | -         | 9,676.8             | 5.8           |
| Luxembourg SE         | 234          | 42           | 192          | 645.2               | 40.6               | 6%         | 10        | 50,143.6            | 2.5           |
| Malta SE              | 13           | 13           | -            | 93.5                | -                  | 0%         | -         | 2,841.9             | 0.4           |
| <b>Regional Total</b> | <b>9,316</b> | <b>8,025</b> | <b>1,291</b> | <b>13,571,715.8</b> | <b>3,376,064.0</b> | <b>25%</b> | <b>54</b> | <b>11,074,907.2</b> | <b>53,230</b> |
| <b>ASIA-PACIFIC</b>   |              |              |              |                     |                    |            |           |                     |               |
| Tokyo SE              | 2,306        | 2,276        | 30           | 3,218,112.8         | 612.1              | 0%         | 1         | 3,557,674.4         | 13,081.8      |

|                       |               |               |              |                     |                    |            |            |                     |                |
|-----------------------|---------------|---------------|--------------|---------------------|--------------------|------------|------------|---------------------|----------------|
| Taiwan SE Corp.       | 702           | 697           | 5            | 718,804.4           | 296.7              | 0%         | -          | 441,435.8           | 2,875.2        |
| Australian SE         | 1,583         | 1,515         | 68           | 523,668.5           | 10,214.0           | 2%         | 8          | 776,402.8           | 2,053.6        |
| Korea Exchange        | 683           | 683           | -            | 488,408.3           | -                  | 0%         | -          | 389,473.4           | 1,961.5        |
| Hong Kong Exchanges   | 1,096         | 1,086         | 10           | 439,463.8           | 449.3              | 0%         | -          | 861,462.9           | 1,764.9        |
| Shanghai SE           | 837           | 837           | -            | 322,828.6           | -                  | 0%         | -          | 314,315.7           | 1,328.5        |
| National SE India     | 957           | 957           | -            | 260,409.2           | -                  | 0%         | -          | 363,276.0           | 1,025.2        |
| Shenzhen SE           | 536           | 536           | -            | 194,457.7           | -                  | 0%         | -          | 133,404.6           | 800.2          |
| Osaka SE              | 1,090         | 1,090         | -            | 134,361.7           | -                  | 0%         | -          | 2,287,047.8         | 546.2          |
| Thailand SE           | 463 463       | -             | -            | 116,381.2           | -                  | 0%         | -          | 115,390.4           | 475.0          |
| BSE, The SE Mumbai    | 4,730         | 4,730         | -            | 118,247.8           | -                  | 0%         | -          | 386,321.1           | 465.5          |
| Singapore Exchange    | 633           | 608           | 25           | 107,247.4           | NA                 | -          | -          | 217,617.8           | 423.9          |
| Bursa Malaysia        | 959           | 955           | 4            | 61,636.4            | 1,134.7            | 2%         | -          | 181,623.8           | 248.5          |
| Jakarta SE            | 331           | 331           | -            | 27,517.7            | -                  | 0%         | -          | 73,250.6            | 114.2          |
| New Zealand Exchange  | 200           | 158           | 42           | 17,034.2            | 1,473.0            | 9%         | 9          | 43,731.3            | 67.3           |
| Philippine SE         | 235           | 233           | 2            | 3,681.2             | 14.9               | 0%         | -          | 28,602.0            | 14.9           |
| Colombo SE            | 242           | 242           | -            | 575.2               | -                  | 0%         | -          | 3,657.0             | 2.4            |
| <b>Regional Total</b> | <b>17,120</b> | <b>16,934</b> | <b>186</b>   | <b>6,752,836.1</b>  | <b>14,194.7</b>    | <b>0%</b>  | <b>18</b>  | <b>10,059,297.0</b> | <b>27,249</b>  |
| <b>Total</b>          | <b>37,586</b> | <b>34,954</b> | <b>2,632</b> | <b>42,121,577.0</b> | <b>4,987,018.0</b> | <b>12%</b> | <b>253</b> | <b>39,340,085.7</b> | <b>166,980</b> |

Source: World Federations of Exchanges, Annual Report and Statistics (2004)

**Table 2. Comparison of the American Depositary Receipts by levels**

|                          | <b>Level-I</b>                  | <b>Level-II</b>                            | <b>Level-III</b>   |
|--------------------------|---------------------------------|--|--|
| Description              | Unlisted in US                  | Listed on Major US Exchange                | Offered and Listed on Major US Exchange  |
| Trading Location         | OTC Pink Sheet trading          | NYSE, AMEX or Nasdaq                       | NYSE, AMEX or Nasdaq   |
| SEC Registration         | Registration Statement Form F-6 | Registration Statement Form F-6            | Registration Statement Form F-6 for initial public offering                          |
| US Reporting Requirement | Exemption under Rule 12g3-2(b)  | Form 20-F filed annually                   | Form 20-F filed annually; short forms F-2 and F-3 used only for subsequent offerings |
| GAAP Requirement         | No GAAP Reconciliation required | Only Partial reconciliation for financials | Full GAAP reconciliation for financials  |

**Source: Karolyi (1998) Table II. 1**

**Table 3. Reporting and Regulatory Ranking of Eight Major Listing Locations Around the World.**

|                | Mean Ranks                       |                                 |                             |                           | Disclosure Level Rank |
|----------------|----------------------------------|---------------------------------|-----------------------------|---------------------------|-----------------------|
|                | Statutory Reporting Requirements | Exchange Reporting Requirements | Capital Market Expectations | Overall Disclosure Levels |                       |
| United States  | 7.27                             | 7.29                            | 7.17                        | 7.28                      | 8                     |
| Canada         | 6.48                             | 6.38                            | 5.91                        | 6.41                      | 7                     |
| United Kingdom | 5.84                             | 5.87                            | 6.09                        | 6.02                      | 6                     |
| Netherlands    | 4.68                             | 4.80                            | 4.50                        | 4.75                      | 5                     |
| France         | 4.11                             | 4.50                            | 4.13                        | 4.17                      | 4                     |
| Japan          | 3.82                             | 4.04                            | 4.22                        | 3.83                      | 3                     |
| Germany        | 3.96                             | 3.90                            | 4.04                        | 3.81                      | 2                     |
| Switzerland    | 2.70                             | 2.78                            | 3.17                        | 2.60                      | 1                     |

Ranks are in descending order with 8 (1) indicating highest (lowest) disclosure level

**Source: Saudagaran and Biddle (1995), Table 3.**

**Table 4. Variables Definition**

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|         |   |
|---------|---|
| TOBIN_Q | The sum of firm's book value of total liability and its market capitalization divided by the firm's book value of total assets; in logarithms in the regression analysis. |
| CL_US   | Takes the value of 1 if the firm is cross-listed in the stock exchange in the US (NYSE or NASDAQ), 0 otherwise.   |
| CL_UK   | Takes the value of 1 if the firm is cross-listed in the London Stock Exchange, 0 otherwise.   |
| SG2Y    | Geometric mean of annual sales growth rate in 2003 and in 2004.   |
| INDU_Q  | Median of Tobin's q of the selected firms in a certain industry. The industry is defined according to 2-digit SIC code.   |
| SIZE    | Log of sales (in million US\$) at the fiscal year-end in 2004.  |
| LIQ     | Dollar value of shares traded in a country's equity markets divided by the country's average market capitalization for the time period                                    |
| GDPG    | GDP growth rate of the source country in year 2004.   |
| COM_LAW | Takes the value of 1 if the firm is selected from countries that have a common law origin, 0 otherwise.   |

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**Table 5. Summary  
Statistics**

| <b>Variable</b>      | <b>Obs</b> | <b>Mean</b> | <b>Median</b> | <b>Std Dev</b> | <b>Min</b> | <b>Max</b> |
|----------------------|------------|-------------|---------------|----------------|------------|------------|
| <b>Q (level)</b>     | 4491       | 1.213       | 1.08          | 0.519          | 0.55       | 3.19       |
| <b>TOBIN_Q (log)</b> | 4991       | 0.121       | 0.073         | 0.366          | -0.60      | 1.16       |
| <b>CL_US</b>         | 4491       | 0.012       | 0             | 0.110          | 0          | 1          |
| <b>CL_UK</b>         | 4491       | 0.009       | 0             | 0.095          | 0          | 1          |
| <b>SG2Y</b>          | 4491       | 12.262      | 5.79          | 32.664         | -77.56     | 960.56     |
| <b>INDU_Q</b>        | 4491       | 1.154       | 1.10          | 0.261          | 0.81       | 2.22       |
| <b>COM_LAW</b>       | 4491       | 0.090       | 0             | 0.287          | 0          | 1          |
| <b>LIQ</b>           | 4491       | 1.208       | 0.99          | 0.776          | 0.69       | 4.62       |
| <b>GDPG</b>          | 4491       | 4.701       | 2.70          | 2.782          | 2.7        | 9.5        |
| <b>SIZE</b>          | 4491       | 12.874      | 12.67         | 1.385          | 8.09       | 18.79      |



**Table 6. Correlation Matrix**  
(Pairwise Correlation Coefficients)  
(Prob > |r| under H0: Rho=0)

|                     | <b>TOBIN_Q(log)</b>               | <b>CL_US</b>                      | <b>CL_UK</b>                     | <b>SG2Y</b>                       | <b>INDU_Q</b>                     | <b>COM_LAW</b>                    | <b>LIQ</b>                       | <b>GDPG</b>                       | <b>SIZE</b>   |
|---------------------|-----------------------------------|-----------------------------------|----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|----------------------------------|-----------------------------------|---------------|
| <b>TOBIN_Q(log)</b> | <i>1.0000</i>                     |                                   |                                  |                                   |                                   |                                   |                                  |                                   |               |
| <b>CL_US</b>        | <i>0.0686</i><br><i>(0.0000)</i>  | <i>1.0000</i>                     |                                  |                                   |                                   |                                   |                                  |                                   |               |
| <b>CL_UK</b>        | <i>0.0351</i><br><i>(0.0185)</i>  | <i>-0.0107</i><br><i>(0.4735)</i> | <i>1.0000</i>                    |                                   |                                   |                                   |                                  |                                   |               |
| <b>SG2Y</b>         | <i>0.2165</i><br><i>(0.0000)</i>  | <i>0.0110</i><br><i>(0.4625)</i>  | <i>0.0185</i><br><i>(0.2156)</i> | <i>1.0000</i>                     |                                   |                                   |                                  |                                   |               |
| <b>INDU_Q</b>       | <i>0.1099</i><br><i>(0.0000)</i>  | <i>0.0163</i><br><i>(0.2759)</i>  | <i>0.0077</i><br><i>(0.6077)</i> | <i>0.0142</i><br><i>(0.3404)</i>  | <i>1.0000</i>                     |                                   |                                  |                                   |               |
| <b>COM_LAW</b>      | <i>0.1926</i><br><i>(0.0000)</i>  | <i>0.0777</i><br><i>(0.0000)</i>  | <i>0.0920</i><br><i>(0.0000)</i> | <i>0.0554</i><br><i>(0.0002)</i>  | <i>0.0701</i><br><i>(0.0000)</i>  | <i>1.0000</i>                     |                                  |                                   |               |
| <b>LIQ</b>          | <i>0.0038</i><br><i>(0.7985)</i>  | <i>0.0380</i><br><i>(0.0109)</i>  | <i>0.0689</i><br><i>(0.0000)</i> | <i>0.1071</i><br><i>(0.0000)</i>  | <i>-0.0346</i><br><i>(0.0206)</i> | <i>-0.1316</i><br><i>(0.0000)</i> | <i>1.0000</i>                    |                                   |               |
| <b>GDPG</b>         | <i>0.2737</i><br><i>(0.0000)</i>  | <i>0.0181</i><br><i>(0.2249)</i>  | <i>0.0316</i><br><i>(0.0342)</i> | <i>0.2797</i><br><i>(0.0000)</i>  | <i>0.0243</i><br><i>(0.1041)</i>  | <i>0.0349</i><br><i>(0.0195)</i>  | <i>0.1394</i><br><i>(0.0000)</i> | <i>1.0000</i>                     |               |
| <b>SIZE</b>         | <i>-0.0014</i><br><i>(0.0270)</i> | <i>0.1806</i><br><i>(0.0000)</i>  | <i>0.1184</i><br><i>(0.0000)</i> | <i>-0.0143</i><br><i>(0.3391)</i> | <i>-0.0011</i><br><i>(0.9391)</i> | <i>-0.0249</i><br><i>(0.0956)</i> | <i>0.0278</i><br><i>(0.0626)</i> | <i>-0.3346</i><br><i>(0.0000)</i> | <i>1.0000</i> |

Significance level in parentheses.

**Table 7. Univariate Analysis**

|                  | <u>Not Cross Listed</u> |               | <u>Cross Listed in US</u> |               |             | <u>Cross Listed in UK</u> |               |             | <u>Total Number</u> |
|------------------|-------------------------|---------------|---------------------------|---------------|-------------|---------------------------|---------------|-------------|---------------------|
|                  | <u>Number</u>           | <u>Mean q</u> | <u>Number</u>             | <u>Mean q</u> | <u>Diff</u> | <u>Number</u>             | <u>Mean q</u> | <u>Diff</u> |                     |
| <b>Australia</b> | 187                     | 1.49          | 8                         | 1.65          | 0.16        | 3                         | 1.97          | 0.48        | 198                 |
| <b>China</b>     | 967                     | 1.40          | 10                        | 1.38          | (0.02)      | 5                         | 1.41          | 0.01        | 982                 |
| <b>India</b>     | 189                     | 1.56          | 8                         | 2.19          | 0.63        | 12                        | 1.33          | (0.23)      | 209                 |
| <b>Japan</b>     | 2516                    | 1.12          | 18                        | 1.41          | 0.29        | 9                         | 1.07          | (0.05)      | 2,543               |
| <b>Korea</b>     | 341                     | 0.91          | 4                         | 1.18          | 0.27        | 4                         | 1.06          | 0.15        | 349                 |
| <b>Taiwan</b>    | 195                     | 1.29          | 7                         | 1.47          | 0.18        | 8                         | 1.55          | 0.26        | 210                 |
| <b>Mean Q</b>    |                         | 1.21          |                           | 1.51          |             |                           | 1.35          |             |                     |
| <b>Total</b>     | 4,395                   |               | 55                        |               | 1.51        | 41                        |               | 0.62        | 4,491               |

**Test of Difference Between Means**

(one tailed two-sample t test with unequal variances)

| <u>Comparison</u>       | <u>t-statistic</u> |
|-------------------------|--------------------|
| U.S. > Non cross listed | 4.678***           |
| U.K. > Non cross listed | 1.724**^           |

\* p < 0.10; \*\* p < 0.05; \*\*\* p < 0.01.

| <b>Table 8. The estimated coefficients from OLS and Random Effects regression</b> |                      |                      |                      |                      |
|---|----------------------|----------------------|----------------------|----------------------|
| Dependent Variable: Tobin_Q (log)   |                      |                      |                      |                      |
|   | Specification (1)    |                      | Specification (2)    |                      |
|   | OLS                  | Random Effects       | OLS                  | Random Effects       |
| <b>CL_US</b>  | 0.172<br>(0.051)***  | 0.146<br>(0.051)**   |                      |                      |
| <b>CL_UK</b>  | 0.059<br>(0.043)*    | 0.059<br>(0.042)*    |                      |                      |
| <b>DIFF</b>   |                      |                      | 0.073<br>(0.036)**   | 0.056<br>(0.036)*    |
| <b>SG2Y</b>   | 0.002<br>(0.000)***  | 0.002<br>(0.000)***  | 0.002<br>(0.000)***  | 0.002<br>(0.000)***  |
| <b>INDU_Q</b>   | 0.132<br>(0.021)***  | 0.174<br>(0.028)***  | 0.133<br>(0.021)***  | 0.181<br>(0.029)***  |
| <b>COM_LAW</b>  | 0.216<br>(0.022)***  | 0.211<br>(0.022)***  | 0.224<br>(0.022)***  | 0.217<br>(0.026)***  |
| <b>LIQ</b>  | 0.002<br>(0.007)     | 0.001<br>(0.007)     | 0.004<br>(0.007)     | 0.002<br>(0.007)     |
| <b>CONSTANT</b>   | -0.084<br>(0.025)*** | -0.131<br>(0.033)*** | -0.086<br>(0.025)*** | -0.139<br>(0.034)*** |
| <b>Observations</b>   | 4491                 | 4491                 | 4491                 | 4491                 |
| <b>R<sup>2</sup></b>  | 0.090                |                      | 0.088                |                      |
| <b>Overall R<sup>2</sup></b>  |                      | 0.090                |                      | 0.088                |
| <b>CL_US=</b><br><b>CL_UK</b>   | F(1,4484) =<br>2.92* | Chi2(1) =<br>1.75    |                      |                      |

\* p < 0.10; \*\* p < 0.05; \*\*\* p < 0.01. Robust standard errors in parentheses.

| <b>Table 9. The estimated coefficients using Treatment Effects</b> |                                |                              |                                |                              |
|--|--------------------------------|------------------------------|--------------------------------|------------------------------|
|  | <b>Cross listing in the US</b> |                              | <b>Cross listing in the UK</b> |                              |
|  | <b>First stage<br/>probit</b>  | <b>Treatment<br/>effects</b> | <b>First stage<br/>probit</b>  | <b>Treatment<br/>effects</b> |
|  | Dep. vble:<br>CL_US            | Dep. vble:<br>Q (log)        | Dep. vble:<br>CL_UK            | Dep. vble:<br>Q (log)        |
| CL_US  |                                | 0.902<br>(0.122)***          |                                |                              |
| CL_UK  |                                |                              |                                | 1.104<br>(0.150)***          |
| SG2Y   |                                | 0.002<br>(0.000)***          |                                | 0.002<br>(0.000)***          |
| INDU_Q   |                                | 0.145<br>(0.020)***          |                                | 0.145<br>(0.020)***          |
| COM_LAW  | 0.862<br>(0.158)***            |                              | 1.092<br>(0.164)***            |                              |
| LIQ  | 0.142<br>(0.060)**             |                              | 0.219<br>(0.057)***            |                              |
| Lambda   |                                | -0.339<br>(0.054)***         |                                | -0.450<br>(0.062)***         |
| GDPG   | 0.110<br>(0.027)***            |                              | 0.105<br>(0.030)***            |                              |
| SIZE   | 0.486<br>(0.046)***            | -0.014<br>(0.004)***         | 0.359<br>(0.046)***            | -0.012<br>(0.004)***         |
| CONSTANT   | -9.833<br>(0.744)***           | 0.091<br>(0.061)*            | -8.297<br>(0.745)***           | 0.069<br>(0.059)***          |
| chi2   |                                | 440.1***                     |                                | 382.9***                     |
| Observations   | 4450                           | 4450                         | 4436                           | 4436                         |

\* p < 0.10; \*\* p < 0.05; \*\*\* p < 0.01. Robust standard errors in parentheses.

| <b>Table 10. Test for the Slope Effects of Cross-listing</b> |                                |                              |                                |                              |
|--|--------------------------------|------------------------------|--------------------------------|------------------------------|
|  | <b>Cross listing in the US</b> |                              | <b>Cross listing in the UK</b> |                              |
|  | <b>First stage<br/>probit</b>  | <b>Treatment<br/>effects</b> | <b>First stage<br/>probit</b>  | <b>Treatment<br/>effects</b> |
|  | Dep. vble:<br>CL_US            | Dep. vble:<br>Q (log)        | Dep. vble:<br>CL_UK            | Dep. vble:<br>Q (log)        |
| CL_US  |                                | 0.953<br>(0.343)***          |                                |                              |
| CL_UK  |                                |                              |                                | 1.384<br>(0.256)***          |
| SG2Y   |                                | 0.002<br>(0.000)***          |                                | 0.002<br>(0.000)***          |
| SG_CL  |                                | 0.005<br>(0.002)***          |                                | 0.009<br>(0.002)***          |
| INDU_Q   |                                | 0.145<br>(0.020)***          |                                | 0.144<br>(0.021)***          |
| IND_CL   |                                | 0.088<br>(0.133)             |                                | 0.135<br>(0.127)             |
| COM_LAW  | 0.862<br>(0.158)***            |                              | 1.091<br>(0.164)***            |                              |
| COM_CL   |                                | 0.251<br>(0.076)***          |                                | 0.150<br>(0.080)**           |
| LIQ  | 0.142<br>(0.060)**             |                              | 0.219<br>(0.058)***            |                              |
| LIQ_CL   |                                | -0.009<br>(0.029)            |                                | -0.109<br>(0.031)***         |
| GDPG_CL  |                                | -0.031<br>(0.014)*           |                                | -0.056<br>(0.015)***         |
| Lambda   |                                | -0.335<br>(0.056)***         |                                | -0.520<br>(0.070)***         |
| GDPG   | 0.110<br>(0.027)***            |                              | 0.105<br>(0.030)***            |                              |
| SIZE   | 0.486<br>(0.046)***            | -0.013<br>(0.004)***         | 0.359<br>(0.046)***            | -0.013<br>(0.004)***         |
| CONSTANT   | -9.833<br>(0.744)***           | 0.085<br>(0.062)*            | -8.297<br>(0.745)***           | 0.079<br>(0.061)*            |
| chi2   |                                | 467.2***                     |                                | 413.0***                     |
| Observations   | 4450                           | 4450                         | 4436                           | 4436                         |

\* p < 0.10; \*\* p < 0.05; \*\*\* p < 0.01. Robust standard errors in parentheses.