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Gang Ji

Cross listing and firm value –
corporate governance or
market segmentation?
An empirical study of the stock market



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Gang Ji

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Tiivistelmä

Tässä työssä tutkitaan, mitä taloudellisia vaikutuksia on sillä, että kiinalaiset yritykset listautuvat pörssissä listoille, joilla on esimerkiksi keskenään erilaiset informaatiovaatimukset. Jos yritys haluaa vähentää yritysjohdon ja sijoittajien välistä informaation epäsymmetriaa, se voi listautua pörssissä sellaiselle listalle, joka vaatii suurempaa avoimuutta ja enemmän informaation julkistamista. Tämän seurauksena yritysten pääoman hinta laskee, ja yritykset voivat aiempaa paremmin hyötyä kasvumahdollisuuksista. Empiirisessä tutkimuksessa käy selville, että kun yrityskohtaiset tekijät vakioidaan, usealle pörssilistalle hakeutuminen parantaa yritysten markkina-arvoa. Tämä tulos tukee listautumisen ns. corporate governance -hypoteesia. On lisäksi huomattava, että kirjanpitosääntöjen parantaminen ei voi korvata eri pörssilistoille listautumista.

Asiasanat: corporate governance, pörssilistautuminen, Kiina

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Gang Ji

Cross listing and firm value - corporate governance or market segmentation? An empirical study of the stock market

Abstract

This study investigates the economic consequences of cross-listing on the Chinese stock market. We argue that by adopting a higher disclosure standard through cross-listing firms voluntarily commit themselves to reducing information asymmetry. As a result, cross-listed firms are able to benefit from growth opportunities with less appropriated cash flow and lower cost of capital. The empirical evidence shows that cross-listed firms indeed command higher valuations than their non-cross-listed counterparts, after controlling for certain firm-specific attributes. This lends support to the corporate governance hypothesis of cross-listing on the Chinese stock market. The study also argues that an overall upgrading of accounting standards cannot substitute for the cross-listing mechanism.

Key words: corporate governance, listing, China

1 Introduction

Until February 2001, China's stock market was rigidly segmented. While domestic investors were allowed to invest in listed firms' A shares, foreign investors could invest only in B shares. Cross-ownership is strictly forbidden. Chinese listed firms that raise capital by issuing both A and B are acknowledged as cross-listed firms. Even though listing and trading of foreign B shares takes place on the local stock market as well, the activity qualifies as cross-listing because the objective is to overcome market segmentation.

Cross-listed firms are required to upgrade the disclosure standard from Chinese GAAP to IAS. Thus, holding other institutional factors constant¹, this unique feature differentiates cross-listed firms from their counterparts which issue only domestic A shares. Maintaining a dual reporting system and auditing of IAS-based disclosures generate significant costs for cross-listed firms. The Chinese Security Regulation Council requires that IAS-based disclosures be audited by international auditing firms, whereas Chinese GAAP-based disclosures are audited by locally certified accountants.

The benefits of cross-listing are well established, both theoretically and empirically. The most notable benefit is explained by the market segmentation hypothesis. The hypothesis stipulates that by reducing investment barriers firms are able to spread risks across many investors, which lowers firms' costs of capital². It seems that Chinese cross-listed firms should be able to benefit from increased market integration by giving access (even if restricted) to foreign investors. However, the existence of a significant and persistent price discount on B shares (vs A shares) - instead of the premium predicted and documented for other similarly segmented stock markets - gives cause for questioning the plausibility of the argument³. This price discount shows that Chinese listed firms, by issuing foreign B shares, obtain much less external capital than they would by issuing exclusively to domestic investors. Recent studies on this price anomaly generally attribute it to the lower returns expected by local A share investors. Moreover, some studies have attributed the lower return expected by domestic investors to two factors. Firstly, capital controls strictly pro-

¹A and B shares are traded on the same domestic exchanges and so are subject to the same institutional environment.

² See reviews by Karolyi and Stulz 1998 and 2001

hibit domestic savings from leaving the country. Secondly, investment opportunities are few and often limited to the inefficient banking sector. Therefore, issuing B shares to foreign investors on the Chinese stock market actually results in higher capital costs for listed firms. This dramatic switch from a proclaimed benefit to an added cost in cross-listings not only questions the market segmentation hypothesis, but also demonstrates the much higher cost of cross-listing on the Chinese stock market.

The alternative hypothesis looks at systematic differences between Chinese GAAP and IAS as regards accounting standards, financial rules, and possibilities for opportunistic applications (eg Chen, Gul and Xu 1999). The IAS is undoubtedly the higher quality accounting standard. Economic theory predicts that when a firm switches to a higher disclosure standard it should experience lower capital costs deriving from information asymmetry (Diamond and Verrecchia 1991, Kim and Verrecchia 1991, 1994). Moreover, by pledging to observe a higher disclosure standard, a firm sends a credible signal that it will reduce the agency cost of having large shareholders, since large shareholders commit themselves to less consumption of private benefits. The above in turn will result in lower costs of capital for listed firms that issue additional equities. The so-called corporate governance hypothesis offers a competing and compelling theory for explaining the benefits of cross-listing, especially regarding the Chinese stock market.

This study argues that a cross-listed firm commits to increased information disclosures, which reduces both the information asymmetry component in the cost of capital and the consumption of private benefits. As a result, the cross-listed firm is better able to take advantage of growth opportunities with less expropriated cash flows. Also, reduced information asymmetry lowers the cost of capital, which eventually leads to higher valuation. The empirical evidence indeed supports this prediction, as valuation premia for cross-listed firms appear to be positive and statistically significant after controlling for various firm-specifics. The traditional market segmentation hypothesis, on the other hand, is flatly rejected, since the presence of foreign investors in Chinese listed firms has a significantly negative impact on firm valuation. Moreover, the finding further corroborates those of previous studies on the B share price discount. More importantly, this study is able to demonstrate that a general upgrading of Chinese GAAP cannot substitute for cross listing, since it

³The average discount on IPO price of a B share in a sample of 40 cross-listed firms on the Shanghai stock exchange is 40% of the A share IPO price.

crucially lacks the voluntary commitment to a better information disclosure standard, which would lead to better corporate governance.

Studying the Chinese stock market is useful for two reasons. First, the well documented unique B share price discount helps to distinguish between the corporate governance and market segmentation hypotheses. Although both hypotheses predict higher firm valuations for cross-listing, market segmentation does not assert such influence on Chinese listed firms, evidently due to the B share discount anomaly. In other words, if valuation premiums do exist for cross-listed firms in this study, the corporate governance hypothesis should be given the credit. Second, Ball et al (2000) suggest that the quality of disclosure depends more on the institutional environment than on accounting standards. A typical international cross-listing involves a firm moving to another country and hence to a different institutional environment. On the Chinese stock market, however, since both domestic and foreign investors are subject to exactly the same institutional framework, this study is able to single out the economic consequences of increased disclosures without interference from other institutional factors. In short, Chinese cross-listings enable the elimination of factors that are known to affect firm value but which are not relevant to the issue pursued in this study.

This study contributes to the existing literature in the following areas. First, it builds on and extends previous studies that focus on the role of large shareholders in the corporate governance structure on the Chinese stock market. Second, this study provides direct evidence on the economic consequences of increased information disclosure. Third, it addresses the quality of information disclosures under two dominant accounting standards in China. Last but not least, this study is able to discriminate between two competing/complementary hypotheses on why cross-listing creates value.

The remainder of this study is organised as follows. Section 2 briefly summarises previous related work. Section 3 describes recent developments in cross listing and accounting standards on the Chinese stock market. Section 4 develops the research hypothesis. Section 5 describes the data, and Section 6 presents the empirical evidence on cross-listing premia. Section 7 concludes.

2 Review of the literature

Chinese cross listing involves two key elements: the issuing of B shares exclusively to foreign investors and the adopting of IAS as the disclosure standard. The following survey of the relevant literatures will cover both subjects.

2.1 Market segmentation and international cross listings

International cross-listing circumvents many of the regulatory restrictions, costs and informational problems that present barriers to cross-border equity investing (Karolyi 1998). When firms reside in a closed capital market with high investment barriers, the high price of market risk translates into high cost of capital. This provides a strong incentive for firms to mitigate investment barriers eg by cross-listing internationally. Empirical studies that assess the cost of capital in international cross-listing have generally used international asset pricing models with barriers to investment.⁴ Overall, the research evidence indicates that international cross-listing results in lower cost of capital and higher market value.⁵

On emerging markets, however, ownership restrictions often represent a form of investment barrier with which investors must contend. Hietala (1989) examines the significant price premia for shares allocated to foreign buyers. He finds that foreign investors require a lower rate of return than do domestic investors. Baily and Jagtiani (1994) find an average premium of 19% for Thailand's Alien Board of the stock exchange, which they suggest is correlated with the severity of foreign ownership restrictions, tradability, and information availability. Stulz and Wasserfallen (1995) argue that price discrimination in the presence of differentiated (between domestic and foreign investors) demand elasticity explains the price premium for foreign-class shares in Switzerland. Domowitz et al (1997) demonstrate that the differentiated demand elasticity hypothesis explains the significant premium on Mexican foreign B shares. Because foreign ownership restrictions hinder the market integration of these emerging economies, the above studies recognise that cross-listing, even with restrictions, can be beneficial in breaking down market segmentation.

⁴See Karolyi and Stulz (2001) for a thorough review on this subject.

⁵See Karolyi (1998) for a review of the empirical evidence.

The lower degree of market segmentation leads to lower costs of capital and thus to higher market valuations for cross-listed firms.

China appears to be an exceptional case (Bailey et al 1999), where prices of foreign B shares trade at substantial discount to domestic A shares. This anomaly has generated much interest among researchers. Bailey (1994) attributes the B share discount to Chinese citizens' lower opportunity costs of investing due to a lack of outlets for their savings. Fernald and Rogers (2000) attribute a 4-percentage-point difference in expected rates of return for foreign vs domestic investors to China's limited investment outlets. Charkravarty et al (1998) develop a model that incorporates both market segmentation and information asymmetry, and find evidence supporting their relative pricing equation for A and B shares. On the other hand, Chen, Lee, and Rui (2001) argue that the price discount is primarily due to the low level of liquidity in the B share market. Li and Fleisher (2001) extend the differentiated demand elasticity hypothesis and find evidence that 'neglect' reduces the return on B shares. Whether because of information asymmetry, illiquid market, or differentiated demand elasticity, the above studies on the B share discount all find higher expected returns for foreign investors. Their evidence differs from that for other emerging markets and fails to explain the motivation behind Chinese cross-listings by the market segmentation hypothesis.

2.2 Increased information disclosure

Economic theory suggests that commitment to an increased level of disclosure should reduce the information asymmetry component in a firm's cost of capital (Diamond and Verrecchia 1991, Kim and Verrecchia 1991, 1994, Baiman and Verrecchia 1996). Leuz (2000) examines German firms that switch from German GAAP to IAS or US GAAP and finds evidence supporting the prediction. In a separate paper, Leuz (2002) looks at German firms that make an accounting standard choice between IAS and US GAAP upon listing on the New Market, but does not find a significant economic difference between the two standards.

Coffee (1999) proposes a competing hypothesis for the market segmentation hypothesis, which he calls the 'corporate governance hypothesis', Coffee argues that 'cross-listing may be a bonding mechanism by which firms incorporated in a jurisdiction with

weak protection of minority rights or poor enforcement mechanisms can voluntarily subject themselves to higher disclosure standards and stricter enforcement in order to attract investors who would otherwise be reluctant to invest (or who would discount such stocks to reflect the risk of minority expropriation)' (Coffee 2000, p. 11). Stulz (1999) stipulates that cross-listing increases the cash flows investors expect to receive by increasing the monitoring of management and large shareholders. Reese and Weisbach (2001) examine the hypothesis that non-US firms cross-list in the United States in order to increase the protection of minority shareholders. Doidge, Karolyi, and Stulz (2004) find that Tobin's Q is significantly higher for firms with US cross-listings and highest for exchange listing vs other types of listing. Since exchange listing entails the most stringent regulatory regime to which cross-listed firms are subject, they believe that the empirical evidence supports the corporate governance hypothesis.

3 B share market and Chinese accounting standards

3.1 Structure of the B share market

As shown in the diagram, multiple share categories exist in the Chinese stock market. B shares were originally designed solely for foreign investors but were later opened to trading by domestic individuals. The B share market, which was first introduced to foreign investors in 1991, offered a means for listed firms to 'attract foreign investment, and promote internationalization of the Chinese stock market' (excerpt from Chinese Securities Regulation Council). However, judging by the current state of the Chinese stock market, neither objective has been achieved. The domestic A share market remains largely segmented from the rest of the global financial market, and the B share market remains negligible compared with the domestic A share market. At the end of 2004, the total market value of the A share market was more than \$400 billion, with 1,236 listed firms, while the total market value of the B share market was a mere \$10 billion, with 110 listings. Considering both the rise in B share prices towards parity with A share prices since the abolishment of ownership segmentation⁶, the performance of the B share market is indeed uninspiring.

⁶ At the end of 2001, the average P/E ratio for A shares was 45 and for B shares 25. The latest statistics show that the P/E ratio for A shares is 17 and for B shares 12 on average.

Diagram 1 Share categories for Chinese stock market: tradability and ownership

Ownership \ Tradability	Traded on exchanges	NOT traded on exchanges
Domestic investors	A share, Employee-share	State-share Legal person-share Employee-share ⁷
Foreign investors	B share ⁸	

Although the face values of foreign B shares are denominated in Chinese yuan, their trading is conducted in foreign currencies: on the Shanghai exchange in US dollars and on the Shenzhen exchange in Hong Kong dollars. On the other hand, B shares are identical to A shares as regards cash flow rights, voting rights, and dividends. Moreover, the trading rules for B shares are exactly the same as those for A shares. Investors in B shares are subject to certain ownership restrictions. For instance, an individual investor is allowed to hold a maximum 25% of a firms' outstanding B shares. The number of foreign B shares issued cannot exceed 49% of a firm's total outstanding shares. These limits effectively eliminate the possibility for foreign investors to challenge the controlling shareholder in a control contest.

Cross-holding of A and B shares has been strictly forbidden on the Chinese stock market. Thus arbitrage is extremely difficult, if not impossible. During the past two years, however, considerable measures have been taken by the authorities to revive the poorly performing A share and illiquid B share markets. Both are plagued by poor protection of small investors. Since 19 February 2001, domestic investors have been allowed to trade B shares using their foreign currency savings. On 1 December 2002, Qualified Foreign Institutional Investors (QFII) granted foreign institutions access to the domestic A share market.⁹ Measures are designed to reduce segmentation between the A and B share markets and speed up integration of the Chinese stock market into the global financial market.

In contrast to the enthusiasm of domestic investors for the B share market,¹⁰ QFII remains underdeveloped. This is perhaps not surprising, given foreign investors' earlier lack of interest in the B share market and the continuance of ownership restrictions. Although ownership restrictions still represent some of the most direct barriers to investment facing both domestic and foreign investors, they are not at all the most decisive barriers for

⁷ Employee shares were abolished at the end of 1998.

⁸ Domestic investors were allowed to own B shares as from 19 February 2001.

⁹ Foreign institutional investors are allowed to hold no more than 10% of total outstanding A shares.

the formation of an efficient and liquid stock market. Coffee (2002) contends that the difference in regulatory regimes explains the pattern of international cross-listing, and strong legal standards tend not to repel but to attract investors. This argument might well provide the answer for a better corporate governance structure in the Chinese stock market.

3.2 Chinese GAAP standard and international accounting standard

Chen, Gul, and Xu (1999) examine how the current Chinese accounting standard differs from the IAS. They find that on average the Chinese GAAP overstates reported earnings of cross-listed firms by 20-30% compared to earnings reported under the IAS. After restatements from Chinese GAAP to IAS, 15% of cross-listed firms change from reported profit to reported loss. They further find that 28.5% of the total difference between the two reported earnings is attributable to accruals, which are open to management-opportunistic reporting under the Chinese GAAP. On the other hand, they expect that after the latest revision to the Chinese GAAP, which came into force in 1998, the difference in reported earnings under the two accounting standards is likely to be reduced by 50%, indicating a much closer correspondence between Chinese GAAP and IAS. The International Forum of Accountancy Development (IFAD) surveys the consistency of domestic GAAP with IAS in its GAAP 2001 project, and finds eight areas in which specific Chinese GAAP rules are missing concerning recognition and measurement, and another six areas in which disclosure requirements are lacking. It appears that the Chinese GAAP will need a drastic overhaul to achieve higher quality and faster convergence toward the IAS, which is constantly evolving.

4 Hypotheses

Two competing hypotheses have been advanced to explain the benefits of cross-listing. Although Coffee (2000) claims that the existing evidence on international cross-listing gives greater support to the corporate governance hypothesis, he recognises that some of the

¹⁰B share prices rose sharply towards parity with A shares, and domestic individuals became the largest investor group in all geographic areas.

results could be seen as supporting both hypotheses. For instance, the cross-listing premiums documented by Doidge et al (2004) could be attributed to both increased market integration and improved corporate governance in cross-listed firms.

On the Chinese stock market however, due to the much lower expected returns for domestic investors, firms that intend to cross-list must be aware of the opportunity costs of acquiring external finance by issuing B shares. Moreover, adopting IAS would expose to investors management-opportunistic reporting under Chinese GAAP. Therefore, the market segmentation hypothesis is unable to explain the cross-listing premium on the Chinese stock market.

Echoing Diamond and Verrecchia (1991), and Baiman and Verrecchia (1996), Leuz (2000) draws a distinction between a commitment and a voluntary disclosure. The paper states that 'a commitment is the decision by the firm about what it will disclose before it knows the content of the disclosure, whereas a voluntary disclosure is a decision by the firm after it observes the content'. Therefore, the accounting standard choice can be seen as representing a *commitment* to greater information disclosure. Although disclosure under IAS is meant for foreign investors, adoption of IAS by a cross-listed firm amounts to a credible promise that it will disclose all information, regardless of content, to all investors, regardless of nationality. This commitment effectively eliminates the information asymmetry component in the cost of capital for both foreign and domestic investors.

La Porta, Lopezde-Silanes, Shleifer, and Vishny (1997, 1998, 2000) opens a new avenue between law and finance and argues that better investor protection promotes financial market development. Their evidence shows that strong legal protection of minority shareholders generates higher firm valuation. Coffee (1999), Stulz (1999), and Reese and Weibach (2001) claim that the benefits of a US listing stem from enhanced investor protection. Large shareholders seldom relinquish their privileges voluntarily. If a firm with controlling ownership structure resides in a market with poor investor protection, the expropriation of minority shareholders is less likely to be detected. Moreover, the cost of a legal penalty could be minor and the enforcement weak. However, if large shareholders are presented with growth opportunities that must be financed externally, they will be enticed by the cash flows. If large shareholders expect cash flows to compensate for the loss in private benefits due to ownership dilution, they will opt for external finance under a wealth constraint. Large shareholders could raise external finance either at home, knowing that domestic investors will in any case discount the expropriation possibility in asset prices, or

within a regulatory regime including greater investor protection. The large shareholder should understand that in either case he will have to voluntarily commit to less expropriation of minority shareholders in order to raise more and cheaper capital.

For instance, firms cross-listing on the US market voluntarily raise their corporate governance standards, which enables them to raise more external finance, both at home and abroad. Lins, Strickland, and Zenner (2000) find firms with US listings become less credit constrained. Reese and Weisbach (2001) document a significant increase in post-listing equity offerings outside the US. When external financing is abundantly available, cross-listed firms can invest in more growth opportunities with lower marginal costs of capital. Moreover, with less private benefits appropriated from cash flows, firms can achieve higher valuations.

Foreign B shares are traded on the domestic stock exchanges. Chinese cross-listing is thus different from many international cross-listings, which usually migrate to another regulatory regime. As a result, Chinese security regulations are effectively binding to both domestic and foreign investors. Although the increased information disclosure by Chinese cross-listed firms is not exactly equivalent to migration to a higher corporate governance standard, it can be a functional substitute for higher substantive standards of corporate governance (Coffee 2002). This study borrows the above proposition and argues that the accounting standard choice of Chinese cross-listed firms can be interpreted as the mechanism for committing to a higher corporate governance standard.

In summary, the increase in information disclosure accomplished by the choice of accounting standard has a twofold impact. It reduces the firm's cost of capital and simultaneously increases the cash flow available for investing in growth opportunities. As firm value is essentially the present value of firm's future growth opportunities, this study argues that

H0: Chinese cross-listed firms have higher valuations due to increased information disclosures.

We also test the alternative hypothesis of market segmentation:

H1: Chinese cross-listed firms have higher valuations due to reduced market segmentation.

5 Data and methodology

This study covers firms on the Shanghai Stock Exchange from 1998 to 2001. Our sample includes 83, 86, 87, and 88 cross-listed non-financial firms for the years 1998 to 2001 respectively. For the same years, the respective numbers of firms issuing only A shares were 379, 422, 507, and 576. Firms that issue only B shares were also excluded from the study. The empirical analysis includes comparison of values of cross-listed firms (issuing both A and B shares), to values of other firms (issuing only A shares).

5.1 Descriptions of variables

For the empirical study, firm value is measured by Tobin's Q:

$$\text{Tobin's } Q_{i,t} = \frac{TA_{i,t-1} - BV_{i,t-1} + MV_{i,t-1}}{TA_{i,t-1}}$$

where $TA_{i,t-1}$ is firm i 's total assets, $BV_{i,t-1}$ its book value, and $MV_{i,t-1}$ its market value.

Data on total asset and book value of equity were collected from listed firms' annual financial statements from the previous financial period. The prices of a firm's A and B shares were averaged over the 15-day period at the end of the previous calendar year. These average prices were then multiplied by the numbers of outstanding A and B shares and summed to obtain each firm's total market value.

To test whether the standard market segmentation hypothesis is able to explain the cross-listing premium on the Chinese stock market, this study uses the ratio of total outstanding B to A shares as a measure of market integration for a cross-listed firm. A higher ratio indicates a larger presence of foreign investors in a cross-listed firm. According to the market segmentation hypothesis, when the risk of domestic investors facing investment barriers is shared by many investors, especially with those endowed with more diversified portfolios, the firm's cost of capital should be lower. If the above measure is positively related to Tobin's Q, this will indicate that cross-listed firms do benefit from a higher degree of market integration, so that the market segmentation hypothesis cannot be rejected. The

number of outstanding A and B shares is also collected from firms' annual financial statements.

The main independent variable used to test the corporate governance hypothesis is a dummy variable, which takes value one for a cross-listing and zero otherwise. Cross-listed firms could be more highly valued simply because they have better growth prospects or because of other firm-specific characteristics that are common to all cross-listed firms. Therefore, this study employs several variables to control for the valuation effects of such factors. Two factors are known to affect firms' decisions on cross-listing. The first is the need for external finance, which is addressed by the leverage ratio, and the other is firm's growth opportunity, which is calculated as the average of the past two years' asset growth.

Our empirical tests also include two more control variables: the industry median Tobin's Q and the natural log of the firm's equity. The industry median Tobin's Q separates 28 industries according to CSRC classifications. All variables are calculated using information obtained from firms' annual financial statements. These two variables are calculated directly from our sample.

5.2 Methodology

Two significant changes have occurred in the institutional environment of the Chinese stock market during the sample period. Significant revision of Chinese GAAP in 1998 moved it much closer to IAS, and at the start of 2001 Chinese individual investors began to trade B shares on the two exchanges. Thus cross-section regressions were run for each sample year to examine how these two structural breaks affect the cross-listing premiums. Given the panel data structure of our sample, the panel data analysis is reported next. This includes the pooled regression, fixed effect, and random effects models. The diagnostic tests, including Lagrange multiplier and Hausman's test were performed to determine which model performs best.

In the empirical analysis we essentially tested whether cross-listed firms (identified by cross-listing dummy) have higher valuations than their non-cross-listed counterparts. However, caveats are needed in interpreting the cross-listing premium. Cross-listed firms could have higher valuations simply because firms with higher valuations have better corporate governance standards. These firms may prefer to use cross-listing to signal their

higher standards. Thus the higher valuation of cross-listed firms could be due simply to selection bias. To tackle the data selection problem, we adopted the Heckman's two-step procedure for the sample year cross-section regressions.

In the first step of the Heckman procedure, the selection process which is responsible for selection bias problems is studied via the so-called selection model. For this purpose a PROBIT model is usually estimated (because its error term is normally distributed - an underlying assumption of the Heckman model). In this study, the selection model adopts the cross-listing dummy as the dependent variable and there are twelve firm-specific independent variables. In the Heckman procedure, the residuals of the selection equation are used to construct a selection bias control factor (λ), which is equal to the inverse of Mill's ratio. This factor is a summarising measure which reflects the effects of all unmeasured characteristics. In the second step of the Heckman procedure, the analysis is performed on the original valuation equation (our main focus of interest). In this substantial analysis we use λ as an additional independent control for selection bias.

Another widely adopted method of studying cross-listings is the event study methodology. However, the use of event study methodology is particularly problematic as regards the Chinese stock market, due to poor and often irregular information disclosure practices. Trading on insider information is rampant, and so the establishment of a correct event window is difficult, if not impossible. Moreover, the main purpose of this study is not to investigate the effects of cross-listing on share prices but rather to explain the cross-listing premium. Therefore, this study does not apply the event study methodology.

6 Empirical tests

6.1 Cross-listings

Panel A (Table 1) reveals some interesting patterns of cross-listings. Only five firms issued B shares in our sample period from 1998 to 2001, while the majority of cross-listings occurred prior to 1998. On the other hand, initial public offerings of domestic A shares totalled 197 in the same period. The pattern of dramatic decline in cross-listing activity seems to indirectly support the prediction that the much improved Chinese GAAP standard adopted in 1998 alleviates the information asymmetry problem for non-cross-listed firms

and renders cross-listing a less valuable means of committing to the better information disclosure.

Panel B compares the size of cross-listed firms with their counterparts. It shows that the average (median) size of cross-listed firms is 67% greater than that of non-cross-listed firms in our sample. The difference is consistent with that of Doidge et al (2004)¹¹, but considerably smaller in magnitude. Doidge et al (2004) argues that the higher corporate governance standard should enhance firms' ability to raise cheaper external finance more easily, which results in higher total assets in cross-listed firms. This explanation appears to be relevant also to our findings concerning the Chinese stock market.

Table 1 Summary statistics of cross-listed firms

Panel A Cross-listings by year

	Firms issue both A and B shares	Firms issue only A shares	Total
1998	83	379	469
1999	86	422	516
2000	87	507	603
2001	88	576	673

Panel B Total assets of listed firms (in CNY bn)

	Mean	Median	Min.	Max.	Observation
Cross-listing	2.53 (15.518)	1.75 (2.256)	0.28	15	200
Non-cross-listing	2.25 (9.107)	1.05 (6.076)	0.05	360	1926

T-statistics and Wilcoxon signed rank statistics in parentheses.

6.2 Market segmentation hypothesis

Table 2 summarises the B share price discount, calculated from both the current sample and collected from other studies. The average (median) price discount calculated on IPO price is 40% in our sample. This means that, by issuing B shares to foreign investors, cross-listed firms would raise 40% less finance than that they would have raised by issuing exclusively to domestic investors. Panel B gives evidence from previous studies to demon-

¹¹Doidge et al (2004) document that total assets of US listed firms are six to ten times larger than those of non-listed firms. They argue that large firms are likely to be recognized by US investors and more likely to have internationally traded goods, following Kang and Stulz (1997).

strate the consistent pattern of the B share price discount on the Chinese stock market. The B share discount ranges from 50% to over 80% of the A share price in various time periods prior to 2001. This evidence is crucial for disentangling the corporate governance and market segmentation hypotheses.

Table 2 Price discount of B share¹², %

Panel A IPO price discount of B shares on Shanghai stock exchange

Sample	Mean	Median
40 firms	0.96	0.36
1994-2000	(1.69)	(5,67)

T-statistics and Wilcoxon signed rank statistics in parentheses

Panel B Evidence of B share price discount in other studies, %

Discount = (AB)/A ¹³	Sample	Mean discount
Bailey (1994)	8 firms, 1992-1993	0.50 ¹⁴
Charkravarty, Sakar, and Wu (1998)	39 firms, 1994-1996	0.59
Fernald and Rogers (2000)	57 firms, 1993-1997	0.53
Karolyi and Li and (2003)	75 firms, 1999-2001	0.81

The market segmentation hypothesis is tested with OLS cross-sectional regressions for each sample year. The tested sample includes only cross-listed firms. The results in Table 3 show that coefficients of the proxy for market integration are negative and statistically significant in all four sample years. This means that a cross-listed firm is lower valued if it has a larger presence of foreign investors. The evidence thus rejects the market segmentation hypothesis for the Chinese stock market. As we have discussed in studies on the B share discount, since the expected return is apparently higher for foreign investors than for their domestic counterparts, the large portion of B shares in total outstanding share results in higher capital costs and thus low valuation.

Among other independent variables, the firm size is found to be negatively related to valuation of cross-listed firms in all sample periods. The negative coefficients seem to echo the 'size effect' anomaly, which is obviously difficult to interpret. We have previously found a negative relation between firm size and block premium. We borrow the earlier explanations and argue that a large shareholder base in a large listed firm helps to prevent

¹² Calculated as (A share price – B share price) / A share price

¹³ B denotes B share price; A denotes A share price.

large shareholder's earnings management. Although the better monitoring of large shareholders should entail higher valuation for the firm, here in this study the Tobin's Q is calculated mainly from accounting information. As discussed in connection with accounting standards, previous studies show that the Chinese GAAP overestimates earnings by as much as 30%. Therefore, without less opportunistic possibility of pumping up earnings, the large firm will experience lower valuation as measured by Tobin's Q.

Table 3 Market segmentation hypothesis

This test is used to confirm previous studies on the price anomaly of A and B- shares on the Chinese stock market. Both pooled and sample year regressions are run individually. The model is specified as: Tobin's $Q_i = \beta_0 + \beta_1 * MI_i + \beta_2 * Assets_i + \beta_3 * Industry_i + \beta_4 * Leverage_i + \beta_5 * Growth_i + \epsilon$. Degree of market integration for cross-listed firms is proxied by total outstanding B shares divided by total outstanding A shares. Firm size is the logarithm of total equity. Industry median is the industry median Tobin's Q. Leverage is the debt-to-asset ratio. Growth is average revenue growth over the past two consecutive years. The sample includes only cross-listed firms.

	1998	1999	2000	2001
Constant	5.393*** (2.773)	14.671*** (5.238)	36.045*** (7.022)	41.744*** (7.997)
Market integration	-1.137*** (-3.623)	-1.401*** (-3.373)	-2.606*** (-3.056)	-1.950** (-2.275)
Firm size	-0.211** (-2.222)	-0.577*** (-4.277)	-1.574*** (-7.242)	-1.663*** (-7.774)
Industry median	0.519** (2.356)	0.263 (0.738)	0.200 (0.426)	-0.550 (-0.736)
Leverage	0.0038 (0.946)	-0.0000 (-0.182)	0.0038*** (6.542)	-0.0006 (-0.673)
Growth	0.0000 (0.323)	-0.0000 (-0.965)	-0.0045 (-1.476)	0.0002 (0.455)
Adjusted R-square	31.40	43.60	79.90	57.80
F-value	4.40	7.035	32.82	12.76
Observation	37	39	40	43

T-statistics in parentheses.

*** indicates significance at 1% level

** indicates significance at 5% level

* indicates significance at 10% level

¹⁴ Price discount is calculated from results in Bailey (1994).

The next step in testing the market segmentation hypothesis is to perform a panel data analysis. This is the more efficient methodology for our sample data. Moreover, panel data analysis enables us to check for robustness of the OLS regression. The results from the panel data analysis are shown in Table 4. The diagnostic test indicates that the pooled regression model is indeed the preferred choice of the three. The coefficients of the market integration variable are negative and statistically significant in all three models. Industry median Tobin's Q and firm's leverage are found to be positively correlated with Tobin's Q. Growth prospects gets positive coefficients in all three models, but is statically significant only in the fixed effects model. The result corroborates with that in the earlier OLS regression. The empirical evidence thus overwhelmingly rejects the market segmentation hypothesis.

Table 4 Panel analysis of market segmentation hypothesis

This test is used to confirm previous studies on the price anomaly of A and B shares on the Chinese stock market. The panel analysis is run in three specifications: pooled, fixed effects, and random effects. Results from diagnostic Lagrange Multiplier and Hausman tests are reported in the table.

	Pooled regression	Fixed effects	Random effects
Constant	29.4158*** (8.835)		29.4067*** (8.738)
Market integration	-1.9696*** (-3.589)	-1.9310** (-2.489)	-1.9656*** (-3.585)
Firm size	-1.3264*** (-8.916)	-2.0522*** (-6.389)	-1.3256*** (-8.804)
Industry median	0.6270*** (2.791)	0.6162** (2.150)	0.6126*** (2.784)
Leverage	0.0234*** (4.749)	0.0308*** (3.975)	0.0234*** (4.733)
Growth	0.0011 (0.775)	0.0029** (2.255)	0.0019 (1.593)
Adjusted R-square	54.28	55.69	81.98
F-value	29.01	3.12	15.64
LM	0		
Hausman	10.05		
Observation	119	119	119

T-statistics in parentheses.

*** indicates significance at 1% level

** indicates significance at 5% level

* indicates significant a 10% level

6.3 Corporate governance hypothesis

Heckman's two-step procedure is performed for each sample-year regression. The selection equation is estimated by PROBIT, which includes twelve firm-level independent variables. Ideally, the selection equation should employ exogenous firm characteristics which affect listing decisions but not the valuation equation. However, since firm size, leverage ratio, and growth opportunity are important factors in listing decisions, we also include those in the selection equation. The firm size variable is found to be significant in the selection equation.

We then estimate the valuation equation, with adjustment for selection bias. The results are reported in Table 5. The coefficients of the cross-listing dummy are negative (not statistically significant) for 1998 and 1999 but positive (highly significant) for 2000 and 2001. Coefficients of Heckman's Lambda are negative and statistically insignificant for all sample years, indicating that selection bias does not pose a serious problem in our empirical tests.

Table 5 Corporate governance hypothesis

The model is specified as: Tobin's $Q_i = \beta_{0i} + \beta_1 * MI_i + \beta_2 * Assets_i + \beta_3 * Industry_i + \beta_4 * Leverage_i + \beta_5 * Growth_i + \varepsilon$. CL is a dummy variable that takes the value of 1 for a cross-listed firm. Assets are the logarithm of equity. Industry is the industry median Tobin's Q. Leverage is the debt-to-asset ratio. Growth is revenue growth.

	1998		1999		2000		2001	
	PROBIT	Heckman	PROBIT	Heckman	PROBIT	Heckman	PROBIT	Heckman
Constant	-11.0866*** (-4.178)	15.5340*** (11.224)	-10.3388*** (-4.334)	17.2621*** (12.335)	-10.2683*** (-4.474)	36.5706*** (14.372)	-9.1780*** (-4.410)	31.0190*** (13.705)
CL		-0.3961 (-0.803)		-0.3098 (-0.577)		2.2494* (1.834)		2.2551* (1.815)
Lambda		-0.0155 (-0.057)		0.5363 (0.182)		-0.9534 (-1.478)		-0.8278 (-1.286)
ROE	0.0028 (0.473)		-0.0000 (-0.237)		0.0005 (0.309)		-0.0003 (-0.187)	
AR turnover	-0.0001 (-0.498)		-0.0555* (-1.869)		-0.0187 (-1.126)		-0.0154 (-1.243)	
Inventory	0.0005		0.0014		0.0005*		0.0002*	

turnover	(1.327)	(1.259)	(1.791)	(1.728)				
Asset turn- over	-0.4517 (-1.308)	-0.3165 (-0.944)	-0.2134 (-0.787)	0.1107 (0.598)				
Quick ratio	-0.1016 (-0.874)	-0.3536** (-2.046)	-0.1792 (-1.275)	-0.2062* (-1.865)				
Leverage ratio	-0.0042 (-0.509)	-0.0067 (-1.005)	0.0021 (0.538)	0.0014 (0.515)				
Short-term debt ratio	0.0006 (0.875)	0.0031 (0.811)	0.0089 (1.531)	0.0087 (1.480)				
Firm size	0.4768*** (4.182)	0.4800*** (4.277)	0.4062*** (4.170)	0.3469*** (4.036)				
Revenue growth	-0.0078* (-1.923)	0.0000 (0.489)	0.0000 (0.043)	-0.0000 (-0.104)				
Profit growth	-0.0001 (-1.180)	0.0000 (1.233)	0.0002 (1.426)	0.0000 (0.588)				
Equity growth	-0.0001 (-0.442)	0.0000 (0.150)	-0.0008 (-0.679)	0.0031 (1.492)				
Asset growth	-0.0083* (-1.820)	-0.0119*** (-2.715)	-0.0066* (-1.903)	-0.0125*** (-2.909)				
Firm size	-0.6875*** (-10.465)	-0.7718*** (-11.801)	-1.6714*** (-14.779)	-1.3972*** (-14.644)				
Industry median	0.8141*** (6.247)	0.7494*** (6.501)	0.7042*** (3.577)	0.2525 (0.862)				
Leverage ratio	-0.0161*** (-6.131)	-0.0063*** (-2.945)	-0.0054 (-1.471)	0.0144*** (6.520)				
Revenue growth	0.0015* (1.716)	0.0003 (1.192)	-0.0004 (-0.515)	-0.0001 (-0.355)				
logL	-100.49	-111.32	-125.25	-140.74				
Pseudo R ²	21.50	18.68	14.55	11.94				
Adjusted R ²	44.39	36.78	34.43	34.50				
Observa- tion	425	418	471	465	559	550	634	620

T-statistics in parentheses.

*** indicates significance at 1% level

** indicates significance at 5% level

* indicates significant at 10% level

Chen et al (1999) confirm that the Chinese GAAP has been significantly improved since 1998, to make it more like IAS. The recent upgrade in Chinese GAAP should certainly reduce the information asymmetry component in capital costs for all listed firms. Thus, one might expect that the incentives for firms to cross-list will diminish. However, the cross-listing premium in the results demonstrates a time pattern of increasing magnitudes and significance. We argue that while both cross-listings and an improved Chinese GAAP represent the higher information disclosure standard, the distinction between the two is fundamental. As we have discussed in the previous section, a voluntary commitment to the higher information disclosure standard by cross-listing sends a much more credible signal than the overall improvement in the involuntary disclosure requirement in the Chinese GAAP. Thus the pattern of increasing cross-listing premia indicates that a general upgrading of the accounting standard cannot be viewed as a substitute for cross-listings as a mechanism for achieving better corporate governance.

The coefficients for firm size and industry median exhibit the same patterns as in the test of market segmentation hypothesis. The coefficients of leverage ratio, however, exhibit an interesting time pattern. More specifically, the coefficients changed from negative to positive during the sample period. The empirical evidence on the relationship between valuation and firm's leverage is mixed at best. The time pattern seems to support the timing hypothesis of how capital structure is determined under information asymmetry. Under the timing hypothesis, managers receive information one period before the market and act in the interests of long-term shareholders (Lucas and McDonald 1990). A firm issues equity when it is overvalued and delays issuing when it is undervalued. Chinese firms flocked to the stock market to ease their finance constraints. While capital was cheap and abundant in the earlier years, firms took advantage of this by issuing as much equity as possible. Thus the lower firm leverage actually represents lower capital costs for listed firms. More recently, the Chinese stock market has been in an extended downturn, due to some negative factors: inter alia, spectacular earnings management, insider manipulation of share prices, and outright expropriation from minority shareholders. Meanwhile, interest rates are low because of expansionary monetary policy in the aftermath of the Asian financial crisis. This changing environment means that higher leverage implies lower capital costs and hence higher valuations for listed firms in the more recent years.

As discussed in the methodology section, the panel data analysis was used to test the corporate governance hypothesis. Table 6 shows the results from the empirical analysis. The random effects panel model is preferred, based on the diagnostic test results. The coefficients of the cross-listing dummy are again positive for all the models, and statistically significant in both the pooled and random effects models. Coefficients of other firm-specific variables are identical to those in the earlier empirical explorations. The adjusted R-square for the random effects model is 78%, which indicates a satisfactory performance by the panel data model.

Table 6 Corporate governance hypothesis

The model is specified as: $Tobin's\ Q = \beta_0 + \beta_1 * CL + \beta_2 * Assets + \beta_3 * Industry + \beta_4 * Leverage + \beta_5 * Growth + \beta_6 * Interactive + \beta_7 * Dummy + \varepsilon$. CL is a dummy variable that takes the value one for a cross-listed firm. Assets are the logarithm of total assets. Industry is the industry median Tobin's Q. Leverage is the debt-to-assets ratio. Growth is revenue growth.

	Pooled regression	Fixed effects	Random effects
Constant	26.2170*** (23.630)		29.6282*** (24.306)
CL	0.3152* (1.924)	0.3441 (0.554)	0.3106* (1.725)
Firm size	-1.2351*** (-24.313)	-1.3069*** (-20.002)	-1.2536*** (-24.904)
Industry median	0.8562*** (11.047)	0.8021*** (9.351)	0.8411*** (11.349)
Leverage	0.0080*** (5.418)	0.0091*** (4.537)	0.0084*** (5.738)
Growth	-0.0000 (-0.049)	-0.0002 (-0.514)	-0.0000 (-0.230)
Adjusted R-square	35.66	48.70	78.19
F-value	159.51	3.12	106.55
LM	34.52		
Hausman	3.24		
Observation	1849	1849	1849

T-statistics in parentheses.

*** indicates significance at 1% level

** indicates significance at 5% level

* indicates significance at 10% level

The results are thus robust under different model specifications and methodologies. The results clearly support the corporate governance hypothesis of a cross-listing premium on the Chinese stock market. On the other hand, given the results on the negative relationship between firm value and market integration, this study rejects the market segmentation hypothesis. Moreover, the magnitude of the cross-listing premium would have been larger if the negative impact on capital cost of issuing B shares had been discounted.

7 Conclusions and discussion

Studies have documented positive impacts of cross-listing on the firm's valuation. Efforts have been made to formulate alternative hypotheses to explain the cross-listing premium. The corporate governance hypothesis concentrates on migration to a high quality regulatory regime as a means of improving the corporate governance standard. Adoption of a better corporate governance standard reduces the information asymmetry component in the cost of capital, and the consumption of private benefits. Alternatively, the market segmentation hypothesis looks at investor diversification as a means of lowering the cost of capital to the firm. Since both hypotheses are able to explain the higher valuation from cross-listing, separating these two hypotheses proves to be difficult.

Chinese cross-listings offer a unique opportunity to tackle the above problem. The presence of a B share price discount suggests that the market segmentation hypothesis probably contributes to the cross-listing premium. Moreover, since B shares are also traded on the Chinese stock market (contrary to most international cross-listings), this study is able to examine the cross-listing premium without needing to consider changes in the regulatory environment.

With the above unique features of the Chinese stock market, this study is able to provide direct evidence supporting the corporate governance hypothesis of cross-listing. Moreover, it demonstrates the positive economic consequence of increased information disclosure on the Chinese stock market. This study documents significant cross-listing premia under different specifications and methodologies. More importantly, this study argues that an overall upgrading of the accounting standard cannot substitute for the cross-listing mechanism. On the other hand, this study confirms that the Chinese cross-listing leads to a lower firm valuation and thus rejects the market segmentation hypothesis.

Although the ownership restriction on B shares was finally abolished in 2001 this study remains relevant because it explores the critical relationship between corporate governance and firm valuation. Although efforts have been made in recent years to break down investment barriers on the Chinese stock market, the overall development of this emerging market may still rely crucially on the extent to which corporate governance is improved. The latter is indeed the more difficult task ahead.

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