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# Three Essays on Cross-Listing

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**THREE ESSAYS ON CROSS-LISTING**

by

Liu Wang

M.Sc. March 2004, University of Essex

A Dissertation Submitted to the Faculty of  
Old Dominion University in Partial Fulfillment of the  
Requirement for the Degree of

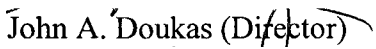
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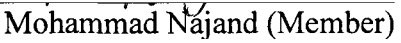
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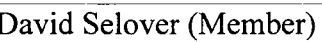
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## **ABSTRACT**

### **THREE ESSAYS ON CROSS-LISTING**

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This dissertation examines the role of cross-listing in shaping corporate earnings quality, stock price informativeness, and firm valuation, as well as its impact on a listing firm's home country information asymmetry and stock misvaluation.

The first essay addresses the information asymmetry between Chinese local A-share and foreign B-share markets and its impact on the B-share discount puzzle. In contrast with the widespread belief that domestic investors are better informed than foreign investors, this study indicates that foreign investors actually possess more value-relevant, firm-specific information in an emerging market such as China, where information transparency and investor protection are relatively weak. As such, the observed B-share discount is not compensation for the informational disadvantage of foreign investors but, rather, the result of a downward price correction effect.

The second essay examines the impact of cross-listing on corporate earnings management, price informativeness, and firm value, contingent upon increased market integration. Consistent with the bonding hypothesis, cross-listed firms are found to have better earnings quality, more informative stock prices, and higher valuation than non-cross-listed firms, even though the divergence between the two groups of firms has been less evident since the regulatory reforms of the Chinese stock market liberalization.

The third essay investigates the role of U.S. listing in mitigating a listing firm's home country information asymmetry and stock misvaluation. In contrast with conventional theories that predict enormous cross-listing benefits, this study finds no significant cross-listing premiums. Further investigation indicates that the absence of cross-listing premiums for Chinese firms is mainly a result of a downward price correction (toward the fundamental values of the stocks) once U.S. listing allows for an enhanced capitalization of firm-specific information. In particular, I find that firms with U.S. listings have more informative and less overvalued stock prices than comparable home country firms and that exchange-based U.S. listings result in more informative and more accurately valued stocks than non-exchange-based listings.

The empirical findings of these studies suggest a consistent story: cross-listing on a more regulated market plays an important role in inducing better corporate governance and more transparent information environments, even in today's increasingly integrated world.

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## CHAPTER 1

### INTRODUCTION

Over the past few decades, the issue of international listings has been one of the primary focuses in modern finance literature. Conventional theories suggest that firms list overseas to lower their cost of capital through mitigated investment barriers, reduced risk exposure, increased liquidity, visibility, and investor base. While these hypotheses have had some success in explaining cross-listing practices, their empirical validity and saliency have long been questioned. Major criticisms stem from their failure to explain why firms continuously list overseas after the removal of investment barriers; why relatively few firms cross-list overseas, given the proposed benefits; and why the market reacts more positively if the firm chooses to cross-list on major exchanges as opposed to over-the-counter (OTC) and private placements.

Facing these difficulties of conventional theories in explaining cross-listing rationales, a variety of hypotheses have been developed, among which the most influential is the bonding hypothesis proposed by Coffee (1999, 2002) and Stulz (1999). In the context of the bonding hypothesis, firms cross-list on more regulated markets to voluntarily bond themselves to higher regulatory, disclosure, and monitoring standards so as to mitigate potential agency conflicts. Built upon this ground, a growing body of literature consistently documents evidence that is in line with this hypothesis. For example, Doidge, Karolyi, and Stulz (2004) find that foreign companies with shares cross-listed in the United States are worth more relative to similar home country firms, and Doidge, Karolyi, Lins, Miller, and Stulz (2009) find that firms' decisions to list overseas involve a trade-off between private control and bonding benefits.

While there is substantial evidence that the bonding consideration is one of the major determinants of a firm's listing decision, whether and to what extent cross-listed firms can effectively "rent" the regulatory environment of another country is still an empirical question. As Cantale (1996) and Moel (1999) point out, even though cross-listing has a positive impact on firm value, the observed listing benefits may not necessarily be attributable to the bonding role of cross-listing but simply a signaling effect. By listing on a market with more stringent disclosure and regulatory requirements, a firm can signal the market that it is a high-quality firm, resulting in a higher valuation, even though no significant improvement in its corporate governance is made.

Moreover, another inevitable challenge to the bonding hypothesis is whether and to what extent the progressive globalization process and enhanced capital market integration will erode the bonding role of cross-listing. Because a necessary condition for the bonding hypothesis to be sustained is the divergence in underlying investment environments across markets, bonding benefits should be mitigated to a large extent in an increasingly integrated world, where regulatory and disclosure requirements are more or less standardized.

These ongoing debates call for direct evidence of the impact of cross-listing in a more integrated world. This study addresses the changing role of cross-listing in shaping corporate behavior in the context of earnings management, stock price informativeness, and firm valuation, as well as its impact on a listing firm's home market information asymmetry and stock misvaluation, contingent upon increased market integration.

China has been chosen as the research focus of this dissertation for two reasons. First, interest in understanding the Chinese capital market has grown commensurately

with China's economic development and its increased integration with the world economy. Nevertheless, empirical evidence to date has been rare and inconclusive in documenting the impact of cross-listing on Chinese firms, and China has been excluded from many influential studies. Therefore, testing the generalizability of the bonding hypothesis for Chinese firms offers an important building block to the literature.

Second, while the issue of cross-listing has stimulated a considerable amount of quality research, a common limitation associated with these studies is that they tend to consider cross-listing impact within a static framework. The effect of globalization on the dynamics of cross-listing (and delisting) decisions is largely ignored. In an increasingly integrated world, observing a significant bonding impact is not the end of the story. A more relevant and important question to address is whether and to what extent the progressive globalization process and enhanced capital market integration affect the role of cross-listing. The structural segmentation and subsequent liberalization of the Chinese stock market provide us with an ideal laboratory for testing this issue.

## **CHAPTER 2**

### **INFORMATION ASYMMETRY, PRICE DISCOVERY, AND THE CHINESE B-SHARE DISCOUNT PUZZLE**

#### **2.1. INTRODUCTION**

As capital markets become more and more globally integrated, the issue of information asymmetry in international equity markets is becoming increasingly crucial. Despite general agreement on the presence of information asymmetry, the issue of whether or not domestic investors are better informed than foreign investors remains controversial, especially in emerging contexts. Some researchers argue that domestic investors are better informed because they have linguistic, cultural, and regulatory advantages (e.g., Brennan and Cao, 1997; Chan, Menkveld, and Yang, 2008), whereas others point out that foreign investors have an informational advantage in emerging markets because they are more experienced and subject to less information censorship (e.g., Chui and Kwok, 1998; Grinblatt and Keloharju, 2000).

In the context of China, one major contribution of the information asymmetry analysis is that it points to a possible explanation for the Chinese B-share discount puzzle. Prior to Chinese stock market liberalization in 2001, Chinese firms could issue two classes of stocks, identical in all aspects except for their ownership restrictions: A shares, which could only be held and traded by Chinese domestic investors, and B shares, which could only be held and traded by foreign investors. As a result, the Chinese stock market is divided into two separate markets: the local A-share and foreign B-share markets.

In segmented markets where companies issue restricted shares that are only available to domestic investors and unrestricted shares that can be held and traded by foreign investors, unrestricted shares are traded uniformly at a premium relative to their restricted counterparts (e.g., Bailey, Chung, and Kang, 1999). In China, however, unrestricted B shares are traded at a large discount, a fact that is often referred to as the “Chinese B-share discount puzzle” (Bailey et al., 1999; Bailey and Jagtiani, 1994; Chan et al., 2008; Yang and Lau, 2005). This sharp contrast has attracted a substantial body of research, among which the most influential is the uninformed foreign investor hypothesis. The idea is that, due to language barriers, different accounting standards, and weak access to local information, foreign investors often have less information than domestic investors, and, hence, require a higher premium (stock price discount) in the B-share market (e.g., Chakravarty, Sarkar, and Wu, 1998; Chan et al., 2008). A major deficiency of this argument stems from its generalizability to emerging markets.

In an environment with limited investor protection, ineffective legal enforcement, and ill-functioning accounting–auditing systems, neither foreign nor domestic investors are in possession of sufficient value-relevant, reliable corporate information. Consequently, Chinese investors are often regarded as speculators who trade on rumors, rather than informed investors who trade on fundamentals (e.g., Ma, 1996; Mei, Scheinkman, and Xiong, 2003). Additionally, the movements of Chinese stocks are found to be highly synchronous with the movements of the market rather than reflecting firm-specific information (e.g., Chan and Hameed, 2006; Morck, Yeung, and Yu, 2000). A comparison of price synchronicity among 40 countries placed China the second highest worldwide (Morck et al., 2000). The fact that Chinese domestic A shares are not

informative *per se* has been a large factor in questioning the uninformed foreign investor interpretation of the B-share discount puzzle. More interestingly, Chui and Kwok (1998) find that in an emerging market such as China, foreign investors are actually more informed than domestic investors.

The ongoing debate over the issue of whether or not domestic investors are better informed than foreign investors in emerging markets gives rise to the first motivation of this study. Using a panel sample of Chinese firms that issue both local A and foreign B shares, I find that foreign investors tend to be more informed than domestic investors in an environment with weak investor protection and limited information transparency. Additionally, this study explores more deeply the controversy over the information-based interpretation of the B-share discount puzzle. With informed foreign investors and inherent home market stock misvaluation, the observed Chinese B-share discount is not compensation for the informational disadvantage of foreign investors but, rather, the result of a downward price correction (toward the fundamental values of the stocks) once more firm-specific information is capitalized by sophisticated foreign investors. Finally, despite the overwhelming focus on the structural segmentation of the Chinese stock market, little, if any, attention has been paid to investigating the magnitude of information asymmetry and the B-share discount, taking into account recent regulatory reforms in China. Whether and to what extent recent market liberalization reforms affect the information environment and the B-share discount in China is still an open question. This study also bridges this gap.

The remainder of this essay is organized as follows. Section 2 briefly discusses the development of the hypotheses. Section 3 describes the data and model specifications. Section 4 reports the empirical results, followed by concluding remarks in Section 5.

## **2.2. HYPOTHESIS DEVELOPMENT**

### ***2.2.1. Information Asymmetry***

Despite the growing importance of the problem of information asymmetry in international equity markets, the issue of whether or not domestic investors are better informed than foreign investors remains controversial, especially in emerging contexts. In the literature, it is widely believed that foreign investors have an informational disadvantage relative to domestic investors due to the former's lack of linguistic, cultural, and regulatory knowledge and weak access to local information (e.g., Brennan and Cao, 1997; Chakravarty et al., 1998; Chan et al., 2008).

In support of the uninformed foreign investor hypothesis, Chan et al. (2008) point out that foreign investors tend to face more severe information asymmetry in an emerging market with limited investor protection and weak information transparency. In China, for example, due to the lack of investor protection, firms often do not fully disclose material changes in their business conditions, corporate managers freely manipulate firm-specific information, and insider trading is widespread. This is the very case facing the Chinese stock market. However, this argument ignores the fact that Chinese domestic investors are likely to face the same degree of information asymmetry as foreign investors.

In an environment with limited investor protection, ineffective legal enforcement, and ill-functioning information infrastructure, domestic investors may not necessarily be



more informed than foreign investors. In China, investors are frequently regarded as speculators who trade on rumors rather than informed investors who trade on fundamentals (e.g., Ma, 1996; Mei et al., 2003). Moreover, price movements are found to be highly synchronous with the movements of the market rather than reflecting firm-specific information (e.g., Chan and Hameed, 2006; Morck et al., 2000). The fact that Chinese domestic A shares are not informative *per se* plays a major role in questioning the uninformed foreign investor interpretation of the B-share discount puzzle.

In this study, I expect foreign B-share investors to be better informed than domestic A-share investors. I justify this argument on three grounds. First, the disclosure requirement is stricter for firms with B-share listings. In China, firms that issue shares to both domestic and foreign investors are required to prepare their financial statements based on both the Chinese Generally Accepted Accounting Principles (GAAP) and the International Accounting Standards (IAS), whereas firms that issue shares exclusively to domestic investors are subject solely to the Chinese GAAP. The increased financial reporting standard in the B-share market will, to a large extent, mitigate information asymmetry between corporate insiders and outsiders. Second, the B-share market is more regulated and subject to less information censorship. The increased investor protection and enhanced information transparency in the B-share market will undoubtedly facilitate timely information transmission and promote informed trading. Third, foreign investors participating in the B-share market are often more sophisticated than Chinese domestic investors in collecting, processing, and analyzing value-relevant corporate information. If foreign investors are more informed, then it is rational for

Chinese domestic investors to follow those relatively informed foreign investors in their decision-making processes.

In the literature, a popular way to address the direction of information flow is to investigate the lead–lag relation between the two markets. In a perfect market with no information asymmetry, all available information should be incorporated into stock prices instantaneously. However, if some investors have an informational advantage relative to others, then a large portion of information will be impounded into stock prices by uninformed investors with a lag after observing the action of informed investors. Consistent with this argument, Lo and MacKinlay (1990) find that past returns of large firms lead current returns of small firms; Badrinath, Kale, and Noe (1995) find that returns on stocks with high institutional ownership lead returns on stocks with low institutional ownership; Brennan, Jegadeesh, and Swaminathan (1993) and Chanand and Hameed (2006) find that returns of firms with high analyst coverage lead those of firms with low analyst coverage. These findings suggest that there is a significant lead–lag relation between informed and uninformed parties, and that uninformed investors tend to follow informed investors in their decision making processes.

In the context of this study, the informed foreign investor hypothesis implies that information will tend to flow from foreign to domestic investors in an emerging market such as China, and that the movements in the B-share market will lead those in the A-share market. Therefore, the following hypothesis is developed.

*H1: Foreign investors are better informed in an emerging market such as China, and the movements in the B-share market will lead those in the A-share market.*

Besides the information flow analysis, another effective way to address the direction of information asymmetry is to compare the price informativeness between the two classes of stocks. If domestic investors are better informed, then A-share prices should be more value-relevant relative to their B-share counterparts. On the contrary, if foreign investors are better informed, then B-share prices should be more informative compared to their A-share counterparts.

Drawing on state-of-the-art finance literature, this study uses price synchronicity to measure stock price informativeness. As Roll (1988) points out, the extent to which stocks move together depends on the relative amounts of firm-level and market-level information incorporated into stock prices. In the past two decades, a growing body of literature consistently provides empirical support for this information-based interpretation of stock synchronicity. For example, Morck et al. (2000) find that stock prices move together more in emerging markets, where reliable firm-specific information is either technically unavailable or prohibitively costly. Durnev, Morck, Yeung, and Zarowin (2003) indicate that the relationship between current returns and future earnings is stronger for firms and industries with low price synchronicity. Durnev, Morck, and Yeung (2004) document a positive association between the economic efficiency of corporate investment and the magnitude of firm-specific variation in stock returns. Jin and Myers (2006) find that stock price synchronicity decreases with the level of information transparency. Gul, Kim, and Qiu (2010) note that foreign ownership and auditor quality are inversely associated with synchronicity and that the amount of firm-level information reflected in stock prices is lower for firms with high synchronicity.

These empirical findings point to a single story: higher firm-specific return variation (as a fraction of total variation) indicates more informative stock prices.

This can also be justified easily on conceptual grounds. Theoretically, this stream of research is developed upon a hypothesized decomposition of information in stock pricing. The idea is that if asset prices can be considered as a function of both firm-specific and market-wide information, then in an environment with significant impediments to informed trading, investors will have to rely more on market-wide information, resulting in a higher degree of stock co-movement. On the other hand, in an environment with sufficient investor protection and information transparency, stock prices will tend to be less synchronous with each other due to informed trading.

In the context of this study, the informed foreign investor hypothesis implies that foreign B-share prices should be more informative (less synchronous) than their A-share counterparts. Therefore, the following hypothesis is derived.

*H2: Foreign investors are better informed in an emerging market such as China, and foreign B-share prices are more informative than local A-share prices.*

### **2.2.2. The B-Share Discount Puzzle**

In segmented markets where companies issue restricted shares that are only available to domestic investors and unrestricted shares that can be held and traded by foreign investors, unrestricted shares are traded uniformly at a premium relative to their restricted counterparts (e.g., Bailey et al., 1999; Bailey and Jagtiani, 1994; Domowitz, Glen, and Madhavan, 1997; Hietala, 1989; Stulz and Wasserfallen, 1995). In China, however, unrestricted B shares are traded at a large discount (e.g., Bailey et al., 1999; Bailey and Jagtiani, 1994; Chan et al., 2008; Yang and Lau, 2005). This difference is

considered a “puzzle” because, in theory, given that foreign investors can diversify away a large portion of the risk associated with Chinese B shares through non-Chinese stocks, the required return should be lower for foreign B shares than for local A shares, resulting in a B-share premium rather than a discount.

The sharp contrast between the Chinese and other capital markets has attracted a substantial body of research. Nevertheless, empirical evidence to date has been inconclusive in interpreting the causes of the discount. Overall, frequently documented explanations can be roughly classified into four streams.

The first stream of research relies on the theory of supply and demand. On the one hand, the lack of alternatives to low-yielding bank accounts in China drives domestic savings into the A-share market and pushes A-share prices up, beyond parity (e.g., Bailey and Jagtiani, 1994; Fernald and Rogers, 2002). On the other hand, the existence of the Hong Kong H-share market provides a good substitute for the B-share market, granting higher demand elasticity to the B shares (e.g., Sun and Tong, 2000). Both effects tend to inflate the A-share prices and deflate the B-share prices. The major criticism concerning this hypothesis stems from its failure to explain the cross-sectional variation in A-share premiums (Chan et al., 2008).

The second line of research attributes the price differential between the two classes of stocks to the speculative behavior of Chinese investors. Because Chinese security markets are extraordinarily risky, domestic investors tend to be highly risk tolerant and speculative, diverting A-share prices from a rational level (e.g., Ma, 1996; Mei et al., 2003). While Mei et al. (2003) find that the A-share turnover rate, which

proxies for the amount of speculative trading, explains about 20% of the cross-sectional variation in A-share premiums, a large portion of the variation remains unexplained.

The third school of research considers the Chinese B-share discount as compensation for the B shares' lack of liquidity and high trading costs (e.g., Chen, Lee, and Rui, 2001; Chen and Xiong, 2001). This hypothesis, however, cannot explain why other capital markets with similar ownership restrictions do not experience the same pattern of foreign share discount.

The last thought of research is built upon the information asymmetry hypothesis developed by Brennan and Cao (1997). The idea is that due to language barriers, different accounting standards, and weak access to local information, foreign investors often have less information than domestic investors, and hence, require a higher premium (stock price discount) in the B-share market (e.g., Chakravarty et al., 1998; Chan et al., 2008). Given that the primary focus of this study is information asymmetry, whether and to what extent other schools of research help explain the B-share discount is beyond the scope of this essay.

In support of the uninformed foreign investor hypothesis, Chan et al. (2008) point out that foreign investors face more severe information asymmetry in an emerging market such as China, where firms often hide material changes in their business conditions, corporate managers freely manipulate firm-specific information, and insider trading is widespread. A major deficiency concerning this hypothesis, however, stems from its generalizability to emerging contexts. The argument is that in an environment with limited investor protection and poor information transparency, domestic investors may not necessarily be better informed than foreign investors. In contrast, foreign investors

are found to be more efficient in collecting and processing value-relevant, firm-specific information in such environments (e.g., Chui and Kwok, 1998).

If foreign investors do not have an informational disadvantage, then the question becomes whether the issue of information asymmetry still contributes to our understanding of the B-share discount puzzle. To better illustrate this point, it is important to understand two idiosyncrasies associated with the Chinese stock market. First, Chinese domestic shares are universally overvalued relative to their fundamentals. One possible explanation is that the lack of alternatives to low-yielding bank accounts in China drives Chinese domestic savings into the stock market and pushes stock prices up, beyond parity (e.g., Bailey and Jagtiani, 1994; Fernald and Rogers, 2002). Additionally, the highly risk-tolerant and speculative behavior of Chinese investors also contributes to the deviation of Chinese stock prices from a rational level (e.g., Ma, 1996; Mei et al., 2003). Second, in China, the movements of stocks are highly synchronous with the movements of the market rather than reflecting firm-specific information (e.g., Chan and Hameed, 2006; Morck et al., 2000). This phenomenon can be well explained by the information-based interpretation of stock price synchronicity. If asset prices can be considered as a function of both firm-specific and market-wide information, then investors will have to rely more on market-wide information in an environment where credible firm-specific information is either technically unavailable or prohibitively costly, resulting in more synchronous stock movements.

Because the B-share market is associated with a higher level of regulatory and disclosure standards, less information censorship, and more sophisticated investor base, one should expect foreign B-share investors to be more efficient in collecting and

processing value-relevant corporate information than local A-share investors. Consequently, more firm-specific (less market-wide) information should be capitalized into B-share prices, resulting in more accurate stock valuation. With inherent stock overvaluation, this implies that B-share prices should be less overvalued due to informed trading. Therefore, in a world with informed foreign investors and inherent stock overvaluation, the so-called B-share discount is mainly a result of a downward price correction (toward the fundamental values of the stocks) once more firm-specific information is incorporated into stock pricing. If this is the case, then one should observe a positive relation between the magnitude of the discount and the capitalization of firm-specific information (as measured by price synchronicity).

Based on the above discussions, the following hypothesis is derived.

*H3: With informed foreign investors, the B-share discount is mainly a result of a downward price correction once more firm-specific information is capitalized; the more informative the stock prices, the larger the discount.*

### **2.2.3. Impact of Market Liberalization**

Observing the information asymmetry between foreign and domestic investors, however, is not the end of the story in today's increasingly integrated world. A more interesting and important question to address is whether and to what extent the regulatory reforms of market liberalization—that is, the opening of the foreign B-share market to Chinese domestic investors on February 19, 2001 and the opening of the domestic A-share market to qualified foreign institutional investors (QFII) on November 5, 2002—affect the patterns of information asymmetry and B-share discount. While it is unlikely for the processes of market liberalization to entirely eradicate the difference between the



two markets, mitigated information asymmetry and reduced price disparity are expected. First, because the disclosure and regulatory requirements across the two markets have been increasingly standardized since the regulatory reforms, the information asymmetry between local A-share and foreign B-share markets should be less prominent. Second, the capabilities of investors to collect and process value-relevant, firm-specific information should be less divergent after market integration, since the investor base is more or less the same across the two markets. Therefore, one hypothesizes the following.

*H4: Both information asymmetry and price disparity between the two markets are mitigated upon the regulatory reforms of market liberalization.*

## **2.3. DATA AND METHODOLOGY**

### ***2.3.1. The B-Share Discount***

The approach to testing the issues of information asymmetry and B-share discount in this study departs from previous research in that, instead of examining aggregate-level data such as market indices, I investigate the price dispersion between the local A and foreign B shares that are issued by the same companies (hereafter termed the twin-share portfolios). This is a more precise approach since it directly addresses the divergence between the two classes of stocks as issued by the same companies and, in the meantime, mitigates the data comparability and omitted-variables problems.

Given that not all Chinese publicly listed firms issue shares to both domestic and foreign investors, this study focuses only on firms that issue both local A and foreign B shares. To facilitate a meaningful comparison, firms that list on the Shanghai Stock Exchange (SSE) and the Shenzhen Stock Exchange (SZSE) are considered separately.

Using balanced panel data, I further require the sample firms to be continuously listed on either the SSE or the SZSE for at least 10 years at the time of estimation. After eliminating firms with insufficient histories or missing values on related variables, companies with incomparable sizes, enterprises in financial industries, and those with foreign listings other than B-share listings, there are 53 firms left. The final sample, therefore, consists of 53 firms (26 SSE-listed and 27 SZSE-listed), each with a continuous dual-listing history during the entire sample period, from October 1997 to September 2007.

In this study, both firm-level data and stock market figures are compiled from the China Stock Market and Accounting Research database (CSMAR). To facilitate a more rigorous analysis, daily data series is utilized, where the trading day closing price is used in calculating continuously compounded returns. To control for the impact of market liberalization, I further divide the sample into three subperiods: the pre-market-liberalization period, the post-market-liberalization period, and the period of market restructuring. The subperiods are truncated by the two regulatory reforms, i.e., the opening of the foreign B-share market to Chinese domestic investors on February 19, 2001 and the opening of the domestic A-share market to QFII on November 5, 2002. The time frame is illustrated in Figure 2.1.

*\*\*\*Insert Figure 2.1 about here\*\*\**

Table 2.1 presents the price differential between the local A and foreign B shares issued by the same companies, sorted by exchange listing (SSE or SZSE) and time period

of estimation (i.e., the pre–market-integration period, the post–market-integration period, and the market restructuring period).

*\*\*\*Insert Table 2.1 about here\*\*\**

Consistent with previous studies that document a significant B-share discount, Table 2.1 indicates that the currency-adjusted B-share prices are much lower, on average, than the corresponding A-share prices. This is particularly true in the pre–market-liberalization period: the average currency-adjusted B-share prices are 2.13 and 2.71 for SSE- and SZSE-listed firms, respectively, whereas the prices of their A-share counterparts are 11.99 and 11.65 for SSE- and SZSE-listed firms, respectively. In line with *H4*, which predicts a mitigated level of B-share discount after market restructuring, the price differential shrinks dramatically in the post–market-liberalization period on both markets. The mean difference declines from 9.86 to 3.80 on the SSE and falls from 8.94 to 2.93 on the SZSE.

Figures 2.2 and 2.3 confirm this pattern graphically. As can be seen, there is a significant price differential or B-share discount during the pre–market-integration period, from October 1, 1997 to February 19, 2001. However, the divergence between the two classes of stocks becomes less evident during the post–market-integration period, from November 5, 2002 to September 30, 2007.

*\*\*\*Insert Figure 2.2 about here\*\*\**

\*\*\*Insert Figure 2.3 about here\*\*\*

### 2.3.2. Information Flow

This study applies a vector autoregression (VAR) methodology to investigate the lead–lag relation between foreign and domestic investors. For a more robust analysis, firms listed on the SSE and the SZSE are considered separately. Therefore, the regulatory segmentation of the local A-share and foreign B-share markets, together with the two exchange choices, divides the Chinese stock market into four segmented markets: the Shanghai A-, Shanghai B-, Shenzhen A-, and Shenzhen B-share markets. In order to obtain a more complete picture, the two pairs of twin-share portfolios (i.e., SSE-listed A and B twin-share portfolios and SZSE-listed A and B twin-share portfolios) are considered simultaneously in an integrated VAR system. Borrowing the idea from the capital asset pricing model (CAPM), corresponding market returns are also included in the simultaneous equations as additional exogenous variables. Specifically, the following VAR system is estimated:

$$\begin{bmatrix} SHA_t \\ SHB_t \\ SZA_t \\ SZB_t \end{bmatrix} = A_0 + \sum_{k=1}^K A_k \begin{bmatrix} SHA_{t-k} \\ SHB_{t-k} \\ SZA_{t-k} \\ SZB_{t-k} \end{bmatrix} + \sum_{l=1}^L B_l \begin{bmatrix} SHAI_{t-l} \\ SHBI_{t-l} \\ SZAI_{t-l} \\ SZBI_{t-l} \end{bmatrix} + \begin{bmatrix} \varepsilon_{SHA,t} \\ \varepsilon_{SHB,t} \\ \varepsilon_{SZA,t} \\ \varepsilon_{SZB,t} \end{bmatrix} \quad (1)$$

where  $SHA_t$  and  $SHB_t$  are the SSE-listed twin-share portfolio returns at time  $t$ , and  $SZA_t$  and  $SZB_t$  are the SZSE-listed twin-share portfolio returns at time  $t$ . Note that the final sample consists of 26 SSE-listed firms and 27 SZSE-listed firms, each of which has a continuous dual-listing history over the entire sample period. The variables  $SHAI_t$ ,  $SHBI_t$ ,  $SZAI_t$ , and  $SZBI_t$  are the corresponding market returns at time  $t$ . Here,  $A_0$  is a 4

$\times 1$  column vector,  $A_k$  and  $B_l$  are both  $4 \times 4$  matrices of coefficients,  $k$  is the number of lagged endogenous variables, and  $l$  is the number of lagged exogenous variables. The  $i,j$ th component of  $A_k$  measures the direct impact that an innovation on the  $j$ th market would have on the  $i$ th market in  $k$  periods.

Table 2.2 reports the correlation matrix of the twin-share portfolios with one another and with the four market indices. As Table 2.2 indicates, the correlation coefficients between the A and B twin-share portfolios are highly significant (0.60 for SSE-listed firms and 0.63 for SZSE-listed firms), indicating a high degree of contemporaneous interdependence between the A and B shares that are issued by the same companies. In other words, a large portion of innovations in one market will be shared by the other on the same calendar day. Moreover, the correlation coefficients between individual portfolios and market indices are all significant (ranging from 0.55 to 0.98), implying that the movements of individual stocks are highly synchronous with those of the market.

*\*\*\*Insert Table 2.2 about here\*\*\**

In addition to the integrated VAR system, firms that are listed on the SSE and the SZSE are also investigated separately. In particular, the following simultaneous equation systems are estimated:

$$\begin{bmatrix} SHA_t \\ SHB_t \end{bmatrix} = A_0 + \sum_{k=1}^K A_k \begin{bmatrix} SHA_{t-k} \\ SHB_{t-k} \end{bmatrix} + \sum_{l=1}^L B_l \begin{bmatrix} SHAI_{t-l} \\ SHBI_{t-l} \end{bmatrix} + \begin{bmatrix} \mathcal{E}_{SHA,t} \\ \mathcal{E}_{SHB,t} \end{bmatrix} \quad (2)$$

$$\begin{bmatrix} SZA_t \\ SZB_t \end{bmatrix} = A_0 + \sum_{k=1}^K A_k \begin{bmatrix} SZA_{t-k} \\ SZB_{t-k} \end{bmatrix} + \sum_{l=1}^L B_l \begin{bmatrix} SZAI_{t-l} \\ SZBI_{t-l} \end{bmatrix} + \begin{bmatrix} \varepsilon_{SZA,t} \\ \varepsilon_{SZB,t} \end{bmatrix} \quad (3)$$

where  $A_0$  is a  $2 \times 1$  column vector,  $A_k$  and  $B_l$  are both  $2 \times 2$  matrices of coefficients, and all the other variables are defined as in equation (1).

The order of VAR is determined by comparing the information criteria among model specifications with lag lengths ranging from 1 to 20 (i.e., from one day to one month). For a more precise specification, the Akaike information criterion (AIC) and the Schwarz Bayesian criterion (SBC) are considered jointly in this study. The statistics of the information criteria for model specifications with 1, 2, 3, 4, 5, 10, and 20 lags are reported in Table 2.3.

*\*\*\*Insert Table 2.3 about here\*\*\**

According to Table 2.3, the VAR with 1 lag seems to be the most appropriate identification for all three model specifications, suggesting that a large portion of innovations in one market are transmitted to another within two calendar days. Therefore, the order of VAR is chosen to be 1 throughout the study.

### **2.3.3. Stock Price Informativeness**

In line with the literature (e.g., Chan and Hameed, 2006; Morck et al., 2000; Roll, 1988), this study uses the R-squared value from the regression of the CAPM to measure the departure of firm-specific stock movements from the market. Since the omitted-variables problem is generally less of a serious concern for panel models than for cross-sectional models (because the past values of the variables in the panel will partly control

for the effects of the missing variables), the Sharpe–Lintner–Black model seems to be capable of testing this issue.

Note that in the literature, many studies include industry returns in the regression (see, for example, Durnev et al., 2004; Gul et al., 2010; Roll, 1998). It is argued, however, that in studies that focus on emerging markets, the inclusion of industry returns in the regression as an additional independent variable might be problematic, because of the difficulties in disentangling the industry effect from the market and the fact that some industries are dominated by a few firms (e.g., Chan and Hameed, 2006). This study follows Chan and Hameed’s approach.<sup>1</sup> In particular, the following model is estimated:

$$(R_{it} - R_t^F) = \alpha + \beta(R_t^M - R_t^F) + \varepsilon_{it} \quad (4)$$

where  $R_{it}$  is the stock return for each individual firm at time  $t$ , that is,  $R_{it} = \log\left(\frac{P_{it}}{P_{i,t-1}}\right) * 100$ ;

$R_t^M$  is the market return at time  $t$ , that is,  $R_t^M = \log\left(\frac{P_t^M}{P_{t-1}^M}\right) * 100$ ;  $R_t^F$  is the risk-free rate

(China’s monthly yield of the three-month household deposit interest rate) at time  $t$ ; and  $\beta$  is the covariance of the market return with the portfolio return divided by the variance of the market return. The R-squared values from equation (4) are then used to measure the departure of firm-specific movements from the market. Specifically,

$$R^2 = 1 - \frac{\sum \hat{\varepsilon}_i^2}{\sum [y_i - \bar{y}]^2} \quad (5)$$

According to the Hausman specification test, the one-way random effects model is utilized. This means that, in general, the residual consists of two parts, that is,

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<sup>1</sup> As a robustness check, additional models with industry returns are also investigated, where the results are statistically unaffected.

$\varepsilon_{it} = u_i + v_{it}$ . For a more precise estimation, the error components model and generalized least squares (GLS) estimation are also applied.

In the context of this study, *H2* implies that stock prices will tend to be more informative (less synchronous) among foreign B shares than among local A shares, as reflected by a lower R-squared value, that is,  $R_B^2 < R_A^2$ . In addition, *H4* predicts a reduced level of information asymmetry after market liberalization. If this is the case, then the divergence in price informativeness between the two classes of stocks should be less evident after the processes of market restructuring, as reflected by a convergence in regression R-squared values.

## 2.4. EMPIRICAL RESULTS

### 2.4.1. Information Flow

Table 2.4 reports the regression results of the VAR systems during the pre-market-liberalization period, from October 1, 1997 to February 19, 2001, based on three different model specifications. First, the empirical results generated from different model specifications are highly consistent, suggesting that the models are well specified. In terms of portfolio returns (columns 1–4), I find a significant dependence of A-share returns upon the past movements of their B-share counterparts, especially for the SSE-listed firms. Additionally, the past returns of Shenzhen B shares tend to have some predictive power on their own future returns. While Table 2.4 documents significant Granger causality between the twin-share portfolios, an inconsistency has to be noted. The signs of some coefficient estimates are negative. Technically speaking, the signs of the coefficients in simultaneous equation systems are hard to interpret because of the



multidimensional, simultaneous impacts among exogenous variables. Theoretically, one possible explanation of the observed negative coefficient estimates is that Chinese A-share investors tend to overreact to movements in the B-share market at the very first moment and then experience a self-correction process the following day. Note that the contemporaneous impact is not reflected in the VAR systems but in the correlation matrix in Table 2.2. In terms of market returns, the Shenzhen B-share market appears to play a significant leading role in predicting individual stock returns (column 8 of Table 2.4). Overall, the results in Table 2.4 suggest that, under perfect market segmentation, the information tends to flow from the B-share market to the A-share market and that foreign investors are better informed than Chinese domestic investors (*H1* is supported).

\*\*\*Insert Table 2.4 about here\*\*\*

Table 2.5 reports the regression results of the VAR systems during the post-market-liberalization period, from November 5, 2002 to September 30, 2007, based on three different model specifications. Again, the empirical results generated from different models are highly consistent. In line with *H4*, which predicts a decreased level of information asymmetry, I find no significant lead-lag relation between the A and B twin shares on either the SSE or the SZSE after market liberalization (columns 1-4). Moreover, I find that the past returns of Shanghai A shares tend to lead their own stock movements and that the Shanghai A-share market becomes the most influential one after market restructuring. A close comparison between Tables 2.4 and 2.5 indicates a reduced level of lead-lag interdependence between the two markets, suggesting that the problem

of information asymmetry between foreign and domestic investors has been mitigated to a large extent since the structural segmentation was abrogated in China. In other words, investors in one market are now able to absorb information generated in the other market more quickly than before.

*\*\*\*Insert Table 2.5 about here\*\*\**

Figure 2.4 plots the stock movements of the A and B twin-share portfolios over time. As can be seen, there is a significant interrelation between local A and foreign B shares that are issued by the same companies. Additionally, the figures also indicate an increasing degree of contemporaneous cross-market synchronicity and a decreasing degree of lead-lag impact upon market liberalization. These findings suggest a reduced level of cross-market diversification benefits and improved market efficiency under increased market integration.

*\*\*\*Insert Figure 2.4 about here\*\*\**

#### **2.4.2. Price Informativeness**

Table 2.6 reports the stock price synchronicity of the twin-share portfolios, sorted by exchange listing (SSE or SZSE) and time period of estimation.

*\*\*\*Insert Table 2.6 about here\*\*\**

According to columns 1 and 2 of Table 2.6, the R-squared values are much lower among B shares than among A shares prior to market liberalization reforms (0.14 relative to 0.30 on the SSE, and 0.12 relative to 0.34 on the SZSE), suggesting that foreign B shares are more informative than their A-share counterparts under perfect market segmentation (*H2* is supported). Consistent with the findings in Table 2.1, which document a significant B-share discount, columns 1 and 2 of Table 2.6 also show that foreign B shares tend to realize negative abnormal returns during the pre-market-liberalization period.

In addition, *H3* predicts a positive relation between the magnitude of the discount and the capitalization of firm-specific information. As Table 2.1 shows, the price disparity between the two classes of stocks declines dramatically after the regulatory reforms (decreases from 9.86 to 3.80 on the SSE and drops from 8.94 to 2.93 on the SZSE). Consistent with the predictions of *H3*, Table 2.6 indicates that the divergence in price synchronicity also shrinks substantially upon market liberalization (the mean difference of the R-squared values declines from 0.16 to 0.05 on the SSE and drops from 0.22 to 0.001 on the SZSE).

Consistent with *H4*, which predicts a mitigated degree of information asymmetry across the two markets, columns 1 and 5 of Table 2.6 document a dramatic decline in price synchronicity among local A shares after the opening of the A-share market to foreign investors (the R-squared value decreases from 0.30 to 0.23 on the SSE and falls from 0.34 to 0.27 on the SZSE). This finding suggests that A share prices have become more informative since the market liberalization reforms in 2001 and 2002. However, a close comparison between columns 2 and 6 indicates more co-movement among B shares

after the opening of the B-share market to Chinese domestic investors (the R-squared value increases from 0.14 to 0.28 on the SSE and rises from 0.12 to 0.27 on the SZSE). Given that Chinese investors are accustomed to trading on market-wide information, one should expect more market-level (less firm-level) information to be incorporated into B-share prices once Chinese investors are allowed to trade in the B-share market. Both effects mitigate the information asymmetry across the two markets.

## 2.5. CONCLUDING REMARKS

This essay addresses the information asymmetry between the Chinese local A-share and foreign B-share markets and its impact on the B-share discount puzzle, contingent upon the regulatory reforms of Chinese stock market liberalization in 2001 and 2002. In contrast with the widespread belief that domestic investors are better informed than foreign investors, B-share investors are found to be more efficient in collecting and processing value-relevant, firm-specific information in an emerging environment such as China, where information transparency and investor protection are relatively weak. In particular, I find that under perfect market segmentation, the information tends to flow from foreign to domestic investors and that B-share prices are generally more informative than those of their A-share counterparts. As such, the observed B-share discount is not compensation for the informational disadvantage of foreign investors but, rather, the result of a downward price correction (toward the fundamental values of the stocks) once more firm-specific information is capitalized by sophisticated foreign investors. Further investigation indicates a mitigated degree of information asymmetry and B-share discount upon market liberalization.

Despite these provocative findings, some caveats should be noted. First, the evidence of this study is based on a single-country analysis. It would be interesting to consider other emerging economies to determine the generalizability of the results. Second, while the empirical results of this study point to a possible explanation of the Chinese B-share discount puzzle, alternative reasons, such as the lack of alternative investment opportunities and the existence of speculative bubbles in China, cannot be safely ruled out without additional investigation.

Notwithstanding these limitations, this study offers new and relatively robust insights into the literature. First, it addresses the ongoing debate over the issue of whether or not domestic investors are better informed than foreign investors in emerging markets. By analyzing the issue in a contingency framework (contingent on the institutional environment of a country), this essay offers a possible reconciliation to the conflicting empirical findings that have been plaguing the literature. Second, it points to another possible and more rational explanation of the Chinese foreign share discount puzzle. The argument is that with informed foreign investors and inherent stock misvaluation, the so-called B-share discount is mainly a result of a downward price correction effect once more firm-specific information is capitalized into stock prices. Finally, despite the overwhelming focus on the structural segmentation of the Chinese stock market, little, if any, attention has been paid to the dynamic pattern of the information asymmetry and B-share discount, taking into account the recent regulatory reforms in China. This study also bridges this gap.

**CHAPTER 3**  
**CROSS-LISTING AND THE VALUE OF BONDING UNDER**  
**INCREASED MARKET INTEGRATION**

**3.1. INTRODUCTION**

In the literature of corporate finance, accounting information such as earnings has been documented to have a significant impact on a firm's stock market performance (e.g., Barth, Beaver, and Landsman, 1998; Burgstahler and Dichev, 1997; Collins, Maydew, and Weiss, 1997). However, the integrity of accounting information has long been questioned, and earnings management has been related to a variety of corporate events. Such events include initial public offerings (e.g., Ball and Shivakumar, 2008; Teoh, Welch, and Wong, 1998a), seasoned public offerings (e.g., Teoh, Welch, and Wong, 1998b), mergers and acquisitions (e.g., Erickson and Wang, 1999; Louis, 2004), share repurchases (e.g., Brockman, Khurana, and Martin, 2008; Gong, Louis, and Sun, 2008), and compensation plans (e.g., Bergstresser and Philippon, 2006; Cornett, Marcus, and Tehranian, 2008).

Furthermore, earnings management tends to be more rampant in emerging than in developed capital markets (e.g., Leuz, Nanda, and Wysocki, 2003). This tendency exists because, first, in an environment with limited investor protection, ineffective legal enforcement, and ill-functioning accounting–auditing systems, corporate managers generally have more discretion over their financial reporting processes. This obviously makes the manipulation of firm-specific information less costly in such environments. Second, the lack of investor protection and information transparency in emerging markets

also magnifies the benefits of private control, increases insiders' incentives to mask firm performance, and further promotes earnings management. Consequently, firms in weak institutional environments exhibit more earnings smoothing, a greater tendency to manage toward a target, a weaker association between accounting earnings and share prices, and a less timely recognition of losses (Lang, Raedy, and Wilson, 2006).

Extant literature has demonstrated both theoretically and empirically that the legal environment and the degree to which investors are protected in a country play an important role in restricting corporate misconduct and insiders' expropriation of minority shareholders (e.g., La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1998). However, the development of the regulatory environment is not a firm-level choice, and it cannot be done overnight. Therefore, an effective countermeasure is for firms in weak institutional environments to cross-list on a more regulated capital market. This may voluntarily bond the firms to higher regulatory, disclosure, and monitoring standards, and, hence, mitigate potential agency costs and corporate misconduct, such as earnings management. This is often referred to as the "bonding hypothesis" (e.g., Coffee, 1999, 2002; Stulz, 1999).

Despite strong theoretical supports, however, empirical evidence documenting the effectiveness of this kind of bonding commitment has been mixed. The literature is permeated with both positive (e.g., Doidge, Karolyi, Lins, Miller, and Stulz, 2009; Doidge, Karolyi, and Stulz, 2004; Reese and Weisbach, 2002) and negative or insignificant findings (e.g., Lang et al., 2006; Siegel, 2005). As Cantale (1996) and Moel (1999) point out, even though cross-listing has a positive impact on firm value, this may not necessarily be attributable to the bonding role of cross-listing; rather, it may simply be a signaling effect. Therefore, further research is needed to better understand whether

firms are effectively “renting” the regulatory environment by cross-listing on a more regulated market. This study addresses the bonding impact of cross-listing on corporate behavior in the context of earnings management, stock price informativeness, and firm valuation.

Moreover, an interesting and important question to address in today’s increasingly integrated world is whether and to what extent the progressive globalization process and enhanced capital market integration affect the role of cross-listing. Theoretically, a necessary condition for the bonding hypothesis to sustain itself is the divergence in underlying investment environments across markets. In an increasingly integrated world where regulatory and disclosure requirements are more or less standardized globally, the bonding benefits of cross-listing may be mitigated to a large extent. Drawing on the unique opportunity of Chinese stock market restructuring, this study examines the changing role of cross-listing under increased market integration.

China has been chosen as the research focus of this study for two reasons. First, despite the increasing importance of the Chinese capital market, empirical evidence to date has been rare and inconclusive in documenting the bonding impact of cross-listing on Chinese firms. For instance, Doidge et al. (2004) find that foreign companies with shares cross-listed in the United States are worth more relative to similar home country firms using data from 40 countries. Additionally, using data from 31 countries, Doidge et al. (2009) find that firms’ decisions to list overseas involve a trade-off between private control and bonding benefits. However, China is excluded from both studies. Therefore, testing the generalizability of the bonding hypothesis for Chinese firms offers an important contribution to the literature.



Second, while the issue of cross-listing has stimulated a considerable amount of quality research, a common limitation associated with these studies is that they tend to consider cross-listing impact within a static framework. The effect of globalization on the dynamics of cross-listing (and delisting) decisions is largely ignored. In an increasingly integrated world, observing a significant bonding impact is not the end of the story. A more relevant and important question to ask is whether and to what extent enhanced market integration erodes the bonding role of cross-listing. The structural segmentation and subsequent liberalization of the Chinese stock market provide us with an ideal laboratory for testing this issue.

The remainder of this essay begins with a brief discussion of hypothesis development in Section 2. Data description and model specifications are presented in Section 3. Empirical results and concluding remarks are offered in Sections 4 and 5, respectively.

### **3.2. HYPOTHESIS DEVELOPMENT**

The framework of this study is built upon the bonding hypothesis of cross-listing proposed by Coffee (1999, 2002) and Stulz (1999), the earnings management literature, the information-based interpretation of stock price synchronicity (e.g., Chan and Hameed, 2006; Morck, Yeung, and Yu, 2000; Roll, 1988), and the structural segmentation and subsequent liberalization of the Chinese stock market.

Before the market liberalization reforms in 2001 and 2002, Chinese domestic firms could issue two distinct classes of stocks, identical in all aspects except for their ownership restrictions: A shares, which could only be held and traded by domestic

investors, and B shares, which could only be held and traded by foreign investors. As a result, the Chinese stock market has been divided into two separate markets: the local A-share market and the foreign B-share market. Owing to the regulatory segmentation of the Chinese stock market, Chinese domestic firms have an additional cross-listing choice besides listing overseas (e.g., the New York Stock Exchange or the London Stock Exchange). They may list on the foreign-based Chinese B-share market in addition to their domestic A-share listings.

What makes the Chinese context interesting are the subsequent liberalization reforms, i.e., the opening of the foreign B-share market to Chinese domestic investors on February 19, 2001 and the opening of the domestic A-share market to qualified foreign institutional investors (QFII) on November 5, 2002. Thanks to the structural segmentation and recent regulatory reforms in China, one is allowed to test the impact of market integration within a relatively short time frame, where the structural stationarity and omitted-variables problems are of less serious modeling concern.

Given that the primary objective of this study is to investigate the impact of market integration on the bonding role of cross-listing, I focus mainly on the B-share listings as the means of cross-listing in this study. Firms are henceforth defined as cross-listed if they have B-share listings and non-cross-listed if they do not.

### ***3.2.1. The Bonding Hypothesis***

In the literature of international finance, conventional theories suggest that firms list overseas to lower their cost of capital through mitigated investment barriers, reduced risk exposure, enhanced liquidity, visibility, and investor base (e.g., Doukas and Switzer, 2000; Foerster and Karolyi, 1999; Lins, Strickland, and Zenner, 2005; Miller, 1999;

Mittoo, 1992). While these hypotheses have had some success in explaining cross-listing practices, their empirical validity and saliency have long been questioned. Major criticisms stem from their failure to explain why firms continuously list overseas after the removal of investment barriers; why relatively few firms cross-list overseas, given the proposed benefits; and why the market reacts more positively if the firm chooses to cross-list on major exchanges as opposed to over-the-counter (OTC) and private placements.

Facing these difficulties of conventional theories in explaining cross-listing rationales, a variety of hypotheses have been developed, among which the most frequently cited is the bonding hypothesis proposed by Coffee (1999, 2002) and Stulz (1999). In the context of the bonding hypothesis, firms cross-list on more regulated markets to voluntarily bond themselves to higher regulatory, disclosure, and monitoring standards so as to mitigate potential agency conflicts (e.g., Coffee, 1999, 2002; Reese and Weisbach, 2002; Stulz, 1999). Consistent with the bonding hypothesis, Doidge et al. (2004) find that cross-listing on a more regulated market (the U.S. market in particular) is an effective device in limiting controlling shareholders' expropriation of minority shareholders, and that foreign companies with shares cross-listed in the United States are worth more than similar home country firms. The major contribution of this hypothesis is that it resolves a current paradox concerning why a majority of firms do not cross-list. According to Doidge et al. (2009), a firm's decision to list overseas involves a trade-off between private control and bonding benefits. Because cross-listing reduces controlling shareholders' consumption of private benefits through both direct (e.g., more stringent disclosure and regulatory requirements) and indirect constraints (e.g., enhanced

monitoring by sophisticated foreign investors), for a firm to cross-list, the benefits of bonding must be large enough to offset controlling shareholders' losses in private control.

While there is substantial evidence that the bonding consideration is one of the major determinants of a firm's listing decision, whether and to what extent cross-listing on a more regulated market effectively bonds real corporate behavior is still an open question. As Cantale (1996) and Moel (1999) point out, even though cross-listing has a positive impact on firm value, the observed listing benefits may not necessarily be attributable to the bonding role of cross-listing; rather, it may simply be a signaling effect. By cross-listing on a market with more stringent disclosure and regulatory requirements, a firm can signal the market that it is a high-quality firm, resulting in a higher valuation, even though no significant improvement in its corporate governance is made. Consistent with this argument, Siegel (2005) finds that U.S. listing is not a perfect substitute for a strong legal environment, nor does it serve as an effective bonding mechanism for deterring malfeasance. As such, it is the "reputational bonding" that explains the success of cross-listings.

This ongoing debate calls for direct evidence of the impact of cross-listing on real corporate practices. On a theoretical basis, the key to validating the empirical effectiveness of the bonding hypothesis is to examine whether cross-listing has a real impact on corporate behavior. If the benefits are purely due to a signaling effect, then there should be little, if any, improvement in the listing firm's corporate governance and/or the information environment. This study addresses the bonding impact of cross-listing on corporate behavior in the context of earnings quality, price informativeness, and firm valuation.

### ***3.2.2. Earnings Management***

In the literature, a substantial body of research consistently documents a nontrivial association between accounting earnings and a firm's stock market performance (e.g., Barth et al., 1998; Burgstahler and Dichev, 1997; Collins et al., 1997). Nevertheless, the integrity of corporate information has long been questioned, and earnings management has been related to a variety of corporate events (e.g., Ball and Shivakumar, 2008; Bergstresser and Philippon, 2006; Brockman et al., 2008; Cornett et al., 2008; Erickson and Wang, 1999; Gong et al., 2008; Louis, 2004; Teoh et al., 1998a, 1998b). Furthermore, the manipulation of corporate information tends to thrive in emerging markets. Firms in such environments are found to exhibit more earnings smoothing, a greater tendency to manage toward a target, a weaker association between accounting earnings and share prices, and a less timely recognition of losses (Lang et al., 2006). This is not surprising because in an environment with limited investor protection, ineffective legal enforcement, and ill-functioning information infrastructure, investors have neither information transparency nor enforcement capability to prevent such managerial misconduct as earnings management. This imposes additional costs on firms in such environments.

Based on the bonding hypothesis, it is often possible for firms in weak institutional environments to cross-list on a more regulated capital market to voluntarily bond themselves to higher regulatory, disclosure, and monitoring standards. By doing so, listing firms are committed to better information transparency, improved corporate governance, and limited expropriation of minority shareholders.

Since firms with foreign listings are bonded by a higher level of regulatory, disclosure, and monitoring standards, the integrity of their reported earnings should differ predictably from that of comparable purely domestic-listed firms. I base this argument on three aspects. First, the information disclosure requirement is stricter for firms with foreign B-share listings. In China, firms that issue shares to both domestic and foreign investors are required to prepare their financial statements based on both the Chinese Generally Accepted Accounting Principles (GAAP) and the International Accounting Standards (IAS), whereas firms that issue shares exclusively to domestic investors are subject solely to the Chinese GAAP. The increased financial reporting standard will, to a large extent, make the manipulation of firm-specific information more costly for firms with B-share listings. Second, under IAS requirements, the financial statements of cross-listed firms must be audited by internationally authorized CPA firms, which are less likely to cooperate with local firms in manipulating their financial figures. Third, sophisticated foreign investors participating in the B-share market, especially institutional investors, often act as powerful external monitors guarding against corporate misconduct.

Because firms with B-share listings bear higher market and regulatory costs for earnings management, one should expect those firms to exhibit better earnings quality than firms without B-share listings.

Based on the above discussions, the following hypothesis is developed.

*H1: Firms with foreign B-share listings have better earnings quality than firms with only domestic A-share listings.*

### ***3.2.3. Price Informativeness***

Given the hypothesized divergence in earnings quality between cross-listed and non-cross-listed firms, an interesting question to ask is whether this kind of bonding commitment and the resultant increase in earnings quality will be correctly incorporated into stock pricing and firm value.

Drawing on state-of-the-art finance literature, this study uses price synchronicity to measure stock price informativeness. As Roll (1988) points out, the extent to which stocks move together depends on the relative amounts of firm-level and market-level information incorporated into stock prices. In the past two decades, a growing body of literature consistently provides empirical support to this information-based interpretation of stock synchronicity. For example, Morck et al. (2000) find that stock prices move together more in emerging markets, where reliable firm-specific information is either technically unavailable or prohibitively expensive. Durnev, Morck, Yeung, and Zarowin (2003) indicate that the relationship between current returns and future earnings is stronger for firms and industries with low price synchronicity. Durnev, Morck, and Yeung (2004) document a positive association between the economic efficiency of corporate investment and the magnitude of firm-specific variation in stock returns. Jin and Myers (2006) find that stock price synchronicity decreases with the level of information transparency. Gul, Kim, and Qiu (2010) note that foreign ownership and auditor quality are inversely associated with synchronicity and that the amount of firm-level information reflected in stock prices is lower for firms with high synchronicity. These empirical findings point to a single story: higher firm-specific return variation (as a fraction of total variation) indicates more informative stock prices.

This can also be justified easily on conceptual grounds. Theoretically, this stream of research is developed upon a hypothesized decomposition of information in stock pricing. The idea is that if asset prices can be considered as a function of both firm-specific and market-wide information, then in an environment with significant impediments to informed trading, investors will have to rely more on market-wide information, resulting in a higher degree of stock co-movement. On the other hand, in an environment with sufficient investor protection and information transparency, stock prices will tend to be less synchronous with each other due to informed trading.

Despite this rather clear and strong theoretical ground, empirical evidence to date has been inconclusive in documenting the impact of cross-listing on stock price informativeness in emerging markets. For example, Gul et al. (2010) indicate that synchronicity is inversely associated with foreign ownership and auditor quality in an emerging market such as China. On the other hand, Fernandes and Ferreira (2008) find that cross-listing improves price informativeness in developed capital markets, but decreases price informativeness in emerging markets. Therefore, the true relationship between cross-listing and stock price informativeness in emerging markets merits further attention. This study offers more robust insights into this debate.

Based on the bonding hypothesis, B-share prices should be more informative than their A-share counterparts. I justify this argument on three grounds. First, if listing on the B-share market indeed leads to better earnings quality, as proposed in this study, then the increased integrity of corporate information among cross-listed firms should ultimately promote informed trading and result in more value-relevant B-share prices. Second, because B-share listing imposes a higher level of disclosure and regulatory



requirements on listing firms, it will undoubtedly mitigate information asymmetry between corporate insiders and outsiders and lead to more informative stock prices. Third, foreign investors participating in the B-share market are often more sophisticated than Chinese domestic investors in collecting, processing, and analyzing value-relevant corporate information, which will further facilitate the capitalization of firm-specific information into stock prices.

Based on the above discussions, the following hypothesis is derived.

*H2: Firms with foreign B-share listings have less synchronous (more informative) stock prices than firms with only domestic A-share listings.*

#### **3.2.4. Firm Value**

To facilitate a more complete analysis, the impact of cross-listing on firm valuation is further investigated. If cross-listing indeed leads to better corporate governance, improved earnings quality, and more informative stock pricing, then firms that issue shares to both domestic and foreign investors should receive a higher market valuation than firms that issue shares exclusively to domestic investors.

In the literature, a substantial body of research documents that cross-listing on a more regulated capital market is value enhancing. As noted by conventional theories, cross-listing provides firms with better access to global capital, reduced risk exposure, enhanced visibility, liquidity, and investor base. As such, cross-listed firms should have a lower cost of capital and a higher valuation in the marketplace. According to the bonding hypothesis, by cross-listing on a more regulated market, corporate insiders, or controlling shareholders, voluntarily bond themselves to increased disclosure, better corporate governance, and improved investor protection. If this is the case, then the

value of cross-listed firms should be higher. Both hypotheses predict a positive effect of cross-listing on firm value.

Because the foreign B-share market is associated with more stringent regulatory, disclosure, and monitoring standards, and because cross-listed firms are committed to better corporate governance and enhanced information transparency, one should expect firms with B-share listings to receive a higher market valuation compared to their purely domestic-listed peers. Therefore, the following hypothesis is derived.

*H3: Firms with foreign B-share listings have a higher valuation than firms with only domestic A-share listings.*

### **3.2.5. Increased Market Integration**

Observing that cross-listing plays an important role in shaping corporate earnings management, price informativeness, and firm value, however, is not the end of the story in today's increasingly integrated world. A more relevant and important question to ask is whether and to what extent the ongoing processes of market integration will erode the bonding role of cross-listing. On a theoretical basis, a necessary condition for the bonding hypothesis to be sustained is the divergence in underlying investment environments across markets. While it is unlikely for the processes of market integration to entirely invalidate the bonding role of cross-listing (Doidge et al., 2004), a diminishing impact is expected. First, as the disclosure and regulatory requirements around the world become more and more standardized, the bonding impact should be less prominent. Second, the power of external monitoring will be less divergent across different markets in a more integrated world since the investor base is more or less the same globally. Therefore, I hypothesize the following.

*H4: The divergence in earnings quality, price informativeness, and firm value between the two groups of firms will be less evident after market integration.*

### **3.3. DATA AND METHODOLOGY**

#### ***3.3.1. Data Description***

This study uses panel data to control for potential survivorship bias and omitted-variables problems. Since the purpose of this study is to compare the earnings quality, price informativeness, and firm value between firms with and without foreign B-share listings, I first construct a paired sample of cross-listed versus non-cross-listed firms. Note that due to the structural segmentation of the Chinese stock market, Chinese domestic firms have an additional cross-listing choice besides listing overseas; they may list on the foreign-based B-share market in addition to domestic A-share listings. To better understand the impact of market integration on the bonding role of cross-listing, I focus mainly on B-share listings as the means of cross-listing in this study. Firms are defined as cross-listed if they have B-share listings and non-cross-listed if they do not.

This study investigates a panel sample of Chinese firms over a nine-year period, from 1998 to 2006. The sample period begins in 1998 because it is the year that publicly traded firms in China were formally required to release cash flow statements. The estimation time frame spans the two regulatory reforms, i.e., the opening of the B-share market to Chinese domestic investors on February 19, 2001 and the opening of the A-share market to QFII on November 5, 2002. The time frame is illustrated in Figure 3.1.

*\*\*\*Insert Figure 3.1 about here\*\*\**

In this study, both firm-level accounting data and stock market figures are compiled from the China Stock Market and Accounting Research database (CSMAR). Using balanced panel data, I further require the sample firms to be continuously listed on either the Shanghai Stock Exchange (SSE) or the Shenzhen Stock Exchange (SZSE) during the entire sample period. After eliminating firms with insufficient histories or missing values on related accounting items,<sup>2</sup> companies with incomparable sizes (relative to cross-listed firms), enterprises in financial industries, and those with foreign listings other than B shares, there are 701 firms left. The final sample, therefore, consists of 67 A- and B-share dual-listed firms and 634 comparable purely domestic A-share listed firms, each with a continuous listing history over the entire sample period. To control for potential industry effects, I further classify the sampled firms into six broadly defined industry categories in line with the CSMAR industry code A.

Table 3.1 provides summary statistics of the sample, sorted by exchange listing (SSE or SZSE), choice of B-share listings, and time period of estimation. The variables are defined as follows: *SIZE* is the size of the firm, calculated as the natural log of total assets; *BM* is the book-to-market ratio, measured as the difference between total assets and total liabilities, divided by the stock market capitalization of the firm; *LEV* is the leverage (debt-to-equity) ratio; *SO* is state ownership, measured as the percentage of common shares owned by the state; *ROA* is the return on assets (ROA), computed as EBXI divided by total assets; and *Q* is the Tobin's Q ratio, calculated as the book value of total assets minus the book value of equity plus the market value of equity, divided by

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<sup>2</sup> Related accounting items include total assets, total liabilities, total equity, earnings before extraordinary items and discontinued operations (EBXI), cash flow from operations (CFO), sales revenues, receivables, and gross property, plant, and equipment (PPE).

the book value of total assets (see, for example, McConnell and Servaes, 1990; Doidge et al., 2004; Morck, Shleifer and Vishny, 1988).

*\*\*\*Insert Table 3.1 about here\*\*\**

According to columns 2 and 3 of Table 3.1, SSE-listed firms appear to have a higher book-to-market ratio (2.75 relative to 2.67), a lower leverage ratio (1.42 relative to 2.02), a higher ROA ratio (11.1% relative to 8.8%), and a lower Q value (0.78 relative to 1.55) than SZSE-listed firms. These figures suggest that SSE-listed firms tend to be more profitable in the marketplace, be more conservative in their financial decisions, and have fewer growth opportunities compared to SZSE-listed firms. Interestingly, these Chinese firms are found to have an unusually high book-to-market ratio (around 2.7 on average) during the sample period. One possible explanation for this is that Chinese firms are more reluctant to write down their assets.

A close comparison between columns 4 and 5 indicates that firms with B-share listings generally have a higher book-to-market ratio than comparable purely domestic-listed firms (2.80 relative to 2.70), suggesting that cross-listed firms tend to face fewer growth opportunities. In addition, cross-listed firms are found to have an average debt-to-equity ratio that is much lower than that of non-cross-listed firms (1.03 relative to 1.77), implying that cross-listed firms tend to rely more on equity financing. Moreover, state ownership appears to be lower among firms with foreign ownership than among purely domestic-listed firms (30.8% relative to 32.4%). The difference in government ownership between the two groups of firms suggests that purely domestic-listed firms are

more likely to be influenced by government mandates, whereas cross-listed firms are more market driven. In addition, the ROA ratio is found to be much higher among cross-listed firms than among non-cross-listed firms (11.9% relative to 9.8%), suggesting that firms with foreign B-share listings are generally more profitable in the marketplace. Consistent with the higher book-to-market ratio for cross-listed firms, Tobin's Q is much lower among firms with B-share listings than among purely domestic-listed firms (0.86 relative to 1.17), implying that cross-listed firms tend to receive a lower market valuation, or face fewer growth opportunities than their home market peers. However, such a comparison must be viewed cautiously, given that non-cross-listed firms have a standard deviation that is 37 times higher than that of cross-listed firms. This abnormally high standard deviation implies significant variations among non-cross-listed firms. As such, the conclusion cannot be safely drawn without taking into account various firm- and industry-level characteristics.

Across time periods (columns 6 and 7 of Table 3.1), the data display a clear tendency toward a reduced use of leverage (the average debt-to-equity ratio drops from 2.07 to 1.48), mitigated state control (the average state ownership decreases from 33.9% to 31.3%), and increased firm value (the average Q ratio increases from 0.71 to 1.40) upon market liberalization. The findings suggest that Chinese firms tend to rely more on equity financing, be more market driven, and face better growth opportunities after market liberalization. All other variables experience marginal variations across different time periods.

### 3.3.2. *Measuring Earnings Management*

In the literature, earnings management is generally investigated using two approaches. The first approach deduces earnings management from accounting information. Measures based on this approach are typically related to the level of accruals (e.g., Dechow and Dichev, 2002; Sloan, 1996). The second approach focuses on the association between earnings and stock returns (e.g., Francis and Schipper, 1999). This method extracts information about earnings from stock prices by assuming that the market is efficient. In this study, I use accounting measures to examine earnings management because of their widespread use in the extant literature and their established significant market effects (e.g., Francis, LaFond, Olsson, and Schipper, 2004, 2005). Since there is no agreed-upon accounting measure of earnings management, this study evaluates earnings quality using two alternative proxies: the absolute value of discretionary accruals and accruals quality.

The first measure used in this study is discretionary accruals. This proxy is based upon a natural decomposition of corporate earnings. In general, earnings consist of two components, CFO and accounting accruals. Accounting accruals can be further separated into two parts: non-discretionary accruals (necessary accounting adjustments) and discretionary accruals (accruals subject to managerial discretion). Following Hribar and Collins (2002), I calculate total accruals using data from cash flow statements. Specifically,  $TA_{it} = EBXI_{it} - CFO_{it}$ . To be consistent with the literature (e.g., Bartov, Gul, and Tsui, 2001; Cornett et al., 2008; Dechow, Sloan, and Sweeney, 1995; Yu, 2008), the modified Jones (1991) model is utilized to estimate discretionary accruals.

First, I conduct the following cross-sectional ordinary least squares (OLS) regressions to estimate the coefficients  $\alpha_1$ ,  $\alpha_2$ , and  $\alpha_3$  within each industry over the sample period from 1999 to 2006 (note that the observations of year 1998 are lost in calculating lagged values). Specifically,

$$\frac{TA_{it}}{A_{i,t-1}} = \alpha_1 \frac{1}{A_{i,t-1}} + \alpha_2 \frac{\Delta REV_{it}}{A_{i,t-1}} + \alpha_3 \frac{PPE_{it}}{A_{i,t-1}} + \varepsilon_{it} \quad (1)$$

where  $TA$  is measured by the difference between EBXI and CFO,  $\Delta REV$  is the change in sales revenues, and  $PPE$  is gross property, plant, and equipment. All variables are scaled by total assets at the beginning of the fiscal year to control for size effects.

Next, the value of non-discretionary accruals,  $NDA$ , is calculated using the estimates of  $\alpha_1$ ,  $\alpha_2$ , and  $\alpha_3$  from model (1). Note that the change in account receivables,  $\Delta REC$ , is included in the equation per the modified Jones model so as to capture the extent to which a change in sales is due to an aggressive recognition of questionable sales. Specifically,

$$NDA_{it} = \alpha_1 \frac{1}{A_{i,t-1}} + \alpha_2 \frac{(\Delta REV_{it} - \Delta REC_{it})}{A_{i,t-1}} + \alpha_3 \frac{PPE_{it}}{A_{i,t-1}} \quad (2)$$

The difference between total and non-discretionary accruals is discretionary accruals. That is,  $DA_{it} = \frac{TA_{it}}{A_{i,t-1}} - NDA_{it}$ . Because all variables are scaled by total assets, the magnitude of discretionary accruals is expressed as a percentage of the firm's lagged assets. Larger values of discretionary accruals indicate higher earnings management (lower earnings quality). Since managers may have incentives to both inflate (reflected by positive  $DA$ ) and deflate (reflected by negative  $DA$ ) corporate earnings, the absolute value of discretionary accruals is frequently used in the literature to capture earnings



management in both directions. In the context of this study, the first hypothesis predicts that the absolute value of discretionary accruals will be lower for cross-listed firms than for non-cross-listed firms.

In the literature, another widely used measure of earnings management is accruals quality (e.g., Dechow and Dichev, 2002; Francis et al. 2005; Francis, Nanda and Olsson, 2008). Accruals quality is often measured by the standard deviation of residuals from the model that regresses current accruals on the lagged, current, and future values of CFO, change in sales revenues, and gross PPE. Specifically,

$$\frac{TA_{it}}{A_{i,t-1}} = \gamma_0 + \gamma_1 \frac{CFO_{i,t-1}}{A_{i,t-1}} + \gamma_2 \frac{CFO_{it}}{A_{i,t-1}} + \gamma_3 \frac{CFO_{i,t+1}}{A_{i,t-1}} + \gamma_4 \frac{\Delta REV_{it}}{A_{i,t-1}} + \gamma_5 \frac{PPE_{it}}{A_{i,t-1}} + \varepsilon_{it} \quad (3)$$

Accruals quality is the standard deviation of residuals from the regression in equation (3). That is,  $AQ_i = \sigma(\varepsilon_{it})$ . A higher standard deviation of residuals implies a lower accruals quality. In this study, the bonding hypothesis implies that the accruals quality of cross-listed firms will tend to be better than that of non-cross-listed firms.

### ***3.3.3. Cross-Listing and Earnings Management***

To achieve a more direct assessment of the cross-listing impact on earnings management, a series of multivariate regressions are conducted. In the regressions, alternative measures of earnings management are regressed on a cross-listing dummy, as well as a number of control variables that have been documented to have a nontrivial influence on earnings quality. Such controls include an exchange dummy, firm size, the book-to-market ratio, ROA, leverage, and state ownership.<sup>3</sup> The control variables are

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<sup>3</sup> To facilitate a more rigorous analysis, the regressions are also conducted with additional control variables. The results are not reported because these controls are never statistically significant across all model specifications and have no evident impact on the main results. Such variables include sales growth, industry concentration, firm age, board size, and board independence, where sales growth and industry concentration are used to control for demand conditions and product-cycle effects.

chosen based on previous studies, data availability, and the nature of this study. Moreover, the regressions are conducted within each industry group to account for potential industry effects.<sup>4</sup> Specifically, the following models are estimated:

$$|DA_{it}| = \lambda_0 + \lambda_1 DCROSS_{it} + \lambda_2 DEXCH_{it} + \lambda_3 SIZE_{it} + \lambda_4 BM_{it} + \lambda_5 ROA_{it} + \lambda_6 LEV_{it} + \lambda_7 SO_{it} + \varepsilon_{it} \quad (4)$$

$$AQ_{it} = \lambda_0 + \lambda_1 DCROSS_{it} + \lambda_2 DEXCH_{it} + \lambda_3 SIZE_{it} + \lambda_4 BM_{it} + \lambda_5 ROA_{it} + \lambda_6 LEV_{it} + \lambda_7 SO_{it} + \varepsilon_{it} \quad (5)$$

The dependent variable in the regressions is either the absolute value of discretionary accruals,  $|DA|$ , or accruals quality,  $AQ$ , where  $|DA|$  is calculated using the modified Jones (1991) model, and  $AQ$  is measured as the standard deviation of residuals from the model that regresses current accruals on the lagged, current, and future values of CFO, change in sales revenues, and gross PPE. The exogenous variables in the models are defined as follows: *DCROSS* is the cross-listing dummy, which takes the value of 1 for firms with both A- and B-share listings and 0 for firms with only domestic A-share listings; *DEXCH* is the exchange dummy, where 1 stands for SSE-listed firms and 0 stands for SZSE-listed firms; *SIZE* is the size of the firm; *BM* is the book-to-market ratio; *ROA* is the ROA ratio; *LEV* is the leverage (debt-to-equity) ratio; and *SO* is state ownership. Here, the book-to-market ratio and ROA are included to account for growth opportunity and profitability, respectively, and the leverage ratio and state ownership are used to control for the impact of capital structure and ownership structure, respectively.

The inclusion of a series of control variables, however, can lead to the problem of multicollinearity. Therefore, a correlation test is further conducted to check for possible signs of collinearity. As Table 3.2 indicates, while there are a number of statistically significant relationships among explanatory variables, none of them exceeds  $r = 0.55$ . In

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<sup>4</sup> As a robustness check, I also duplicate the regressions with industry dummies, where the results are statistically unaffected.

addition to the correlation test, I also calculate the VIF statistics as a cross-check for this issue, where none of the statistics is greater than 2.0. Hence, the concern about multicollinearity does not appear to be warranted.

\*\*\*Insert Table 3.2 about here\*\*\*

Since the purpose of these multivariate regressions is to investigate the cross-listing impact on earnings management, the main variable of focus here is the cross-listing dummy, *DCROSS*. If listing on the B-share market improves earnings quality substantially (as *H1* contends), then the coefficient estimates of *DCROSS* should be negative and statistically significant. To address the changing role of cross-listing upon market integration, the regressions are further conducted with respect to the pre- (1999–2001) and post-market-integration periods (2003–2006). If the impact of cross-listing is mitigated under increased market integration (as *H4* contends), then the coefficient estimates of *DCROSS* should be less significant after market liberalization reforms.

#### ***3.3.4. Cross-Listing and Price Informativeness***

In line with the literature (e.g., Chan and Hameed, 2006; Morck et al., 2000; Roll, 1988), this study uses the R-squared value from the regression of the capital asset pricing model (CAPM) to measure the departure of firm-specific stock movements from the market. Since the omitted-variables problem is generally less of a serious concern for panel models than for cross-sectional models (because the past values of the variables in the panel will partly control for the effects of the missing variables), the Sharpe–Lintner–Black model seems to be capable of testing this issue.

Note that in the literature many studies include industry returns in the regression (see, for example, Durnev et al., 2004; Gul et al., 2010; Roll, 1998). It is argued, however, that in studies that focus on emerging markets, the inclusion of industry returns as an additional independent variable might be problematic, because of the difficulties in disentangling the industry effect from the market and the fact that some industries are dominated by a few firms (e.g., Chan and Hameed, 2006). This study follows Chan and Hameed's approach.<sup>5</sup> In particular, the following model is estimated:

$$(R_{it} - R_t^F) = \alpha + \beta(R_t^M - R_t^F) + \varepsilon_{it} \quad (6)$$

where  $R_{it}$  is the stock return for each individual firm at time  $t$ , that is,  $R_{it} = \log\left(\frac{P_{it}}{P_{i,t-1}}\right) * 100$ ;

$R_t^M$  is the market return at time  $t$ , that is,  $R_t^M = \log\left(\frac{P_t^M}{P_{t-1}^M}\right) * 100$ ;  $R_t^F$  is the risk-free rate

(China's monthly yield of the three-month household deposit interest rate) at time  $t$ ; and  $\beta$  is the covariance of the market return with the portfolio return divided by the variance of the market return. The R-squared values from equation (6) are then used to measure the departure of firm-specific movements from the market. Specifically,

$$R^2 = 1 - \frac{\sum \hat{\varepsilon}_i^2}{\sum [y_i - \bar{y}]^2} \quad (7)$$

According to the Hausman specification test, the one-way random effects model is utilized. This means that, in general, the residual consists of two parts, that is,  $\varepsilon_{it} = u_i + v_{it}$ . For a more precise estimation, the error components model and generalized least squares (GLS) estimation are also applied.

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<sup>5</sup> As a robustness check, additional models with industry returns are also investigated, where the results are statistically unaffected.

In testing the impact of cross-listing on the capitalization of firm-specific information, one needs to compare the price synchronicity between cross-listed and non-cross-listed firms. If cross-listing plays an important role in inducing more informative stock prices, then firms with B-share listings should experience less synchronous stock movements than firms without, that is,  $R_C^2 < R_{NC}^2$ . If the impact of cross-listing is less bonding under increased market integration, then the divergence in price informativeness between the two groups of firms should be less evident after market liberalization, as reflected by a convergence in regression R-squared values.

To achieve a more direct assessment, the impact of cross-listing on price synchronicity is further investigated in a multivariate regression. The dependent variable is price synchronicity, measured by  $SYNCH = \text{Log}\left(\frac{R^2}{1-R^2}\right)$  (see, for example, Chan and Hameed, 2006; Durnev et al., 2004; Morck et al., 2000). Logistic transformation is utilized because the R-squared value is undesirable for regression purposes (it is bounded between 0 and 1). Additionally, the transformed variable also possesses some useful features. That is,  $SYNCH = \text{Log}\left(\frac{R^2}{1-R^2}\right) = \text{Log}\left(\frac{\sigma_m^2}{\sigma_\varepsilon^2}\right) = \text{Log}(\sigma_m^2) - \text{Log}(\sigma_\varepsilon^2)$ . Intuitively, a higher value of  $SYNCH$  indicates a greater power of market-wide variation,  $\sigma_m^2$ , relative to firm-specific variation,  $\sigma_\varepsilon^2$ , in explaining stock performance.

In addition to the control variables in models (4) and (5), trading volume is further included in the regression to account for the impact of the speed of price adjustments on price synchronicity. Because actively traded stocks may react to market information faster than infrequently traded stocks, the individual price movements of stocks with high

trading volume will tend to be more synchronous with the market, all else being equal (e.g., Chan and Hameed, 2006). In particular, the following model is estimated:

$$SYNCH_{it} = \lambda_0 + \lambda_1 DCROSS_{it} + \lambda_2 DEXCH_{it} + \lambda_3 SIZE_{it} + \lambda_4 BM_{it} + \lambda_5 ROA_{it} + \lambda_6 LEV_{it} + \lambda_7 SO_{it} + \lambda_8 VOL_{it} + \varepsilon_{it} \quad (8)$$

The independent variables in the model include the cross-listing dummy, *DCROSS*; the exchange dummy, *DEXCH*; firm size, *SIZE*; the book-to-market ratio, *BM*; the ROA ratio, *ROA*; the leverage (debt-to-equity) ratio, *LEV*; state ownership, *SO*; and trading volume, *VOL*. In terms of hypothesis testing, if listing on the B-share market results in less synchronous stock movements (as *H2* contends), then the coefficient estimates of *DCROSS* should be negative and statistically significant. If the impact of cross-listing on price synchronicity is less evident under increased market integration (as *H4* contends), then the coefficient estimates of *DCROSS* should be less significant after the regulatory reforms.

### ***3.3.5. Cross-Listing and Firm Value***

Observing a significant divergence in earnings quality and price informativeness between cross-listed and non-cross-listed firms, the next question to address is whether and to what extent the increased corporate governance and improved information environment will be correctly incorporated into firm valuation. This section investigates the impact of cross-listing on firm value. Following the literature, I measure the dependent variable, firm value, using Tobin's Q ratio, which is calculated as the book value of total assets minus the book value of equity plus the market value of equity, divided by the book value of total assets (see, e.g., McConnell and Servaes, 1990; Doidge et al., 2004; Morck et al., 1988). Explanatory variables in the model include the cross-listing dummy, *DCROSS*; the exchange dummy, *DEXCH*; firm size, *SIZE*; the price-to-

earnings ratio,  $PE$ ; the leverage ratio,  $LEV$ ; and state ownership,  $SO$ . Given the special relationship between Tobin's  $Q$  and the book-to-market ratio, I use the price-to-earnings ratio in equation (9) to control for growth opportunity, which is measured as current stock price divided by the earnings per share figure. Again, the regression is conducted within each industry group to control for potential industry effects. Specifically, the following model is estimated:

$$Q_{i,t} = \alpha + \beta_1 DCROSS_{it} + \beta_2 DEXCH_{it} + \beta_3 SIZE_{it} + \beta_4 PE_{it} + \beta_5 LEV_{it} + \beta_6 SO_{it} + \varepsilon_{it} \quad (9)$$

If cross-listing results in higher valuation (as  $H3$  contends), then the coefficient estimates of  $DCROSS$  should be positive and significant. If the impact on firm value is mitigated in a more integrated world (as  $H4$  contends), then the coefficient estimates of  $DCROSS$  should be less significant during the post-market-integration period.

### 3.4. EMPIRICAL RESULTS

#### 3.4.1. Earnings Management

Table 3.3 compares the magnitude of earnings management between cross-listed and non-cross-listed firms. Panel A is for the entire sample period and panel B breaks down into pre- and post-market-integration periods.

\*\*\*Insert Table 3.3 about here\*\*\*

Panel A of Table 3.3 shows that, on the whole, both the absolute value of discretionary accruals (about 10.3% of lagged assets) and the measure of accruals quality (about 7.7% of lagged assets) are much higher than those documented in previous studies

for developed capital markets (around 5% of lagged assets; see, e.g., Bergstresser and Philippon, 2006; Francis et al., 2005; Yu, 2008). This finding suggests that earnings management tends to thrive in emerging markets where regulatory and disclosure standards are relatively low and investor protection is weak.

In line with *H1*, which postulates that cross-listed firms have better earnings quality, I find that earnings management is less prevalent among cross-listed firms than among non-cross-listed firms. The  $|DA|$  and  $AQ$  values are 9.7% and 6.7%, respectively, for firms with B-share listings (panel A, column 5), whereas they are 10.3% and 7.7%, respectively, for firms with only domestic A-share listings (panel A, column 6). The mean difference is 0.67% for the  $|DA|$  measure and 0.97% for the  $AQ$  measure. Both are statistically significant.

In addition, the empirical findings in panel B of Table 3.3 are highly consistent with *H4*, which predicts a diminishing role of cross-listing under increased market integration. During the pre-market-integration period, both  $|DA|$  and  $AQ$  are much lower for cross-listed firms than for non-cross-listed firms (7.9% relative to 10.4% with respect to  $|DA|$ , and 5.8% relative to 7.6% with respect to  $AQ$ ). The mean difference is significant at the 1% level for both measures. After liberalization reforms, however, the divergence becomes statistically insignificant for the  $|DA|$  measure (the mean difference shrinks from 2.5% to 0.2%) and marginally significant for the  $AQ$  measure (the mean difference declines from 1.8% to 0.2%).

Overall, the results provide preliminary evidence that firms with B-share listings tend to have better earnings quality than their purely domestic-listed peers, while the quality differential between the two groups of firms becomes less evident in a more



integrated world. A year-by-year analysis of earnings management in Table 3.4 provides additional support for this central argument. As Table 3.4 indicates, the divergence in earnings quality between cross-listed and non-cross-listed firms is highly significant prior to the initialization of market liberalization in 2001, whereas the difference fades away after the completion of the regulatory reforms in 2002.

*\*\*\*Insert Table 3.4 about here\*\*\**

The pattern of earnings management for the two groups of firms is presented graphically in Figure 3.2. As can be seen, both the absolute value of discretionary accruals,  $|DA|$ , and accruals quality,  $AQ$ , are much lower for cross-listed firms than for non-cross-listed firms during the pre-market-integration period, from 1999 to 2001. Additionally, there is a clear convergence in earnings quality between the two groups of firms during the post-market-integration period, from 2002 to 2006.

*\*\*\*Insert Figure 3.2 about here\*\*\**

Table 3.5 presents the regression results regarding the impact of cross-listing on earnings management, where the dependent variable is either  $|DA|$  (columns 1–3) or  $AQ$  (columns 4–6). Consistent with the empirical results reported in Tables 3.3 and 3.4, the cross-listing dummy is significantly negative during both the full sample period and the pre-market-integration period for both earnings management measures. It becomes statistically insignificant during the post-market-integration period.

*\*\*\*Insert Table 3.5 about here\*\*\**

The empirical results thus far document a consistent pattern: cross-listed firms manage earnings less than their purely domestic-listed peers, while the divergence between the two groups of firms becomes less evident in a more integrated world.

#### ***3.4.2. Price Informativeness***

In line with the literature, this study uses the R-squared value from the regression of the CAPM to measure the departure of firm-specific stock movements from the market, and, hence, the capitalization of firm-specific information. The regression results are reported in Table 3.6, where columns 1 and 2 focus on the full sample period, and columns 3–6 break down into pre- and post-market-integration periods. As columns 1 and 2 show, firms with B-share listings tend to move in a relatively unsynchronized manner compared to their purely domestic-listed peers (with the R-squared value of 0.37 relative to 0.42), implying that B-share listing promotes the capitalization of firm-specific information. Further investigation indicates that there is a significant divergence in price synchronicity between the two groups of firms under perfect market segmentation (the R-squared value is 0.33 for firms with B-share listings and 0.53 for firms without), whereas the difference shrinks dramatically after market integration (the R-squared value is 0.29 for firms with B-share listings and 0.38 for firms without). The mean difference declines from 0.20 to 0.09.

*\*\*\*Insert Table 3.6 about here\*\*\**

For a direct analysis of the impact of cross-listing on price informativeness, a multivariate regression is further conducted. The regression results are reported in Table 3.7, where columns 1 and 2 focus on the full sample period, and columns 3–6 break down into pre- and post-market-integration periods. Consistent with the findings in Table 3.6, the coefficient estimates of *DCROSS* are negative and significant across all model specifications. In terms of control variables, I find that firm size, the book-to-market ratio, and state ownership tend to have a positive and significant impact on price synchronicity, suggesting that larger firms, state-owned enterprise, and companies with better growth opportunities are more likely to co-move with the market, or dominate the movements of the market. In addition, SSE-listed firms appear to have less synchronous stock movements than SZSE-listed firms. In contrast with the findings of Chan and Hameed (2006), trading volume is found to be insignificant during both the full and the post-market-linearization periods, and it is marginally significant during the pre-market-linearization period. One possible explanation is that firm size and trading volume are highly correlated, and firm size subsumes trading volume in explaining synchronicity.

\*\*\*Insert Table 3.7 about here\*\*\*

Overall, the results indicate that firms with B-share listings are valued more on firm-specific information, whereas firms with only domestic A-share listings are valued more on market-wide information. This is probably due to the distinct disclosure and regulatory standards and the participation of foreign investors in the B-share market.

These findings provide strong support to the bonding hypothesis, indicating that cross-listing indeed encourages informed trading and facilitates the capitalization of firm-specific information. The effect remains significant after market integration.

### **3.4.3. Firm Value**

Table 3.8 reports the regression results regarding the impact of cross-listing on firm value (as measured by Tobin's Q). Columns 1 and 2 focus on the full sample period, columns 3 and 4 consider the pre-market-integration period, and columns 5 and 6 examine the post-market-integration period.

\*\*\*Insert Table 3.8 about here\*\*\*

Consistent with *H3*, which predicts a positive impact of cross-listing on firm value, the coefficient estimates of *DCROSS* are found to be positive and highly significant (at the 1% level) during both the full and pre-market-integration periods, suggesting that B-share listing is value-enhancing. This result is consistent with the main findings of Doidge et al. (2004), which indicate that firms cross-listed in the United States have an average Tobin's Q ratio that is 16.5% higher than that of their home country peers. In line with *H4*, which predicts a diminishing role of cross-listing under increased market integration, the statistical significance of *DCROSS* changes from 1% to 5% in the post-market-integration period.<sup>6</sup> The documented valuation premiums suggest

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<sup>6</sup> Given the continued significance of *DCROSS* after market integration, a natural question to ask is whether or not this remaining positive impact of cross-listing is due to growth opportunity. To address this concern, I repeat the regression with an additional interaction term between cross-listing and the price-to-earnings ratio. The results are not reported, because the interaction term is neither statistically significant nor does it have any impact on the main findings. This suggests that the positive link between cross-listing and firm value is not driven by growth opportunity.

that Chinese investors do not adjust their valuations based on cross-listed firms when investing in similar purely domestic-listed firms. Additionally, what is remarkable here is that the valuation premiums remain significant even after the liberalization reforms, suggesting that domestic and cross-listed stocks are determined by different forces in China and that there is a lack of attention among investors.

To sum up, the empirical results in this study suggest that cross-listing on a more regulated market leads to better corporate governance, improved information environment, and enhanced firm valuation, while the impact is less prominent in a more integrated world.

#### ***3.4.4. Robustness Check for Endogeneity***

Despite these provocative findings, some caveats should be noted. An inevitable empirical challenge associated with studies that assess strategy performance is endogeneity (or simultaneous bias). With the potential self-selection problem, observing a positive relationship between cross-listing and earnings quality does not necessarily lead to the conclusion that cross-listing results in better earnings quality. The positive link between the two variables may be attributable to the fact that firms with better corporate governance (less earnings manipulation) are more likely to cross-list on a more regulated capital market. Likewise, the positive association between cross-listing and price informativeness (or firm value) may be attributable to the fact that firms with better corporate transparency (or better growth opportunities) are more likely to cross-list.

A convenient way to address this causality issue is to compare the earnings quality of cross-listed firms before and after their B-share listings, while keeping all the other variables constant. However, the limited history of the Chinese stock market and

the tendency of Chinese firms to engage in domestic and foreign listings simultaneously have prevented us from obtaining sufficient pre-cross-listing observations. In the literature, another popular method to address this issue is to use instrumental variables. Nevertheless, given that both cross-listing decisions and earnings management practices remain largely unexplored in emerging economies, the construction of instrumental variables seems to be very subjective. This leaves the use of lagged dependent variables as the best choice for this study. Therefore, I re-estimate equations (4) and (5) with lagged dependent variables. Specifically, the following models are estimated:

$$|DA_{it}| = \lambda_0 + \lambda_1 DCROSS_{it} + \lambda_2 DEXCH_{it} + \lambda_3 SIZE_{it} + \lambda_4 BM_{it} + \lambda_5 ROA_{it} + \lambda_6 LEV_{it} + \lambda_7 SO_{it} + \lambda_8 DA_{it-1} + \varepsilon_{it} \quad (10)$$

$$AQ_{it} = \lambda_0 + \lambda_1 DCROSS_{it} + \lambda_2 DEXCH_{it} + \lambda_3 SIZE_{it} + \lambda_4 BM_{it} + \lambda_5 ROA_{it} + \lambda_6 LEV_{it} + \lambda_7 SO_{it} + \lambda_8 AQ_{it-1} + \varepsilon_{it} \quad (11)$$

Table 3.9 provides additional confidence concerning endogeneity, since the inclusion of lagged dependent variables does not change the statistic significance of *DCROSS*, nor does it have any significant influence on any other variables.<sup>7</sup>

\*\*\*Insert Table 3.9 about here\*\*\*

### 3.5. CONCLUDING REMARKS

This study examines the changing role of cross-listing in shaping corporate earnings management, stock price informativeness, and firm valuation under increased market integration. Using a panel sample of Chinese firms over a nine-year period from 1998 to 2006, I find that cross-listing has a significant positive impact on earnings quality.

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<sup>7</sup> The same technique is applied to the models regarding the impact of cross-listing on price synchronicity and firm value. The results are highly consistent with the findings in Tables 3.7 and 3.8, indicating that our empirical design is relatively immune to the problem of endogeneity.

Consistent with the findings on earnings management, firms with B-share listings are found to have more informative stock pricing (as measured by price synchronicity) and higher valuation (as measured by Tobin's Q) than comparable purely domestic-listed firms. Further investigation indicates a reduced level of divergence between the two groups of firms upon market integration. Overall, the results suggest that cross-listing plays a significant but diminishing bonding role in an increasingly integrated world. The results are robust using various earnings management measures and different model specifications.

Despite the interesting findings, some caveats should be noted. First, the evidence of this study is based on a single-country analysis. It would be rewarding to consider other emerging economies that undergo similar market liberalization processes to determine the generalizability of the results. Second, while the mitigated bonding role of cross-listing under increased market integration points to a possible explanation for the worldwide foreign delisting wave, alternative reasons, such as increased regulatory requirements, cannot be safely ruled out without additional investigation.

Notwithstanding these limitations, this study offers new and relatively robust insights into the literature. First, while the bonding hypothesis has been researched significantly, little attention has been paid to directly testing the effectiveness of this kind of commitment in bonding real corporate practices. This study examines the bonding impact of cross-listing on corporate behavior in the context of earnings management, stock price informativeness, and firm valuation.

Second, while the issue of cross-listing has stimulated a considerable amount of quality research, a common limitation associated with these studies is that they tend to

consider cross-listing impact in a static framework. The effect of increased market integration on the dynamics of cross-listing (and delisting) decisions is largely ignored. Drawing on the unique opportunity of the Chinese stock market restructuring in 2001 and 2002, this essay effectively addresses the changing role of cross-listing under increased market integration within a relatively short time frame, where structural stationarity and omitted-variables problems are of less serious modeling concern.

Third, while the issues of earnings management, price informativeness, cross-listing, and market liberalization have been objects of focus in modern finance literature, no systematic attempt to date has been made to address these issues in an integrated framework. By investigating the impact of cross-listing on corporate earnings quality, price informativeness, and firm valuation, contingent upon the regulatory reforms of Chinese stock market liberalization, this study provides a meaningful synthesis of these disparate research streams. The empirical findings of this essay also point to a possible explanation for the current worldwide foreign delisting wave that has been plaguing major stock exchanges.



## CHAPTER 4

### U.S. LISTING, STOCK MISVALUATION, AND THE CONTENT OF INFORMATION IN STOCK PRICING

#### 4.1. INTRODUCTION

Over the past few decades, the issue of international listings has been one of the primary focuses in modern finance literature. Previous studies have provided an extensive theoretical ground for expecting significant and long-lasting cross-listing premiums, that is, superior (abnormal) returns enjoyed by cross-listed firms on their home markets relative to comparable purely domestic-listed firms. This is especially true for firms that cross-list on more advanced capital markets.

Conventional theories suggest that firms list overseas to overcome investment barriers and to lower their cost of capital. Because international listings provide firms with improved access to global capital, reduced risk exposure, enhanced visibility, liquidity and investor base, the cost of capital will be lower for cross-listed firms than for non-cross-listed firms (e.g., Doukas and Switzer, 2000; Foerster and Karolyi, 1999; Lins, Strickland, and Zenner, 2005; Miller, 1999; Mittoo, 1992). While these hypotheses have had some success in explaining cross-listing practices, their empirical validity and saliency have long been questioned. Major criticisms stem from their failure to explain why firms continuously list overseas after the removal of investment barriers; why relatively few firms cross-list overseas, given the proposed benefits; and why the market reacts more positively if the firm chooses to list on major exchanges as opposed to over-the-counter (OTC) and private placements.

Facing these difficulties of conventional theories in explaining cross-listing rationales, a variety of hypotheses have been developed, among which the most frequently cited is the bonding hypothesis proposed by Coffee (1999, 2002) and Stulz (1999). In the context of the bonding hypothesis, firms cross-list on more regulated markets to voluntarily bond themselves to higher regulatory, disclosure, and monitoring standards so as to mitigate potential agency conflicts (e.g., Coffee, 1999, 2002; Karolyi, 1998; Reese and Weisbach, 2002; Stulz, 1999). Consistent with the bonding hypothesis, Doidge, Karolyi, and Stulz (2004) find that U.S. listing is an effective device in limiting controlling shareholders' expropriation of minority shareholders and that firms with shares cross-listed in the United States are worth more than similar home country firms. The major contribution of this hypothesis is that it resolves a current paradox concerning why a majority of firms do not cross-list. According to Doidge, Karolyi, Lins, Miller, and Stulz (2009), a firm's decision to list overseas involves a trade-off between private control and bonding benefits. Because cross-listing reduces controlling shareholders' consumption of private benefits, for a firm to cross-list, the benefits of bonding must be large enough to offset controlling shareholders' losses in private control.

Moreover, it is argued that cross-listing on advanced markets with stricter disclosure requirements is an effective device in mitigating information asymmetry between corporate insiders and outsiders (e.g., Bailey, Karolyi, and Salva, 2006; Fuerst, 1998; Moel, 1999). Empirically, international listings are found to be related to higher analyst coverage, improved forecast accuracy, and a more transparent information environment (e.g., Baker, Nofsinger, and Weaver, 2002; Lang, Lins, and Miller, 2003).

Despite these rather clear and strong theoretical grounds, empirical evidence to date has been inconclusive in documenting the benefits of international listings. The literature is permeated by both positive (e.g. Doidge et al., 2004; Doukas and Switzer, 2000; Miller 1999) and negative or insignificant findings (e.g. Alexander, Eun, and Janakiramanan, 1998; Foerster and Karolyi, 1999; Foerster and Karolyi, 1993). The failure of cross-listing research to demonstrate consistent findings has raised the question of whether existing theories are incomplete or contingent in explaining cross-listing practices. By addressing cross-listing issues in a contingency framework (contingent on the unique environment of a listing firm's home market), this essay offers a possible reconciliation to the conflicting empirical findings that have been plaguing the literature. As this study indicates, in an environment filled with severe information asymmetry and stock overvaluation, as is found in China, the presence of cross-listing premiums depends on the relative power of two distinct effects, i.e., the cross-listing benefits and the downward price correction (toward the fundamental values of the stocks). If U.S. listing indeed plays an important role in cultivating information transparency and more value-relevant stock pricing, as proposed in the literature, then it should undoubtedly induce more accurate stock valuation. With inherent stock overvaluation, therefore, cross-listing premiums will exist if and only if listing benefits dominate the downward price pressure.

The empirical investigation is conducted using a panel sample of Chinese firms with and without U.S. listings over a three-year period, from October 2004 to September 2007. China has been chosen as the research focus of this study for two reasons. First, interest in understanding the Chinese capital market has grown commensurately with China's economic development and its increased integration with the world economy.

Nevertheless, empirical evidence to date has been rare and inconclusive in documenting the impact of cross-listing on Chinese firms. For example, using data from 40 countries, Doidge et al. (2004) find that foreign companies with shares cross-listed in the United States are worth more than similar home country firms; using data from 31 countries, Doidge et al. (2009) find that firms' decisions to cross-list involve a trade-off between private control and bonding benefits. However, China is excluded from both studies. Therefore, testing the generalizability of existing theories to the Chinese stock market offers an important building block to the literature.

Second, the unique features of the Chinese stock market provide an ideal laboratory for testing the impact of cross-listing on home country information asymmetry and stock misvaluation. With limited investor protection, ineffective legal enforcement, and ill-functioning information infrastructure, investors have neither information transparency nor the ability to value a firm or a stock accurately. Stock misvaluation presents itself in such an environment with severe information asymmetry. In China, investors are frequently regarded as speculators who trade on rumors rather than informed investors who trade on fundamentals (e.g., Ma, 1996; Mei, Scheinkman, and Xiong, 2003), and the stock movements are found to be highly synchronous with the movements of the market rather than reflecting firm-specific information (e.g., Chan and Hameed, 2006; Morck, Yeung, and Yu, 2000). As a consequence, Chinese local shares are found to be universally overvalued relative to their fundamentals (e.g., Bailey and Jagtiani, 1994; Fernald and Rogers, 2002; Ma, 1996; Mei et al., 2003). This unique environment offers a natural platform for testing the impact of U.S. listing on stock misvaluation.

The remainder of this essay proceeds as follows. Section 2 offers a brief discussion on hypothesis development. Section 3 provides data description and model specifications. Empirical results are reported in Section 4, followed by concluding remarks in Section 5.

## **4.2. HYPOTHESIS DEVELOPMENT**

### ***4.2.1. U.S. Listing and Price Correction***

In order to get an in-depth analysis of the cross-listing impact on Chinese firms, it is important to understand two idiosyncratic features of the Chinese stock market. First, stocks are universally overvalued relative to their fundamentals in China. Some researchers argue that it is the lack of alternatives to low-yielding bank accounts that drives Chinese domestic savings into the stock market and pushes stock prices up, beyond parity (e.g., Bailey and Jagtiani, 1994; Fernald and Rogers, 2002). Some researchers point out that it is the highly risk-tolerant and speculative behavior of Chinese investors that ultimately leads to the deviation of stock prices from a rational level (e.g., Ma, 1996; Mei et al., 2003). Because the objective of this study is to explore the impact of U.S. listing on stock misvaluation, what caused the overvaluation in the first place is beyond the scope of this study.

The second idiosyncrasy associated with the Chinese stock market is that the movements of stocks are highly synchronous with the movements of the market, rather than reflecting firm-specific information (e.g., Chan and Hameed, 2006; Morck et al., 2000). A worldwide comparison of stock price synchronicity placed China the second highest among 40 sample countries (Morck et al., 2000). This phenomenon can be well

explained by an information-based interpretation of stock price synchronicity proposed by Roll (1988). The idea is that if asset prices can be considered as a function of both firm-specific and market-wide information, then investors will have to rely more on market-wide information in an environment where reliable firm-specific information is either technically unavailable or prohibitively costly, resulting in highly synchronous stock movements.

Given the inherent information asymmetry and stock misvaluation, U.S. listing will affect Chinese firms in two dimensions. On the one hand, there are numerous cross-listing benefits. As proposed by conventional theories, cross-listing provides firms with improved access to global capital, reduced risk exposure, enhanced visibility, liquidity, and investor base, resulting in a lower cost of capital. Additionally, as the bonding hypothesis contends, because cross-listing on a more regulated market is an effective device in bonding corporate insiders and mitigating agency conflicts, cross-listed firms should have better corporate governance, more transparent information environment, and a higher valuation than their home country peers. Both hypotheses predict a significant cross-listing premium. On the other hand, it is argued that cross-listing plays an important role in mitigating information asymmetry in the marketplace (e.g., Bailey et al., 2006; Baker et al., 2002; Fuerst, 1998; Lang et al., 2003; Moel, 1999). If this is the case, then there will be an inevitable downward price correction (toward the fundamental values of the stocks) in addition to whatever the benefits are when these overvalued Chinese firms list in the U.S.

Therefore, in an environment filled with severe information asymmetry and stock misvaluation, such as China, the presence of cross-listing premiums depends on the

relative power of two distinct effects, i.e., the cross-listing benefits and the price correction effect. Premiums will exist if and only if listing benefits dominate the downward price pressure. In terms of hypothesis testing, this implies that stock prices of cross-listed firms should be more informative and less overvalued (as reflected by lower risk-adjusted abnormal returns) than those of purely domestic-listed firms.

Based on the above discussions, the following hypothesis is developed.

*H1: Firms with U.S. listings are less overvalued (as reflected by lower risk-adjusted abnormal returns) than comparable home country firms.*

#### **4.2.2. Price Synchronicity**

Drawing on state-of-the-art finance literature, this study uses price synchronicity to measure stock price informativeness. As Roll (1988) points out, the extent to which stocks move together depends on the relative amounts of firm-level and market-level information incorporated into stock prices. In the past two decades, a growing body of literature consistently provides empirical support to this information-based interpretation of stock synchronicity. For example, Morck et al. (2000) find that stock prices move together more in emerging markets, where reliable firm-specific information is either technically unavailable or prohibitively costly. Durnev, Morck, Yeung, and Zarowin (2003) indicate that the relationship between current returns and future earnings is stronger for firms and industries with low price synchronicity. Durnev, Morck, and Yeung (2004) document a positive association between the economic efficiency of corporate investment and the magnitude of firm-specific variation in stock returns. Jin and Myers (2006) find that stock price synchronicity decreases with the level of information transparency. Gul, Kim, and Qiu (2010) note that foreign ownership and

auditor quality are inversely associated with synchronicity, and that the amount of firm-level information reflected in stock prices is lower for firms with high synchronicity. These empirical findings point to a single story: higher firm-specific return variation (as a fraction of total variation) indicates more informative stock prices.

This can also be justified easily on conceptual grounds. Theoretically, this stream of research is developed upon a hypothesized decomposition of information in stock pricing. The idea is that if asset prices can be considered as a function of both firm-specific and market-wide information, then in an environment with significant impediments to informed trading, investors will have to rely more on market-wide information, resulting in a higher degree of stock co-movement. On the other hand, in an environment with sufficient investor protection and information transparency, stock prices will tend to be less synchronous with each other due to informed trading.

In the context of this study, the price correction hypothesis implies that stock prices of cross-listed firms should be more informative (less synchronous) than those of non-cross-listed firms. Therefore, the following hypothesis is derived.

*H2: Firms with U.S. listings tend to have less synchronous stock movements than comparable home country firms.*

#### **4.2.3. Price–Earnings Relationship**

Nevertheless, the empirical validity of price synchronicity as a measure of the capitalization of firm-specific information has been challenged by some recent studies (e.g., Ashbaugh-Skaife, Gassen, and LaFond, 2005). For a more rigorous analysis, I perform an additional test in this section to see whether the synchronicity measure captures the amount of firm-specific information that is incorporated into stock prices.



Standing at the core of various firm-level information, accounting earnings obviously play an important role in predicting a firm's stock market performance (e.g., Barth, Beaver, and Landsman, 1998; Burgstahler and Dichev, 1997; Collins, Maydew, and Weiss, 1997). The positive association between earnings and stock performance rests on strong conceptual grounds. In a standard valuation model with no market impediments, stock prices should reflect the discounted present value of all expected future cash flows. Therefore, there will be a strong relationship between corporate earnings and stock prices (or returns) if the market is efficient in inducing informative, value-relevant stock prices. This study uses the price-earnings relationship as a cross-check measure of the capitalization of firm-specific information.

In the literature, the relationship between accounting earnings and stock prices (or returns) is generally investigated through either an event study approach or an association approach. Event studies focus on exploring short-term stock market responses to earnings announcements. In association types of studies, however, returns measured over long time periods (e.g., a fiscal year) are regressed on current earnings or unexpected earnings to examine the price-earnings relationship. Both approaches are developed upon a standard valuation model in which unbiased stock price reflects the discounted present value of expected future cash flows.

Because of data availability issues, this study investigates the price-earnings association to address the capitalization of earnings information into stock prices. In the context of this study, the price correction hypothesis implies that the price-earnings relationship should be stronger among cross-listed firms than among non-cross-listed firms. Therefore, the following hypothesis is developed.

*H3: The price–earnings relationship is stronger among firms with U.S. listings than comparable home country firms.*

#### **4.2.4. Exchange vs. Non–Exchange Listings**

In the literature, a number of studies suggest a varying degree of cross-listing benefits, depending on the exchange choice of U.S. listings (e.g., Doidge et al., 2004; Doukas and Switzer, 2000; Miller, 1999). Because the sample encompasses both exchange-based (i.e., NYSE) and non–exchange-based (i.e., OTC and private placements) U.S. listings, I further examine the impact of listing choices on the magnitude of price correction. Because the regulatory and disclosure standards are more stringent for exchange listings (requiring full SEC disclosure and full reconciliation with the U.S. GAAP) than for OTC listings and private placements (requiring minimal SEC disclosure and no GAAP compliance), the listing impact on exchange-listed firms should be more prominent. If this is the case, then exchange listings should result in better information environment, more significant price correction, and less overvalued stock prices.

In terms of hypothesis testing, this implies that NYSE-listed firms should exhibit a lower level of price synchronicity, stronger price–earnings relationship, and more accurate stock valuation (as reflected by lower risk-adjusted abnormal returns) relative to firms that choose OTC listings and private placements.

Based on the above discussions, I hypothesize the following.

*H4: Stock prices are more informative and less overvalued among NYSE-listed firms than among firms that choose OTC listings and private placements.*

### 4.3. DATA AND METHODOLOGY

#### *4.3.1. Data Description*

Given that a majority of Chinese firms list in the U.S. via American Depositary Receipt (ADR), this study focuses mainly on the ADRs as the means of U.S. listing. Each ADR is issued by a U.S. depositary bank and can represent a fraction or a multiple of a foreign share. Listing firms have a choice of four types of ADRs: three levels of public offerings as well as private placements (Rule 144A). Firms that list on major exchanges, such as NYSE, AMEX, and NASDAQ, are required to fully reconcile their financial statements to the U.S. GAAP and release material corporate information based on SEC disclosure rules. On the other hand, firms that choose OTC listings (Level I ADRs) and private placements (Rule 144A) are subject to little, if any, SEC disclosure and no GAAP compliance. This distinct feature offers a natural platform for testing the price correction effect, contingent upon different listing standards.

This study uses panel data to control for potential survivorship bias and omitted-variables problems. Since the purpose of this study is to analyze the impact of U.S. listing on Chinese firms, I first identify 91 Chinese ADRs (as documented by the Bank of New York in September 2007). Using balanced panel data, I further require the sample firms to be continuously listed on both the Chinese domestic A-share market and the U.S. market for at least three years, from October 2004 to September 2007. The sample period is chosen based on a tradeoff between sample size and the length of the time period. After eliminating firms with insufficient cross-listing histories, companies with missing values on related items, and those in financial industries, there are 27 firms left.

The final sample, therefore, consists of 27 U.S. listed firms (8 NYSE listings and 19 OTC listings and private placements), each with a continuous cross-listing history over the entire sample period.

Table 4.1 provides a brief description of the listed firms. An interesting feature of this sample is that, in addition to U.S. listings, these Chinese firms tend to cross-list simultaneously on some other Asian markets, such as the Hong Kong Stock Exchange and the Chinese B-share market.<sup>8</sup> Additionally, some firms even list on the foreign-based Asian markets prior to their domestic listings, that is, they may list on the Hong Kong Stock Exchange or the B-share market first, followed by U.S. listings, and then domestic A-share listings. One possible explanation is that these firms regard the Chinese domestic A-share market as more risky than the relatively regulated Hong Kong Stock Exchange and the foreign-based B-share market.

*\*\*\*Insert Table 4.1 about here\*\*\**

Based on the characteristics of these 27 cross-listed firms, I then construct a matched sample of purely domestic-listed firms, which are matched in terms of both industry and firm size. After eliminating firms with insufficient histories or missing values, companies with incomparable sizes or unmatched industry categories, and those with any type of foreign listings, 816 comparable purely domestic-listed firms are identified, each with a continuous domestic listing history over the entire sample period.

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<sup>8</sup> Prior to Chinese stock market liberalization in 2001, Chinese domestic firms could issue two distinct classes of stocks, identical in all aspects except for their ownership restrictions: A shares, which could only be held and traded by domestic investors, and B shares, which could only be held and traded by foreign investors. As a result, the Chinese stock market has been divided into two separate markets: the domestic A-share market and the foreign B-share market.

In this study, both firm-level accounting data and stock market figures are compiled from the China Stock Market and Accounting Research Database (CSMAR). Following the literature, I use China's monthly yield of the three-month household deposit interest rate as a proxy for the risk-free rate, which is compiled from the People's Bank of China. To account for potential industry effects, the sampled firms are further classified into six broadly defined industry categories in line with the CSMAR industry code A.

Table 4.2 presents summary statistics, where panel A focuses on the full sample and panel B breaks down into two sub-groups, i.e., firms with and without U.S. listings. In order to address the impact of exchange choices, I further divide the sample of cross-listed firms into exchange-based and non-exchange-based listings in panel C. The variables are defined as follows: *SIZE* is the size of the firm, calculated as the natural log of total assets; *BM* is the book-to-market ratio, measured as the difference between total assets and total liabilities, divided by the stock market capitalization of the firm; *LEV* is the leverage (debt-to-equity) ratio; *ROA* is the return on assets, computed as earnings before extraordinary items and discontinued operations (EBXI) divided by total assets; and *RET* is the monthly holding period return on a firm's common stock (using continuously compounded return leads to consistent results).

\*\*\*Insert Table 4.2 about here\*\*\*

As panel B of Table 4.2 indicates, firms with U.S. listings have an average book-to-market ratio that is much lower than that of comparable home country firms (1.58

relative to 15.62), suggesting that cross-listed firms tend to face better growth opportunities than their home market peers. This observation is highly consistent with the findings of Doidge et al. (2004), which indicate that firms with U.S. listings have an average Tobin's Q ratio that is 16.5% higher than that of similar home country firms. Additionally, Chinese firms without foreign listings appear to have an unusually high book-to-market ratio. One possible explanation for this is that Chinese firms are more reluctant to write down their assets. Moreover, cross-listed firms tend to be more profitable than their home country peers in terms of the ROA ratio (6.2% relative to 3.2%), suggesting that cross-listing on a more regulated market serves as an effective device in cultivating corporate efficiency. In terms of the holding period return, I find that the average return is higher among cross-listed firms than among non-cross-listed firms (3.33% relative to 2.76%), implying that cross-listed firms may have a higher cost of capital compared to their purely domestic-listed peers. However, such a comparison must be viewed cautiously, since neither market-wide nor firm-specific characteristics have been taken into account.

As panel C of Table 4.2 indicates, NYSE-listed firms are generally larger (with an average size of 24.72, as opposed to 21.60) and more efficiently operated (with a ROA ratio of 7.6%, as opposed to 5.6%) than firms that choose OTC listings and private placements. In addition, exchange-listed firms tend to rely more on debt financing than non-exchange-listed firms (with a leverage ratio of 2.52, as opposed to 1.06). This phenomenon can be well explained by the price correction hypothesis. If the cost of price correction associated with exchange listings is too high, then it is rational for NYSE-listed firms to rely on debt financing due to the concern of stock undervaluation.

### 4.3.2. Price Synchronicity

In line with the literature (e.g., Chan and Hameed, 2006; Morck et al., 2000; Roll, 1988), this study uses the R-squared value from the regression of the capital asset pricing model (CAPM) to measure the departure of firm-specific stock movements from the market. In the literature, many studies include industry returns in the regression (see, for example, Durnev et al., 2004; Gul et al., 2010; Roll, 1998). It is argued, however, that in studies that focus on emerging markets, the inclusion of industry returns as an additional independent variable might be problematic, because of the difficulties in disentangling the industry effect from the market and the fact that some industries are dominated by a few firms (e.g., Chan and Hameed, 2006). This study follows Chan and Hameed's approach.<sup>9</sup> In particular, the following model is estimated:

$$(R_{it} - R_t^F) = \alpha + \beta(R_t^M - R_t^F) + \varepsilon_{it} \quad (1)$$

where  $R_{it}$  is the stock return for each individual firm at time  $t$ ,  $R_t^M$  is the corresponding market return at time  $t$ ,  $R_t^F$  is the risk-free rate (China's monthly yield of the three-month household deposit interest rate) at time  $t$ ; and  $\beta$  is the covariance of the market return with the portfolio return divided by the variance of the market return.

According to the Hausman specification test, the one-way random effects model is utilized. This means that, in general, the residual consists of two parts, that is,  $\varepsilon_{it} = u_i + v_{it}$ . For a more precise estimation, the error components model and generalized least squares (GLS) estimation are also applied. The R-squared values from model (1)

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<sup>9</sup> As a robustness check, additional models with industry returns are also investigated, where the results are statistically unaffected.

are then used to measure the departure of firm-specific movements from the market, specifically,

$$R^2 = 1 - \frac{\sum \hat{\varepsilon}_i^2}{\sum [y_i - \bar{y}]^2} \quad (2)$$

In this study, I use *alphas* from model (1) as an indicator of abnormal returns. Since the omitted-variables problem is generally less of a serious concern for panel models than for cross-sectional models (because the past values of the variables in the panel will partly control for the effects of the missing variables), the Sharpe–Lintner–Black model seems to be capable of detecting risk-adjusted abnormal returns.

In terms of hypothesis testing, if U.S. listing indeed leads to more accurate stock valuation (as *H1* contends), then the *alphas* should be less significantly different from zero for cross-listed firms. If cross-listing plays an important role in inducing more informative stock prices (as *H2* contends), then stock movements should be less synchronous among cross-listed firms than among non-cross-listed firms, that is,  $R_C^2 < R_{NC}^2$ . Likewise, if stock prices are more informative among exchange listings (as *H4* contends), then the R-squared value should be lower for NYSE-listed firms than for firms that choose OTC listings and private placements, that is  $R_E^2 < R_{NE}^2$ .

#### **4.3.3. Price–Earnings Relationship**

Following the suggestions of Kothari and Zimmerman (1995), this study considers the price–earnings relationship based on both the price and return models to ensure that the empirical results are not sensitive to the way that the model is specified. In price models, stock prices are regressed on earnings per share figures, whereas in



return models, stock returns are regressed on scaled earnings. In particular, the following models are estimated:

$$P_{it} = \alpha + \beta X_{it} + \varepsilon_{it} \quad (3)$$

$$P_{it} / P_{i,t-1} = \alpha + \beta X_{it} / P_{i,t-1} + \varepsilon_{it} \quad (4)$$

where  $P_{it}$  is the trading day closing price at time  $t$ ,  $X_{it}$  is the earnings per share figure at time  $t$ , and  $P_{i,t-1}$  is the trading day closing price at time  $t-1$ . Note that equation (4) is considered a return model because  $P_{it} / P_{i,t-1}$  equals one plus the holding period return.

In the literature, studies estimating the price–earnings relationship are interested in both the significance of the estimated slope coefficient, i.e., the earnings response coefficient (ERC), and the explanatory power of the model. In particular, if earnings are related to stock prices, the estimated ERC should be significantly different from zero and the model should explain a large portion of variation in stock prices (or returns). In the context of this study,  $H3$  implies that firms with U.S. listings will have more significant ERCs and higher R-squared values as compared to their home country peers, that is,  $ERC_C > ERC_{NC}$  and  $R_C^2 > R_{NC}^2$ .

#### **4.3.4. Robustness Checks**

As mentioned in Table 4.1, an interesting feature associated with the sample is that, in addition to U.S. listings, the firms tend to cross-list simultaneously on some other Asian markets, such as the Hong Kong Stock Exchange and the Chinese B-share market. With these additional listing choices, observing a positive relationship between U.S. listing and price informativeness does not necessarily lead to the conclusion that listing

on the U.S. market mitigates firm-specific information asymmetry. The observed relation may be attributable to Hong Kong or B-share listings rather than U.S. listings.

An effective way to address this issue is to compare the price synchronicity before and after a firm's U.S. listing, while keeping all the other listing choices constant. To construct a subsample of cross-listed firms for this purpose, I further require the sample firms to have at least three years of domestic A-share listings before their U.S. listings. Due to the short history of the Chinese stock market and the fact that a majority of Chinese firms engage in domestic and U.S. listings simultaneously, only 4 firms are qualified for this purpose. Given the extremely small sample size, I investigate the 4 firms individually. In order to rule out short-run disturbance around U.S. listings, the pre- and post-cross-listing periods are constructed with a gap of six months before and a gap of six months after the listing events. The time frame of estimation is illustrated in Figure 4.1. The only exception is Tianjin Capital Environment Protection (TCEPY), for which I test an earlier pre-cross-listing period in order to avoid the firm-specific disturbance of corporate restructuring between late 1998 and late 2000. If U.S. listing indeed mitigates home country information asymmetry and stock misvaluation, then the firm should exhibit more informative and less overvalued stock prices after U.S. listing.

*\*\*\*Insert Figure 4.1 about here\*\*\**

#### **4.4. EMPIRICAL RESULTS**

Table 4.3 reports the regression results regarding abnormal returns and stock price synchronicity. Following the literature, this study uses the R-squared value from the

regression of the CAPM to measure the departure of firm-specific stock movements from the market, and, hence, the capitalization of firm-specific information.

*\*\*\*Insert Table 4.3 about here\*\*\**

Based on columns 1 and 2 of Table 4.3, Chinese firms with U.S. listings generally realize insignificant risk-adjusted abnormal returns on their home market ( $t = 0.31$ ), whereas their domestic peers enjoy positive and significant abnormal returns ( $t = 4.67$ ). This finding indicates that U.S. listing plays an important role in mitigating the listing firm's home market stock misvaluation ( $H1$  is supported). In addition, the R-squared value is much lower for cross-listed firms than for non-cross-listed firms (25% relative to 28%), suggesting that cross-listed firms are valued more on firm-specific information, whereas non-cross-listed firms are valued more on market-wide information, all else being equal ( $H2$  is supported).

In addition, a close comparison between columns 3 and 4 indicates that NYSE-listed firms tend to have more informative (with the R-squared value of 18.7%, as opposed to 25.2%) and less overvalued stock prices (as reflected by lower risk-adjusted abnormal returns) relative to firms that choose OTC listings and private placements ( $H4$  is supported). These findings imply that higher listing standards tend to promote informed trading, facilitate the capitalization of firm-specific information, and result in more precisely valued stocks.

Given the empirical difficulties in measuring the content of information, the association between price and earnings is further investigated as a cross check for the

capitalization of firm-specific information. The empirical results are reported in Table 4.4, where panel A focuses on the price model and panel B considers the return model.

*\*\*\*Insert Table 4.4 about here\*\*\**

Consistent with the empirical findings in Table 4.3, columns 1 and 2 of Table 4.4 indicate that the price–earnings relationship is much stronger for cross-listed firms than for non–cross-listed firms. The estimated slope coefficient, or the ERC, is positive and significant for firms with U.S. listings ( $t = 5.50$  in the price model and  $t = 2.00$  in the return model), whereas it is insignificant for purely domestic-listed firms ( $t = 0.55$  in the price model and  $t = 1.00$  in the return model). In line with the findings on the ERC, the R-squared value is found to be much higher for cross-listed firms than for non–cross-listed firms (4.15% relative to 0% in the price model, and 0.57% relative to 0% in the return model). As can be seen, the results in panels A and B are highly consistent, indicating that the empirical findings in Table 4.3 are not contingent upon model specifications. Overall, these findings indicate that U.S. listing plays an important role in promoting the capitalization of value-relevant, firm-specific information ( $H3$  is supported).

Moreover, as columns 3 and 4 indicate, the price–earnings relationship is much stronger among NYSE-listed firms than among firms that choose OTC listings and private placements, in terms of both the ERC ( $t = 6.31$  relative to 4.58 in the price model, and  $t = 2.53$  relative to 1.87 in the return model) and the R-squared value (16% relative to 4% in the price model, and 8% relative to 0.7% in the return model). In sum, these results suggest that stock prices of exchange-listed firms contain more value-relevant

corporate information, and that listing standards play an important role in shaping the content of information in stock valuation (*H4* is supported).

As a robustness check, I further investigate the price synchronicity of listing firms before and after their U.S. listings. The empirical results are reported in Table 4.5. If listing in the U.S. indeed allows investors to rely more on firm-specific information, then one should observe less synchronous and more precisely valued stock prices upon U.S. listings. Consistent with the price correction hypothesis, all 4 firms experience dramatic declines in price synchronicity after their U.S. listings: the R-squared value decreases from 38.4% to 23.5% for Far East Pharmaceutical Technology (FEPTY), declines from 53.1% to 37.4% for Angang Steel (ANGGY), falls from 75.1% to 31.3% for Shanghai Jinqiao Export Processing Zone Development (SJQIY), and drops from 40.0% to 24.5% for Tianjin Capital Environment Protection (TCEPY).

The fitted values for these robustness tests are plotted in Figure 4.2. As the figures indicate, the model fits decrease dramatically in the post-cross-listing period for all 4 firms, implying that more firm-specific (less market-wide) information is incorporated into stock prices as a result of U.S. listing.

*\*\*\*Insert Table 4.5 about here\*\*\**

*\*\*\*Insert Figure 4.2 about here\*\*\**

#### 4.5. CONCLUDING REMARKS

This essay examines a panel sample of Chinese firms with and without U.S. listings to address the role of cross-listing in mitigating home country information asymmetry and stock misvaluation. In contrast with conventional theories that predict enormous cross-listing benefits, this study finds no significant cross-listing premiums. Further investigation indicates that the absence of cross-listing premiums for these Chinese firms is mainly a result of a downward price correction (toward the fundamental values of the stocks) once more firm-specific information is capitalized into stock prices. In particular, I find that firms with U.S. listings tend to exhibit more informative and less overvalued stock prices (as reflected by lower risk-adjusted abnormal returns) than comparable home country firms. Within the sample of cross-listed firms, I find that exchange-based U.S. listings result in more informative and less overvalued stock prices than OTC listings and private placements. The positive relationships among listing standards, stock price informativeness, and the magnitude of price correction provide strong empirical support to the price correction interpretation of the absence of cross-listing premiums.

While the present study extends and complements the current literature in many aspects, some caveats should be noted. First, the results of this study are inconsistent with conventional theories that predict enormous cross-listing benefits. Nevertheless, this apparent conflict can be reconciled easily in a contingency framework. The argument is that in an environment filled with severe information asymmetry and stock misvaluation, as found in China, the presence of cross-listing premiums depends on the relative power of two distinct effects, i.e., the cross-listing benefits and the downward price correction.

No premiums will be documented if the downward price pressure is large enough to offset cross-listing benefits. This is the very case in China. A major challenge facing the price correction hypothesis, however, is the question why do these Chinese firms choose to cross-list in the U.S., given the absence of cross-listing premiums. This paradox merits further research. Second, the evidence of this study is based on a single-country analysis. It would be interesting to consider other weak institutional environments with similar firm-specific information asymmetry and stock misvaluation to determine the generalizability of the results. Third, while the empirical results of this study point to a possible explanation of the absence of cross-listing premiums in China, alternative explanations cannot be safely ruled out without additional investigation.

Notwithstanding these limitations, the present study offers a number of new insights into the literature. First, while the issue of international listings has been subjected to extensive research, little attention has been paid to exploring the role of cross-listing, taking into account the unique characteristics of a country. This study examines the role of cross-listing in an environment filled with severe firm-specific information asymmetry and stock misvaluation. By addressing cross-listing practices in a contingency framework (contingent on the unique environment of the listing firm's home market), this study extends our understanding of how unique environmental features can shape the effectiveness of a particular corporate strategy.

Second, while the issue of stock misvaluation has been researched significantly in the field of investment, whether and to what extent the inherent misvaluation can be mitigated through a particular firm strategy and/or a major change in the information environment is still an empirical question. Using a panel sample of Chinese firms, this

study indicates that cross-listing (and the resultant improvement in the information environment) is an effective device in deterring a listing firm's home country information asymmetry and stock misvaluation.

Finally, despite the growing interest in understanding the Chinese capital market, empirical evidence to date has been rare and inconclusive in documenting the impact of cross-listing on Chinese firms. For example, Doidge et al. (2004) find that foreign companies with shares cross-listed in the United States are worth more than similar home country firms using data from 40 countries, and Doidge et al. (2009) find that firms' decisions to cross-list involve a trade-off between private control and bonding benefits using data from 31 countries. However, China is excluded from both studies. By testing the generalizability of existing theories to the Chinese stock market, this study offers an important building block to the literature.



## CHAPTER 5

### CONCLUSIONS

This dissertation examines the role of cross-listing in shaping corporate earnings quality, stock price informativeness, and firm valuation, as well as its impact on a listing firm's home country information asymmetry and stock misvaluation.

The first essay addresses the information asymmetry between Chinese local A-share and foreign B-share markets and its impact on the B-share discount puzzle, contingent upon the regulatory reforms of Chinese stock market liberalization in 2001 and 2002. In contrast with the widespread belief that domestic investors are better informed than foreign investors, this study indicates that foreign investors actually possess more value-relevant, firm-specific information in an emerging environment such as China, where information transparency and investor protection are relatively weak. In particular, I find that under perfect market segmentation, information tends to flow from foreign to domestic investors and that B-share prices are generally more informative than their A-share counterparts. As such, the observed Chinese B-share discount is not compensation for the informational disadvantage of foreign investors but, rather, the result of a downward price correction (toward the fundamental values of the stocks) once more firm-specific information is capitalized by sophisticated foreign investors. Further investigation indicates a mitigated degree of information asymmetry and B-share discount after market liberalization.

The second essay investigates the changing impact of cross-listing on corporate earnings management, stock price informativeness, and firm value, contingent upon increased market integration. In line with the bonding hypothesis, I find that Chinese

firms with foreign listings manage their earnings less than comparable purely domestic-listed firms, although the divergence in earnings quality has been less evident since the regulatory reforms of Chinese stock market liberalization. Consistent with the findings on earnings management, firms with foreign listings are found to have more informative stock pricing (as measured by price synchronicity) and higher valuation (as measured by Tobin's Q) than firms without foreign listings. Further investigation indicates a reduced level of divergence in both price informativeness and firm value upon market integration. Overall, the results suggest that cross-listing plays a significant but diminishing bonding role in an increasingly integrated world. The empirical findings of this essay also point to a possible explanation for the worldwide foreign delisting wave that has been plaguing major stock exchanges.

The third essay examines a panel sample of Chinese firms with and without U.S. listings to address the role of cross-listing in mitigating a listing firm's home country information asymmetry and stock misvaluation. In contrast with conventional theories that predict enormous cross-listing benefits, this study finds no significant cross-listing premiums. Further investigation indicates that the absence of cross-listing premiums for these Chinese firms is mainly a result of a downward price correction (toward the fundamental values of the stocks) once U.S. listing allows for an enhanced capitalization of firm-specific information. In particular, I find that stock prices of firms with U.S. listings are more informative (as measured by less synchronous stock movements and stronger price-earnings relationships) and less overvalued (as reflected by lower risk-adjusted abnormal returns) than comparable home country firms. Within the sample of cross-listed firms, I find that exchange-based U.S. listings result in more informative and

less overvalued stocks than OTC listings and private placements. The positive relationships among listing standards, stock price informativeness, and the magnitude of price correction provide strong empirical support to the price correction interpretation of the absence of cross-listing premiums.

This dissertation contributes to the literature in multiple ways. First, it addresses various ongoing debates and current paradoxes, such as the information asymmetry between domestic and foreign investors in emerging markets, the absence of cross-listing premiums in some countries, and the dialogue between bonding and signaling effects. By analyzing the impact of cross-listing in a contingency framework (contingent on the unique features of a listing firm's home country), this study offers a possible reconciliation to the conflicting empirical findings that have been plaguing the literature. It also extends our understanding of how unique environmental features can shape the effectiveness of a particular corporate strategy.

Second, while the issue of cross-listing has stimulated a considerable amount of quality research, a common limitation associated with these studies is that they tend to consider cross-listing impact in a static framework. The effect of increased market integration on the dynamics of cross-listing (and delisting) decisions is largely ignored. Drawing on the unique opportunity of Chinese stock market restructuring in 2001 and 2002, this dissertation effectively addresses the changing role of cross-listing under increased market integration within a relatively short time frame, where structural stationarity and omitted-variables problems are of less serious modeling concern.

Finally, despite the growing interest in understanding the Chinese capital market, empirical evidence to date has been rare and inconclusive in documenting the impact of

cross-listing on Chinese firms, and China has been excluded from many influential studies. This study adds to the literature by examining the impact of cross-listing on Chinese firms in the context of earnings management, stock price informativeness, and firm valuation, as well as its role in mitigating home market information asymmetry and stock misvaluation.

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**Table 2.1. Price differential between the twin-share portfolios.**

This table reports the price differential between the local A and foreign B shares issued by the same companies. To facilitate a meaningful comparison, the analysis is made contingent upon different sample periods (i.e., the pre-market-integration period, from October 1, 1997 to February 19, 2001, the post-market-integration period, from November 5, 2002 to September 30, 2007, and the restructuring period, from February 19, 2001 to November 5, 2002) and the choice of exchange listings (SSE or SZSE). The final sample consists of 53 firms (26 SSE-listed and 27 SZSE-listed), each with a continuous dual-listing history over the entire sample period.

	<b>A-Share Portfolio</b>	<b>B-Share Portfolio</b>	<b>Price Differential</b>
<b><i>Panel A. SSE-Listed Firms (26 Firms)</i></b>			
The Pre-Market-Liberalization Period	11.988 (2.06)	2.133 (0.78)	9.855
The Period of Market Restructuring	14.119 (1.99)	7.086 (1.32)	7.033
The Post-Market-Liberalization Period	7.449 (2.19)	3.650 (0.99)	3.799
<b><i>Panel B. SZSE-Listed Firms (27 Firms)</i></b>			
The Pre-Market-Liberalization Period	11.649 (1.98)	2.711 (0.64)	8.938
The Period of Market Restructuring	12.228 (1.65)	6.409 (1.52)	5.819
The Post-Market-Liberalization Period	7.317 (1.81)	4.392 (0.84)	2.925

Standard deviations are in parentheses.

**Table 2.2. Correlation matrix.**

This table reports the Pearson correlation coefficients of the A and B twin-share portfolios with each other and with the four market indices (i.e., the Shanghai A-, Shanghai B-, Shenzhen A-, and Shenzhen B-share markets), where the null hypothesis is of no correlation.

<i>Panel A. SSE-Listed Firms</i>						
	SHA	SHB	SHAI	SHBI	SZAI	SZBI
SHA		0.5970 <.0001	0.8581 <.0001	0.5726 <.0001	0.8788 <.0001	0.5489 <.0001
SHB	0.5970 <.0001		0.5884 <.0001	0.9819 <.0001	0.5921 <.0001	0.8030 <.0001
<i>Panel B. SZSE-Listed Firms</i>						
	SZA	SZB	SHAI	SHBI	SZAI	SZBI
SZA		0.6275 <.0001	0.8836 <.0001	0.5502 <.0001	0.9287 <.0001	0.5884 <.0001
SZB	0.6275 <.0001		0.6010 <.0001	0.8074 <.0001	0.6109 <.0001	0.9704 <.0001

**Table 2.3. Information criteria for different model specifications.**

This table reports the information criteria statistics for different model specifications with lag lengths ranging from 1 to 20 (i.e., from one day to one month). To obtain a more precise specification, the Akaike information criterion (AIC) and the Schwarz Bayesian criterion (SBC) are considered jointly in identifying the order of the VAR.

	Order 1	Order 2	Order 3	Order 4	Order 5	Order 10	Order 20
<b><i>Panel A. Model Specification 1</i></b>							
<b>AIC</b>	-3.4465	-3.4325	-3.4463	-3.4281	-3.4025	-3.3068	-3.2769
<b>SBC</b>	-3.2737	-3.1059	-2.9658	-2.7937	-2.6141	-1.7464	-0.1646
<b><i>Panel B. Model Specification 2</i></b>							
<b>AIC</b>	0.1827	0.1834	0.1855	0.1927	0.2012	0.2196	0.1758
<b>SBC</b>	0.2307	0.2698	0.3104	0.3561	0.4031	0.6145	0.9587
<b><i>Panel C. Model Specification 3</i></b>							
<b>AIC</b>	-0.2549	-0.2540	-0.2578	-0.2565	-0.2490	-0.2193	-0.1950
<b>SBC</b>	-0.2069	-0.1675	-0.1329	-0.0931	-0.0470	0.1756	0.5879

**Table 2.4. Lead-lag relation during the pre-market-integration period.**

This table reports the VAR estimates during the pre-market-integration period, from October 1, 1997 to February 19, 2001, based on the following different model specifications:

$$\begin{aligned} \text{Model 1} \quad \begin{bmatrix} SHA_t \\ SHB_t \\ SZA_t \\ SZB_t \end{bmatrix} &= A_0 + \sum_{k=1}^K A_k \begin{bmatrix} SHA_{t-k} \\ SHB_{t-k} \\ SZA_{t-k} \\ SZB_{t-k} \end{bmatrix} + \sum_{l=1}^L B_l \begin{bmatrix} SHAI_{t-l} \\ SHBI_{t-l} \\ SZAI_{t-l} \\ SZBI_{t-l} \end{bmatrix} + \begin{bmatrix} \varepsilon_{SHA,t} \\ \varepsilon_{SHB,t} \\ \varepsilon_{SZA,t} \\ \varepsilon_{SZB,t} \end{bmatrix} \\ \text{Model 2} \quad \begin{bmatrix} SHA_t \\ SHB_t \end{bmatrix} &= A_0 + \sum_{k=1}^K A_k \begin{bmatrix} SHA_{t-k} \\ SHB_{t-k} \end{bmatrix} + \sum_{l=1}^L B_l \begin{bmatrix} SHAI_{t-l} \\ SHBI_{t-l} \end{bmatrix} + \begin{bmatrix} \varepsilon_{SHA,t} \\ \varepsilon_{SHB,t} \end{bmatrix} \\ \text{Model 3} \quad \begin{bmatrix} SZA_t \\ SZB_t \end{bmatrix} &= A_0 + \sum_{k=1}^K A_k \begin{bmatrix} SZA_{t-k} \\ SZB_{t-k} \end{bmatrix} + \sum_{l=1}^L B_l \begin{bmatrix} SZAI_{t-l} \\ SZBI_{t-l} \end{bmatrix} + \begin{bmatrix} \varepsilon_{SZA,t} \\ \varepsilon_{SZB,t} \end{bmatrix} \end{aligned}$$

where  $SHA_t$  and  $SHB_t$  are the SSE-listed twin-share portfolio returns at time  $t$ , and  $SZA_t$  and  $SZB_t$  are the SZSE-listed twin-share portfolio returns at time  $t$ . Note that the SSE-listed twin-share portfolios include 26 A- and B-share dual-listed firms, and the SZSE-listed twin-share portfolios include 27 A- and B-share dual-listed firms. The variables  $SHAI_t$ ,  $SHBI_t$ ,  $SZAI_t$ , and  $SZBI_t$  are the corresponding market returns at time  $t$ . Here,  $A_0$  is a  $4 \times 1$  column vector in Model 1 and a  $2 \times 1$  column vector in Models 2 and 3,  $A_k$  and  $B_l$  are  $4 \times 4$  matrices of coefficients in Model 1 and  $2 \times 2$  matrices of coefficients in Models 2 and 3. The parameter  $k$  is the number of lagged endogenous variables and  $l$  is the number of lagged exogenous variables. According to AIC and SBC criteria, a lag length of 1 is chosen for all three model specifications.

	SHA (t-1)	SHB (t-1)	SZA (t-1)	SZB (t-1)	SHAI (t-1)	SHBI (t-1)	SZAI (t-1)	SZBI (t-1)
<b>Panel A. Model 1</b>								
SHA	0.0147 (0.17)	<b>-0.2034*</b> (-1.82)			-0.0285 (-0.15)	0.1553 (1.39)	0.0239 (0.13)	<b>0.2551**</b> (2.08)
SHB	0.0631 (0.45)	-0.0329 (-0.18)			-0.5971* (-1.96)	0.0939 (0.51)	0.4281 (1.44)	<b>0.1759</b> (0.87)
SZA			0.0344 (0.32)	-0.1819 (-1.40)	-0.1227 (-0.63)	0.0012 (0.01)	0.0605 (0.32)	<b>0.2299*</b> (1.79)
SZB			0.0549 (0.36)	<b>-0.3981**</b> (-2.17)	-0.5709** (-2.09)	0.0554 (0.33)	0.3454 (1.30)	<b>0.4943***</b> (2.73)
<b>Panel B. Model 2</b>								
SHA	-0.0031 (-0.04)	<b>-0.2060*</b> (-1.85)			0.0462 (0.49)	0.2049* (1.86)		
SHB	0.0075 (0.05)	-0.0386 (-0.21)			-0.1099 (-0.71)	0.1863 (1.03)		
<b>Panel C. Model 3</b>								
SZA			0.0503 (0.48)	-0.1996 (-1.55)			-0.0518 (-0.44)	<b>0.2112*</b> (1.67)
SZB			0.0382 (0.26)	<b>-0.3873**</b> (-2.12)			-0.1206 (-0.73)	<b>0.5395***</b> (3.01)

The  $t$ -values are in parentheses. Here, \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels.

**Table 2.5. Lead-lag relation during the post-market-integration period.**

This table reports the VAR estimates during the post-market-integration period, from November 5, 2002 to September 30, 2007, based on the following different model specifications:

$$\begin{aligned} \text{Model 1: } \begin{bmatrix} SHA_t \\ SHB_t \\ SZA_t \\ SZB_t \end{bmatrix} &= A_0 + \sum_{k=1}^K A_k \begin{bmatrix} SHA_{t-k} \\ SHB_{t-k} \\ SZA_{t-k} \\ SZB_{t-k} \end{bmatrix} + \sum_{l=1}^L B_l \begin{bmatrix} SHAI_{t-l} \\ SHBI_{t-l} \\ SZAI_{t-l} \\ SZBI_{t-l} \end{bmatrix} + \begin{bmatrix} \mathcal{E}_{SHA,t} \\ \mathcal{E}_{SHB,t} \\ \mathcal{E}_{SZA,t} \\ \mathcal{E}_{SZB,t} \end{bmatrix} \\ \text{Model 2: } \begin{bmatrix} SHA_t \\ SHB_t \end{bmatrix} &= A_0 + \sum_{k=1}^K A_k \begin{bmatrix} SHA_{t-k} \\ SHB_{t-k} \end{bmatrix} + \sum_{l=1}^L B_l \begin{bmatrix} SHAI_{t-l} \\ SHBI_{t-l} \end{bmatrix} + \begin{bmatrix} \mathcal{E}_{SHA,t} \\ \mathcal{E}_{SHB,t} \end{bmatrix} \\ \text{Model 3: } \begin{bmatrix} SZA_t \\ SZB_t \end{bmatrix} &= A_0 + \sum_{k=1}^K A_k \begin{bmatrix} SZA_{t-k} \\ SZB_{t-k} \end{bmatrix} + \sum_{l=1}^L B_l \begin{bmatrix} SZAI_{t-l} \\ SZBI_{t-l} \end{bmatrix} + \begin{bmatrix} \mathcal{E}_{SZA,t} \\ \mathcal{E}_{SZB,t} \end{bmatrix} \end{aligned}$$

where  $SHA_t$  and  $SHB_t$  are the SSE-listed twin-share portfolio returns at time  $t$ , and  $SZA_t$  and  $SZB_t$  are the SZSE-listed twin-share portfolio returns at time  $t$ . Note that the SSE-listed twin-share portfolios include 26 A- and B-share dual-listed firms, and the SZSE-listed twin-share portfolios include 27 A- and B-share dual-listed firms. The variables  $SHAI_t$ ,  $SHBI_t$ ,  $SZAI_t$ , and  $SZBI_t$  are the corresponding market returns at time  $t$ . Here,  $A_0$  is a  $4 \times 1$  column vector in Model 1 and a  $2 \times 1$  column vector in Models 2 and 3,  $A_k$  and  $B_l$  are  $4 \times 4$  matrices of coefficients in Model 1 and  $2 \times 2$  matrices of coefficients in Models 2 and 3. The parameter  $k$  is the number of lagged endogenous variables and  $l$  is the number of lagged exogenous variables. According to AIC and SBC criteria, a lag length of 1 is chosen for all three model specifications.

	SHA (t-1)	SHB (t-1)	SZA (t-1)	SZB (t-1)	SHAI (t-1)	SHBI (t-1)	SZAI (t-1)	SZBI (t-1)
<b>Panel A. Model 1</b>								
<b>SHA</b>	<b>0.1662**</b> (2.44)	-0.1043 (-0.81)			<b>-0.3084***</b> (-3.01)	0.1645 (1.26)	0.2897** (2.08)	-0.0786 (-0.75)
<b>SHB</b>	0.0427 (0.57)	0.0270 (0.19)			<b>-0.4037***</b> (-3.61)	0.2520* (1.76)	0.2060 (1.35)	-0.0154 (-0.14)
<b>SZA</b>			-0.0301 (-0.33)	0.0142 (0.13)	<b>-0.2094**</b> (-2.17)	0.2035 (1.64)	0.1755 (1.33)	-0.0491 (-0.50)
<b>SZB</b>			-0.1557 (-1.59)	0.1010 (0.90)	<b>-0.1902*</b> (-1.85)	0.1672 (1.27)	0.1471 (1.05)	-0.0113 (-0.11)
<b>Panel B. Model 2</b>								
<b>SHA</b>	<b>0.2285***</b> (4.12)	-0.1256 (-0.98)			<b>-0.1938***</b> (-2.93)	0.1648 (1.30)		
<b>SHB</b>	0.0396 (0.65)	0.0317 (0.23)			<b>-0.3476***</b> (-4.81)	0.2770** (2.00)		
<b>Panel C. Model 3</b>								
<b>SZA</b>			-0.0326 (-0.36)	0.0584 (0.57)			0.1189 (1.35)	-0.0670 (-0.70)
<b>SZB</b>			-0.1796* (-1.88)	0.1613 (1.47)			0.0904 (0.96)	-0.0144 (-0.14)

The  $t$ -values are in parentheses. Here, \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels.

**Table 2.6. Price informativeness of the twin-share portfolios.**

This table reports the stock price synchronicity of the twin-share portfolios over the sample period from October 1997 to September 2007. For a more rigorous analysis, the regression is conducted contingent upon the choice of exchange listings (SSE or SZSE) and the two regulatory reforms (i.e., the opening of the foreign B-share market to Chinese domestic investors in 2001 and the opening of the local A-share market to QFII in 2002). The risk-adjusted abnormal return is estimated using the market model,  $(R_{it} - R_{it}^F) = \alpha + \beta(R_{it}^M - R_{it}^F) + \varepsilon_{it}$ , where  $R_{it}$  is the individual stock return at time  $t$ ,  $R_{it}^M$  is the corresponding market return at time  $t$ , and  $R_{it}^F$  is the risk-free rate at time  $t$ . Following the literature, the price synchronicity is measured by the R-squared value from the capital asset pricing model. According to the Hausman specification test, the one-way random effects model is utilized. In order to get a more precise estimation, the error components model and GLS estimation are applied.

<i>Panel A. SSE-Listed Firms (26 Firms)</i>						
	<i>Pre-Market-Liberalization</i>		<i>Period of Market Restructuring</i>		<i>Post-Market-Liberalization</i>	
	<i>A-share Portfolio</i>	<i>B-share Portfolio</i>	<i>A-share Portfolio</i>	<i>B-share Portfolio</i>	<i>A-share Portfolio</i>	<i>B-share Portfolio</i>
<b><math>\alpha</math> Estimate</b>	0.046 (1.50)	-0.129* (-2.76)	0.294* (10.41)	0.401* (10.43)	-0.107* (-4.38)	-0.101* (-4.88)
<b><math>\beta</math> Estimate</b>	1.021* (92.1)	0.932* (55.7)	1.151* (99.7)	1.127* (71.6)	1.008* (87.3)	0.994* (101.2)
<b>R Squared</b>	<b>0.304</b>	<b>0.137</b>	0.482	0.324	<b>0.225</b>	<b>0.281</b>
<i>Panel B. SZSE-Listed Firms (27 Firms)</i>						
	<i>Pre-Market-Liberalization</i>		<i>Period of Market Restructuring</i>		<i>Post-Market-Liberalization</i>	
	<i>A-share Portfolio</i>	<i>B-share Portfolio</i>	<i>A-share Portfolio</i>	<i>B-share Portfolio</i>	<i>A-share Portfolio</i>	<i>B-share Portfolio</i>
<b><math>\alpha</math> Estimate</b>	0.018 (0.64)	-0.509*** (-11.66)	0.136*** (5.18)	0.533*** (13.30)	0.071*** (3.05)	-0.022 (-1.02)
<b><math>\beta</math> Estimate</b>	1.023*** (100.8)	0.810*** (52.7)	1.070*** (102.5)	1.191*** (74.8)	1.083*** (100.9)	1.003*** (101.2)
<b>R Squared</b>	<b>0.335</b>	<b>0.121</b>	0.486	0.335	<b>0.273</b>	<b>0.274</b>

The  $t$ -values are in parentheses. Here, \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels.



**Table 3.1. Summary statistics.**

This table reports the summary statistics of the sample, sorted by exchange listing (columns 2 and 3), the choice of B-share listings (columns 4 and 5), and the time period of estimation (columns 6 and 7). The variables in the table are defined as follows: *SIZE* is the size of the firm, calculated as the natural log of total assets; *BM* is the book-to-market ratio, measured as the difference between total assets and total liabilities, divided by the stock market capitalization of the firm; *LEV* is the leverage (debt-to-equity) ratio; *SO* is state ownership, measured as the percentage of common shares owned by the state; *ROA* is the ROA ratio, computed as EBXI divided by total assets; and *Q* is the Tobin's Q ratio, calculated as the book value of total assets minus the book value of equity plus the market value of equity, divided by the book value of total assets. The final sample consists of 701 firms (67 A- and B-share dual-listed firms and 634 comparable purely domestic-listed firms), each with a continuous listing history over the entire sample period from 1998 to 2006.

	Full Sample (701 Firms)	<i>By Exchanges</i>		<i>By Listing Choices</i>		<i>By Time Periods</i>	
		SSE (372 Firms)	SZSE (329 Firms)	CL (67 Firms)	NC (634 Firms)	Pre- Market Integration	Post- Market Integration
<b>SIZE</b>	21.102 (0.97)	21.163 (0.98)	21.032 (0.95)	21.522 (0.95)	21.057 (0.96)	20.896 (0.86)	21.225 (1.01)
<b>BM</b>	2.7127 (1.52)	2.7491 (1.52)	2.6715 (1.51)	2.8047 (1.83)	2.7030 (1.48)	2.7388 (1.28)	2.6970 (1.64)
<b>LEV</b>	1.7027 (22.14)	1.4212 (13.93)	2.0209 (28.73)	1.0286 (9.09)	1.7739 (23.10)	2.0690 (31.62)	1.4829 (13.59)
<b>SO</b>	0.3227 (0.25)	0.3276 (0.26)	0.3171 (0.25)	0.3083 (0.24)	0.3242 (0.25)	0.3392 (0.26)	0.3127 (0.25)
<b>ROA</b>	0.1001 (0.64)	0.1107 (0.08)	0.0881 (0.93)	0.1186 (0.08)	0.0981 (0.67)	0.1037 (0.07)	0.0979 (0.81)
<b>Q</b>	1.1411 (26.64)	0.7792 (0.55)	1.5503 (38.88)	0.8585 (0.76)	1.1710 (28.01)	0.7092 (0.23)	1.4003 (33.69)

Standard deviations are in parentheses.

**Table 3.2. Correlation matrix.**

This table reports the correlation coefficients of the explanatory variables. The variables in the table are defined as follows: *DCROSS* is the cross-listing dummy, which takes the value of 1 for firms with both A- and B-share listings and 0 for firms with only domestic A-share listings; *DEXCH* is the exchange dummy, where 1 stands for SSE-listed firms and 0 stands for SZSE-listed firms; *SIZE* is the size of the firm, calculated as the natural log of total assets; *BM* is the book-to-market ratio, measured as the difference between total assets and total liabilities, divided by the stock market capitalization of the firm; *ROA* is the ROA ratio, computed as EBXI divided by total assets; *LEV* is the leverage (debt-to-equity) ratio; and *SO* is state ownership, measured as the percentage of common shares owned by the state. The final sample consists of 701 firms (67 A- and B-share dual-listed firms and 634 comparable purely domestic-listed firms), each with a continuous listing history over the entire sample period from 1998 to 2006.

	<b>DCROSS</b>	<b>DEXCH</b>	<b>SIZE</b>	<b>BM</b>	<b>ROA</b>	<b>LEV</b>	<b>SO</b>
<b>DCROSS</b>	1.0000						
<b>DEXCH</b>	0.0248*	1.0000					
<b>SIZE</b>	0.1412***	-0.0674***	1.0000				
<b>BM</b>	0.0197	-0.0255*	0.5488***	1.0000			
<b>ROA</b>	0.0094	-0.0177	0.1339***	0.0603***	1.0000		
<b>LEV</b>	-0.0099	0.0135	-0.0188	-0.0306**	-0.0008	1.0000	
<b>SO</b>	-0.0186	-0.0210	0.1191***	0.1032***	0.0165	-0.0262*	1.0000

The *p*-values are in parentheses. Here \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels.

**Table 3.3. Earnings management.**

This table compares the magnitude of earnings management between cross-listed and non-cross-listed firms. Panel A is for the entire sample period and panel B breaks down into pre- and post-market-integration periods. For a more rigorous analysis, earnings quality is measured using two alternative approaches: the absolute value of discretionary accruals,  $|DA|$ , and accruals quality,  $AQ$ . Here,  $|DA|$  is calculated using the modified Jones (1991) model and  $AQ$  is measured as the standard deviation of residuals from the model that regresses current accruals on the lagged, current, and future values of CFO, change in sales revenues, and gross PPE. The final sample consists of 701 firms (67 A- and B-share dual-listed firms and 634 comparable purely domestic-listed firms), each with a continuous listing history over the entire sample period from 1998 to 2006.

**Panel A: Earnings Management During the Full Sample Period**

	Full Sample (701)	<i>SSE-Listed vs. SZSE-Listed Firms</i>			<i>Cross-Listed vs. Non-Cross-Listed Firms</i>		
		SSE (372)	SZSE (329)	Mean Diff. (SSE-SZSE)	CL (67)	NC (634)	Mean Diff. (NC-CL)
<b>DA</b>	0.1026 (0.099)	0.1031 (0.102)	0.1020 (0.095)	0.0011	0.0965 (0.082)	0.1032 (0.101)	0.0067*
<b>AQ</b>	0.0769 (0.003)	0.0767 (0.005)	0.0739 (0.004)	0.0028***	0.0673 (0.010)	0.0770 (0.003)	0.0097***

**Panel B: Earnings Management Before and After Market Integration**

	<i>Pre-Market-Integration Period (1999–2001)</i>				<i>Post-Market-Integration Period (2003–2006)</i>			
	Full Sample (701)	CL (67)	NC (634)	Mean Diff. (NC-CL)	Full Sample (701)	CL (67)	NC (634)	Mean Diff. (NC-CL)
<b>DA</b>	0.1017 (0.102)	0.0795 (0.068)	0.1040 (0.104)	0.025***	0.1070 (0.100)	0.1089 (0.084)	0.1068 (0.100)	-0.002
<b>AQ</b>	0.0750 (0.003)	0.0580 (0.004)	0.0759 (0.003)	0.018***	0.0790 (0.001)	0.0761 (0.005)	0.0783 (0.001)	0.002**

Standard deviations are in parentheses. Here, \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels.

**Table 3.4. Earnings management, year by year.**

This table compares the magnitude of earnings management between cross-listed and non-cross-listed firms, year by year. Consistent with Table 3.3, earnings quality is measured using two alternative approaches: the absolute value of discretionary accruals,  $|DA|$ , and accruals quality,  $AQ$ . Here,  $|DA|$  is calculated using the modified Jones (1991) model and  $AQ$  is measured as the standard deviation of residuals from the model that regresses current accruals on the lagged, current, and future values of CFO, change in sales revenues, and gross PPE. The final sample consists of 701 firms (67 A- and B-share dual-listed firms and 634 comparable purely domestic-listed firms), each with a continuous listing history over the entire sample period from 1998 to 2006. Note that there are no  $AQ$  values in 2006 because the observations of year 2006 are lost when calculating forward CFO.

	1999	2000	2001	2002	2003	2004	2005	2006
<b>Panel A: Absolute Value of Discretionary Accruals</b>								
<b>Cross-Listed Firms</b>	0.0815 (0.062)	0.0888 (0.068)	0.0681 (0.073)	0.0979 (0.102)	0.1068 (0.076)	0.1149 (0.083)	0.1038 (0.084)	0.1104 (0.093)
<b>Non-Cross-listed Firms</b>	0.1077 (0.100)	0.1098 (0.115)	0.0946 (0.097)	0.0865 (0.089)	0.1186 (0.121)	0.1102 (0.098)	0.0971 (0.083)	0.1011 (0.095)
<b>Mean Diff. (NC-CL)</b>	0.026***	0.021**	0.027***	-0.011	0.012	-0.005	-0.007	-0.009
<b>Panel B: Accruals Quality</b>								
<b>Cross-Listed Firms</b>	0.0584 (0.002)	0.0553 (0.003)	0.0602 (0.005)	0.0691 (0.003)	0.0724 (0.003)	0.0749 (0.004)	0.0811 (0.003)	
<b>Non-Cross-listed Firms</b>	0.0743 (0.001)	0.0803 (0.002)	0.0730 (0.001)	0.0767 (0.001)	0.0780 (0.001)	0.0791 (0.001)	0.0779 (0.001)	
<b>Mean Diff. (NC-CL)</b>	0.016***	0.025***	0.013***	0.008***	0.006***	0.004**	-0.003**	

Standard deviations are in parentheses. Here, \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels.

**Table 3.5. Impact of cross-listing on earnings management.**

This table reports the regression results regarding the impact of cross-listing on earnings management. The dependent variable in the models is either the absolute value of discretionary accruals,  $|DA|$  (columns 1–3), or accruals quality,  $AQ$  (columns 4–6). In particular, the following models are estimated:

$$|DA_{it}| = \lambda_0 + \lambda_1 DCROSS_{it} + \lambda_2 DEXCH_{it} + \lambda_3 SIZE_{it} + \lambda_4 BM_{it} + \lambda_5 ROA_{it} + \lambda_6 LEV_{it} + \lambda_7 SO_{it} + \varepsilon_{it} \quad (4)$$

$$AQ_{it} = \lambda_0 + \lambda_1 DCROSS_{it} + \lambda_2 DEXCH_{it} + \lambda_3 SIZE_{it} + \lambda_4 BM_{it} + \lambda_5 ROA_{it} + \lambda_6 LEV_{it} + \lambda_7 SO_{it} + \varepsilon_{it} \quad (5)$$

The independent variables are defined as follows: *DCROSS* is the cross-listing dummy, which takes the value of 1 for firms with both A- and B-share listings and 0 for firms with only domestic A-share listings; *DEXCH* is the exchange dummy, where 1 stands for SSE-listed firms and 0 stands for SZSE-listed firms; *SIZE* is the size of the firm, calculated as the natural log of total assets; *BM* is the book-to-market ratio, measured as the difference between total assets and total liabilities, divided by the stock market capitalization of the firm; *ROA* is the ROA ratio, computed as EBXI divided by total assets; *LEV* is the leverage (debt-to-equity) ratio; and *SO* is state ownership, measured as the percentage of common shares owned by the state. The final sample consists of 701 firms (67 A- and B-share dual-listed firms and 634 comparable purely domestic-listed firms), each with a continuous listing history over the entire sample period from 1998 to 2006.

	<i>DV: Absolute Value of Discretionary Accruals</i>			<i>DV: Accruals Quality</i>		
	Full Sample Period	Pre-Market Integration	Post-Market Integration	Full Sample Period	Pre-Market Integration	Post-Market Integration
<b>Intercept</b>	0.1592*** (7.44)	0.1553*** (2.95)	0.1440*** (9.35)	0.0783*** (67.76)	0.0760*** (50.87)	0.0809*** (81.72)
<b>DCROSS</b>	-0.0101* (-1.92)	-0.0218*** (-3.59)	-0.0062 (-0.95)	-0.0096*** (-2.78)	-0.0179*** (-4.84)	-0.0021 (-0.78)
<b>DEXCH</b>	-0.0006 (-0.26)	-0.0022 (-0.54)	-0.0002 (-0.04)	0.00001 (0.19)	-0.00004 (-0.51)	0.00007*** (13.41)
<b>SIZE</b>	-0.0048*** (-3.88)	-0.0048* (-1.66)	-0.0037*** (-3.66)	-0.0001 (-1.56)	0.00001 (0.23)	-0.0001*** (-3.78)
<b>BM</b>	0.0023 (0.93)	0.0056 (1.36)	-0.0007 (-0.19)	-0.00003 (-0.39)	-0.00007 (-0.46)	0.00002 (1.18)
<b>ROA</b>	0.4017*** (6.18)	0.4109*** (39.45)	0.4107*** (2.96)	-0.0014* (-1.93)	-0.0019 (-1.02)	-0.0009*** (-3.16)
<b>LEV</b>	0.0005** (2.34)	0.0006 (1.23)	0.0003* (1.82)	-0.000004*** (-2.87)	-0.000003 (-0.97)	-0.000004** (-2.56)
<b>SO</b>	-0.0128** (-2.13)	-0.0239* (-1.85)	-0.0035 (-0.73)	0.0003*** (2.90)	0.00004 (0.43)	0.0005*** (7.93)
<b>R<sup>2</sup></b>	0.1348	0.1019	0.1687	0.6998	0.9151	0.4581

The *t*-values are in parentheses. Here, \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels.

**Table 3.6. Price informativeness.**

This table reports the regression results regarding the impact of cross-listing on price informativeness. Following the literature, this study uses the R-squared value from the regression of the capital asset pricing model to measure the departure of firm-specific stock movements from the market, that is,  $(R_{it} - R_t^F) = \alpha + \beta(R_t^M - R_t^F) + \varepsilon_{it}$ . Here,  $R_{it}$  is the stock return for each individual firm at time  $t$ ;  $R_t^M$  is the market return at time  $t$ ; and  $R_t^F$  is the risk-free rate at time  $t$ . According to the Hausman specification test, the one-way random effect model is utilized. For a more precise estimation, the error components model and GLS estimation are applied. The final sample consists of 701 firms (67 A- and B-share dual-listed firms and 634 comparable purely domestic-listed firms), each with a continuous listing history over the entire sample period from 1998 to 2006.

	<i>Full Sample</i>		<i>Pre-Market Integration</i>		<i>Post-Market Integration</i>	
	<u>Cross-Listed</u>	<u>Non-Cross-Listed</u>	<u>Cross-Listed</u>	<u>Non-Cross-Listed</u>	<u>Cross-Listed</u>	<u>Non-Cross-Listed</u>
$\alpha$	-0.1023*** (-7.77)	-0.1445*** (-32.76)	-0.1157** (-2.24)	-0.0861*** (-12.66)	-0.1640*** (-10.3)	-0.1867*** (-34.06)
$\beta$	0.6849*** (17.78)	0.7852*** (61.02)	1.3493*** (8.12)	1.024*** (46.19)	0.5193*** (11.75)	0.6750*** (44.66)
$R^2$	<b>0.3720</b>	<b>0.4235</b>	<b>0.3332</b>	<b>0.5289</b>	<b>0.2929</b>	<b>0.3864</b>

The  $t$ -values are in parentheses. Here, \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels.

**Table 3.7. Impact of cross-listing on price informativeness.**

This table reports the regression results regarding the impact of cross-listing on price informativeness. The dependent variable in the regression is price synchronicity, measured as  $SYNCH = \text{Log}\left(\frac{R^2}{1-R^2}\right)$ , and the independent variables include a cross-listing dummy, an exchange dummy, firm size, the book-to-market ratio, ROA, leverage, state ownership, and trading volume. Specifically, the following model is estimated:

$$SYNCH = \lambda_0 + \lambda_1 DCROSS_{it} + \lambda_2 DEXCH_{it} + \lambda_3 SIZE_{it} + \lambda_4 BM_{it} + \lambda_5 ROA_{it} + \lambda_6 LEV_{it} + \lambda_7 SO_{it} + \lambda_8 VOL_{it} + \varepsilon_{it} \quad (8)$$

The independent variables are defined as follows: *DCROSS* is the cross-listing dummy, which takes the value of 1 for firms with both A- and B-share listings and 0 for firms with only domestic A-share listings; *DEXCH* is an exchange dummy, where 1 stands for SSE-listed firms and 0 stands for SZSE-listed firms; *SIZE* is the size of the firm, calculated as the natural log of total assets; *BM* is the book-to-market ratio, measured as the difference between total assets and total liabilities, divided by the stock market capitalization of the firm; *ROA* is the ROA ratio, computed as EBXI divided by total assets; *LEV* is the leverage (debt-to-equity) ratio; *SO* is state ownership, measured as the percentage of common shares owned by the state; and *VOL* is trading volume (in millions of shares). The final sample consists of 701 firms (67 A- and B-share dual-listed firms and 634 comparable purely domestic-listed firms), each with a continuous listing history over the entire sample period from 1998 to 2006.

	<i>Full Sample Period</i>		<i>Pre-Market Integration</i>		<i>Post-Market Integration</i>	
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 1</i>	<i>Model 2</i>
<b>Intercept</b>	-2.1456*** (-4.74)	-2.1115*** (-4.30)	-2.8020*** (-3.55)	-2.2302*** (-2.64)	-1.9025*** (-2.99)	-1.8124*** (-2.58)
<b>DCROSS</b>	-0.4166*** (-6.80)	-0.4155*** (-6.75)	-0.4549*** (-4.51)	-0.4339*** (-4.28)	-0.4058*** (-4.70)	-0.4033*** (-4.65)
<b>DEXCH</b>	-0.2088*** (-5.85)	-0.2086*** (-5.84)	-0.2056*** (-3.54)	-0.2057*** (-3.55)	-0.2110*** (-4.17)	-0.2105*** (-4.16)
<b>SIZE</b>	0.1001*** (4.44)	0.0983*** (3.98)	0.1301*** (3.30)	0.0988** (2.30)	0.0897*** (2.85)	0.0850** (2.42)
<b>BM</b>	0.0348** (2.48)	0.0354** (2.46)	0.0949*** (3.58)	0.1058*** (3.91)	0.0187 (0.99)	0.0201 (1.04)
<b>ROA</b>	-0.0187 (-0.67)	-0.0183 (-0.65)	-0.9810** (-2.20)	-1.0042** (-2.25)	-0.0097 (-0.34)	-0.0088 (-0.31)
<b>LEV</b>	-0.0001 (-0.16)	-0.0001 (-0.15)	-0.0001 (-0.07)	-0.0001 (-0.06)	0.0001 (0.05)	0.0001 (0.05)
<b>SO</b>	0.2510*** (3.52)	0.2520*** (3.52)	0.1997* (1.78)	0.2026* (1.81)	0.2777*** (2.66)	0.2805*** (2.67)
<b>VOL</b>		0.00004 (0.18)		0.0032* (1.86)		0.0001 (0.30)
<b>R<sup>2</sup></b>	0.0242	0.0242	0.0349	0.0365	0.0220	0.0220

The *t*-values are in parentheses. Here, \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels.

**Table 3.8. Impact of cross-listing on firm value.**

This table reports the regression results regarding the impact of cross-listing on firm value. The dependent variable in the model is Tobin's Q, and the independent variables include a cross-listing dummy, an exchange dummy, firm size, the price-to-earnings ratio, leverage, and state ownership. Given the special relationship between Tobin's Q and the book-to-market ratio, the price-to-earnings ratio is utilized in this regression to control for growth opportunity. Specifically, the following model is estimated:

$$Q_{it} = \alpha + \beta_1 DCROSS_{it} + \beta_2 DEXCH_{it} + \beta_3 SIZE_{it} + \beta_4 PE_{it} + \beta_5 LEV_{it} + \beta_6 SO_{it} + \varepsilon_{it} \quad (9)$$

where  $Q$  is Tobin's Q ratio, computed as the book value of total assets minus the book value of equity plus the market value of equity, divided by the book value of total assets;  $DCROSS$  is the cross-listing dummy, which takes the value of 1 for firms with both A- and B-share listings and 0 for firms with only domestic A-share listings;  $DEXCH$  is an exchange dummy, where 1 stands for SSE-listed firms and 0 stands for SZSE-listed firms;  $SIZE$  is the size of the firm, calculated as the natural log of total assets;  $PE$  is the price-to-earnings ratio, measured as current stock price divided by the earnings per share figure;  $LEV$  is the leverage (debt-to-equity) ratio; and  $SO$  is state ownership, measured as the percentage of common shares owned by the state. The final sample consists of 701 firms (67 A- and B-share dual-listed firms and 634 comparable purely domestic-listed firms), each with a continuous listing history over the entire sample period from 1998 to 2006.

	<i>Full Sample Period</i>		<i>Pre-Market Integration</i>		<i>Post-Market Integration</i>	
	<b>Model 1</b>	<b>Model 2</b>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 1</b>	<b>Model 2</b>
<b>Intercept</b>	20.534 (1.26)	20.547 (1.25)	2.2420*** (8.49)	2.2135*** (8.36)	38.259 (1.17)	38.358 (1.17)
<b>DCROSS</b>	<b>0.2986***</b> (3.07)	<b>0.2825***</b> (2.85)	<b>0.1159***</b> (4.77)	<b>0.1083***</b> (6.17)	<b>0.4642**</b> (2.46)	<b>0.4520**</b> (2.35)
<b>DEXCH</b>	-0.1490 (-0.86)	-0.1439 (-0.83)	-0.0120 (-1.27)	-0.0065 (-0.61)	-0.2993 (-0.87)	-0.2977 (-0.86)
<b>SIZE</b>	-0.9220 (-1.21)	-0.9211 (-1.21)	-0.0745*** (-6.15)	-0.0734*** (-6.03)	-1.7431 (-1.15)	-1.744 (-1.15)
<b>PE</b>		-0.0013 (-1.05)		0.00005 (0.14)		-0.0025 (-1.02)
<b>LEV</b>	0.0258** (2.53)	0.0254** (2.55)	0.0469** (2.48)	0.0471** (2.45)	0.0049 (0.45)	0.0062 (0.60)
<b>SO</b>	0.1217 (0.53)	0.0975 (0.46)	-0.0622** (-2.36)	-0.0539* (-1.78)	0.3088 (0.67)	0.2550 (0.60)
<b>R<sup>2</sup></b>	0.3341	0.3507	0.3400	0.3625	0.3177	0.3263

The  $t$ -values are in parentheses. Here, \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels.



**Table 3.9. Impact of cross-listing on earnings management (robustness check).**

This table reports the regression results regarding the impact of cross-listing on earnings management with lagged dependent variables. The dependent variable in the models is either the absolute value of discretionary accruals,  $|DA|$  (columns 1–3), or accruals quality,  $AQ$  (columns 4–6). Specifically, the following models are estimated:

$$|DA_{it}| = \lambda_0 + \lambda_1 DCROSS_{it} + \lambda_2 DEXCH_{it} + \lambda_3 SIZE_{it} + \lambda_4 BM_{it} + \lambda_5 ROA_{it} + \lambda_6 LEV_{it} + \lambda_7 SO_{it} + \lambda_8 DA_{i,t-1} + \varepsilon_{it} \quad (10)$$

$$AQ_{it} = \lambda_0 + \lambda_1 DCROSS_{it} + \lambda_2 DEXCH_{it} + \lambda_3 SIZE_{it} + \lambda_4 BM_{it} + \lambda_5 ROA_{it} + \lambda_6 LEV_{it} + \lambda_7 SO_{it} + \lambda_8 AQ_{i,t-1} + \varepsilon_{it} \quad (11)$$

where  $DCROSS$  is the cross-listing dummy, where 1 stands for firms with both A- and B-share listings and 0 stands for firms with only domestic A-share listings;  $DEXCH$  is the exchange dummy, where 1 stands for SSE-listed firms and 0 stands for SZSE-listed firms;  $SIZE$  is the size of the firm, calculated as the natural log of total assets;  $BM$  is the book-to-market ratio, measured as the difference between total assets and total liabilities, divided by the stock market capitalization of the firm;  $ROA$  is the ROA ratio, computed as  $EBX$  divided by total assets;  $LEV$  is the leverage (debt-to-equity) ratio; and  $SO$  is state ownership, measured as the percentage of common shares owned by the state. The final sample consists of 701 firms (67 A- and B-share dual-listed firms and 634 comparable purely domestic-listed firms), each with a continuous listing history over the entire sample period from 1998 to 2006.

	<i>DV: Absolute Value of Discretionary Accruals</i>			<i>DV: Accruals Quality</i>		
	Full Sample Period	Pre-Market Integration	Post-Market Integration	Full Sample Period	Pre-Market Integration	Post-Market Integration
<b>Intercept</b>	0.1553*** (7.12)	0.1574*** (3.11)	0.1353*** (7.21)	0.0481*** (5.05)	0.0475** (2.08)	0.0435*** (5.48)
<b>DCROSS</b>	-0.0102* (-1.93)	-0.0219*** (-3.62)	-0.0061 (-0.95)	-0.0054** (-2.08)	-0.0116*** (-5.31)	0.0007 (0.31)
<b>DEXCH</b>	-0.0007 (-0.30)	-0.0024 (-0.59)	-0.0002 (-0.04)	0.00002 (0.64)	0.00001 (0.14)	0.00006*** (3.04)
<b>SIZE</b>	-0.0047*** (-3.71)	-0.0049* (-1.68)	-0.0035*** (-3.18)	-0.00002 (-0.57)	0.00002 (0.41)	-0.00006 (-1.54)
<b>BM</b>	0.0024 (0.94)	0.0058 (1.38)	-0.0008 (-0.20)	-0.00002 (-0.36)	-0.00004 (-0.30)	0.000001 (0.07)
<b>ROA</b>	0.4013*** (6.18)	0.4107*** (39.11)	0.4101*** (2.96)	-0.0009 (-1.19)	-0.0018 (-0.97)	-0.0001 (-0.20)
<b>LEV</b>	0.0005** (2.38)	0.0006 (1.23)	0.0004* (1.88)	-0.000003** (-2.05)	-0.000003 (-0.84)	-0.000003 (-1.34)
<b>SO</b>	-0.0130** (-2.15)	-0.024* (-1.81)	-0.0038 (-0.81)	0.0002* (1.86)	-0.00001 (-0.11)	0.0003*** (2.72)
<b>DA<sub>(t-1)</sub></b>	0.0178 (1.27)	-0.0042 (-0.15)	0.0352** (2.11)			
<b>AQ<sub>(t-1)</sub></b>				0.3861*** (2.88)	0.3756 (1.16)	0.4624*** (4.42)
<b>R<sup>2</sup></b>	0.1365	0.1036	0.1707	0.7487	0.9213	0.5612

The  $t$ -values are in parentheses. Here, \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels.

**Table 4.1. Sample description.**

This table provides a brief description of the sample. The final sample consists of 27 U.S. listed Chinese firms (8 NYSE-listed firms and 19 OTC listings and private placements), each with a continuous cross-listing history over the entire sample period from October 2004 to September 2007.

<b>Firm</b>	<b>Domestic Listing</b>	<b>U.S. Listing</b>	<b>U.S. Exchange</b>	<b>Industry</b>	<b>DR Bank</b>	<b>Domestic Exchange</b>
<b>Panel A. NYSE Listed Firms</b>						
SHI*	11/8/1993	7/23/1993	NYSE	Chemicals	BNY	SSE
CEA*	11/5/1997	1/30/1997	NYSE	Travel & Leisure	BNY	SSE
ZNH*	7/25/2003	7/24/1997	NYSE	Travel & Leisure	BNY	SSE
YZC*	7/1/1998	3/27/1998	NYSE	Mining	BNY	SSE
CHU*	10/9/2002	6/16/2000	NYSE	Mobile Telecom.	BNY	SSE
SNP*	8/8/2001	10/18/2000	NYSE	Oil & Gas Producers	CIT	SSE
CEO*	2/5/2002	2/20/2001	NYSE	Oil & Gas Producers	MGT	SSE
HNP*	12/6/2001	8/19/2003	NYSE	Electricity	BNY	SSE
<b>Panel B. OTC &amp; Private Placements</b>						
MAAPP*	1/6/1994	11/1/1993	PORTAL	Industrial Metals	CIT	SSE
SHFGY**	3/27/1992	12/1/1993	OTC	Industrial Engineer	BNY	SSE
SLLBY**	11/13/1992	3/1/1994	OTC	Chemicals	BNY	SSE
YIRPP*	4/11/1995	3/25/1994	PORTAL	Chemicals	CIT	SSE
SGOTY**	5/4/1993	5/1/1995	OTC	Real Estate	BNY	SSE
GSHIY*	10/28/1993	7/13/1995	OTC	Industrial Engineer	BNY	SSE
DCHLY**	12/4/1992	10/1/1995	OTC	Auto & Parts	BNY	SSE
TSGTY*	8/27/1993	2/1/1996	OTC	Beverages	BNY	SSE
CSDXY*	5/23/2002	3/1/1996	OTC & PORTAL	Industrial Transport.	BNY	SSE
SJQIY**	3/26/1993	7/1/1996	OTC	Real Estate	BNY	SSE
SLUJY**	6/28/1993	7/1/1996	OTC	Real Estate	BNY	SSE
GZPHY*	2/6/2001	6/21/2002	OTC	Pharmacy & Biotech	BNY	SSE
JEXYY*	1/16/2001	12/23/2002	OTC	Industrial Transport	BNY	SSE
JIXAY*	1/11/2002	10/7/2003	OTC	Mining	BNY	SSE
TCEPY*	6/30/1995	12/23/2003	OTC	Gas & Utilities	BNY	SSE
SZPRY**	9/15/1993	8/1/1994	OTC	Real Estate	BNY	SZSE
JLMT**	12/1/1993	9/29/1995	Reg. S	Industrial Engineer	CIT	SZSE
ANGGY*	12/25/1997	12/6/2002	OTC	Industrial Metals	BNY	SZSE
FEPTY*	1/21/1997	3/2/2004	OTC	Pharmacy & Biotech	DB	SZSE

\* Firms cross-listed on the Hong Kong Stock Exchange. \*\* Firms cross-listed on the B-share market.

**Table 4.2. Summary statistics.**

This table reports the summary statistics of the sample, where panel A focuses on the full sample and panel B breaks down into two sub-groups, i.e., firms with and without U.S. listings. To address the impact of U.S. listing choices, the sample of cross-listed firms is further divided into exchange-based and non-exchange-based listings in panel C. The variables are defined as follows: *SIZE* is the size of the firm, calculated as the natural log of total assets; *BM* is the book-to-market ratio, measured as the difference between total assets and total liabilities, divided by the stock market capitalization of the firm; *LEV* is the leverage (debt-to-equity) ratio; *ROA* is the return on assets, computed as EBXI divided by total assets; and *RET* is the monthly holding period return on a firm's common stock. The final sample consists of 843 firms (27 cross-listed firms and 816 comparable purely domestic-listed firms), each with a continuous listing history over the entire sample period from October 2004 to September 2007.

	Panel A Full Sample (843 Firms)	Panel B. Cross-Listed vs. Non- Cross-Listed Firms		Panel C. Exchange vs. Non- Exchange Listings	
		Firms with U.S. listings (27 Firms)	Firms without U.S. listings (816 Firms)	NYSE (8Firms)	OTC& Private Placements (19 Firms)
<b>SIZE</b>	21.425 (0.95)	21.727 (1.54)	21.366 (0.87)	24.720 (1.37)	21.598 (1.12)
<b>BM</b>	15.121 (29.63)	1.577 (2.32)	15.616 (30.11)	0.835 (0.40)	1.889 (2.69)
<b>LEV</b>	1.440 (5.21)	1.493 (2.28)	1.438 (5.28)	2.520 (3.72)	1.061 (0.98)
<b>ROA</b>	0.033 (0.06)	0.062 (0.08)	0.0320 (0.06)	0.076 (0.08)	0.056 (0.09)
<b>RET</b>	2.774 (16.20)	3.333 (13.82)	2.756 (16.27)	3.364 (13.21)	3.321 (14.08)

Standard deviations are in parentheses.

**Table 4.3. Abnormal returns and stock price synchronicity.**

This table reports the regression results regarding abnormal returns and stock price synchronicity. Following the literature, this study uses the R-squared value from the regression of the capital asset pricing model to measure the departure of firm-specific stock movements from the market, that is,  $(R_{it} - R_t^f) = \alpha + \beta(R_t^M - R_t^f) + \varepsilon_{it}$ . Here,  $R_{it}$  is the stock return for each individual firm at time  $t$ ,  $R_t^M$  is the corresponding market return at time  $t$ , and  $R_t^f$  is the risk-free rate at time  $t$ . According to the Hausman specification test, the one-way random effect model is utilized. For a more precise estimation, the error components model and GLS estimation are applied. The final sample consists of 27 cross-listed firms and 816 comparable purely domestic-listed firms, each with a continuous listing history over the entire sample period from October 2004 to September 2007.

	<i>Cross-Listed vs. Non-Cross-Listed Firms</i>		<i>Exchange vs. Non-Exchange Listings</i>	
	<b>Firms with U.S. listings (27 Firms)</b>	<b>Firms without U.S. listings (816 Firms)</b>	<b>NYSE (8Firms)</b>	<b>OTC&amp; Private Placements (19 Firms)</b>
<b><math>\alpha</math> Estimate</b>	0.0014 (0.31)	0.0137*** (4.67)	0.0007 (0.07)	0.0322** (2.06)
<b><math>\beta</math> Estimate</b>	0.8869*** (17.86)	1.3017*** (53.08)	0.9009*** (8.00)	1.0007*** (7.55)
<b>R Squared</b>	0.2520	0.2773	0.1871	0.2521

The  $t$ -values are in parentheses. Here, \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels.

**Table 4.4. Price–earnings relation.**

This table reports the regression results regarding the price–earnings relation, where panel A focuses on the price model,  $P_{it} = \alpha + \beta X_{it} + \varepsilon_{it}$ , and panel B considers the return model,  $P_{it} / P_{i,t-1} = \alpha + \beta X_{it} / P_{i,t-1} + \varepsilon_{it}$ . Here,  $P_{it}$  is the trading day closing price at time  $t$ ,  $X_{it}$  is the earnings per share figure at time  $t$ , and  $P_{i,t-1}$  is the trading day closing price at time  $t-1$ . According to the Hausman specification test, the one-way random effect model is utilized. For a more precise estimation, the error components model and GLS estimation are applied. The final sample consists of 27 cross-listed firms and 816 comparable home country firms, each with a continuous listing history over the entire sample period from October 2004 to September 2007.

**Panel A. Price Model**  $P_{it} = \alpha + \beta X_{it} + \varepsilon_{it}$ 

	<u>Cross-Listed vs. Non-Cross-Listed Firms</u>		<u>Exchange vs. Non-Exchange Listings</u>	
	<u>Firms with U.S. listings (27 Firms)</u>	<u>Firms without U.S. listings (816 Firms)</u>	<u>NYSE (8Firms)</u>	<u>OTC&amp; Private Placements (19 Firms)</u>
<b><math>\alpha</math> Estimate</b>	5.8832*** (5.27)	5.9034*** (24.57)	5.1501*** (4.10)	5.5348*** (4.48)
<b><math>\beta</math> Estimate</b>	0.6611*** (5.50)	0.00001 (0.56)	3.4764*** (6.31)	0.5327*** (4.58)
<b>R Squared</b>	0.0415	0.0000	0.1621	0.0409

**Panel B. Return Model**  $P_{it} / P_{i,t-1} = \alpha + \beta X_{it} / P_{i,t-1} + \varepsilon_{it}$ 

	<u>Cross-Listed vs. Non-Cross-Listed Firms</u>		<u>Exchange vs. Non-Exchange Listings</u>	
	<u>Firms with U.S. listings (27 Firms)</u>	<u>Firms without U.S. listings (816 Firms)</u>	<u>NYSE (8Firms)</u>	<u>OTC&amp; Private Placements (19 Firms)</u>
<b><math>\alpha</math> Estimate</b>	0.0120** (2.42)	0.0080*** (8.69)	-0.0778** (-2.11)	0.0134** (2.19)
<b><math>\beta</math> Estimate</b>	0.0456** (2.00)	0.000002 (1.00)	0.8889** (2.53)	0.0461* (1.87)
<b>R Squared</b>	0.0057	0.0000	0.0827	0.0070

The  $t$ -values are in parentheses. Here, \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels.

**Table 4.5. Price synchronicity before and after U.S. listing.**

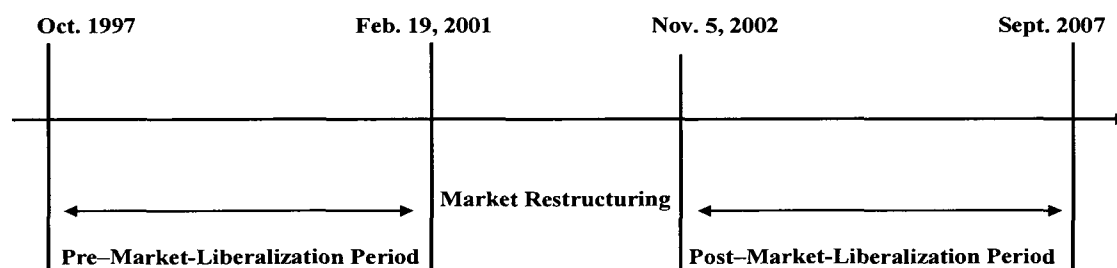
This table reports the price synchronicity before and after U.S. listings for the 4 firms that have sufficient pre-cross-listing histories. Following the literature, this study uses the R-squared value from the regression of the capital asset pricing model to measure the departure of firm-specific stock movements from the market, that is,  $(R_{it} - R_{it}^F) = \alpha + \beta(R_t^M - R_t^F) + \varepsilon_{it}$ . Here,  $R_{it}$  is the stock return for each individual firm at time  $t$ ,  $R_t^M$  is the corresponding market return at time  $t$ , and  $R_t^F$  is the risk-free rate at time  $t$ . According to the Hausman specification test, the one-way random effect model is utilized. For a more precise estimation, the error components model and GLS estimation are applied.

	<b>FEPTY</b> U.S. Listing Date: March 2, 2004		<b>ANGGY</b> U.S. Listing Date: December 6, 2002		<b>SJQIY</b> U.S. Listing Date: July 1, 1996		<b>TCEPY</b> U.S. Listing Date: December 23, 2003	
	<i>Before</i>	<i>After</i>	<i>Before</i>	<i>After</i>	<i>Before</i>	<i>After</i>	<i>Before</i>	<i>After</i>
$\alpha$	-2.313 (-1.38)	-2.099 (-0.90)	-0.200 (-0.17)	0.958 (-0.57)	3.632 (-1.25)	-2.487 (-1.36)	-1.815 (-1.20)	-2.001 (-0.96)
$\beta$	1.117*** (4.53)	0.824*** (3.18)	0.879*** (6.12)	1.072*** (4.44)	1.257*** (9.98)	0.838*** (3.88)	0.823*** (4.69)	0.897*** (3.27)
$R^2$	0.384	0.235	0.531	0.374	0.751	0.313	0.400	0.245

The  $t$ -values are in parentheses. Here, \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels.

**Figure 2.1. Estimation time frame.**

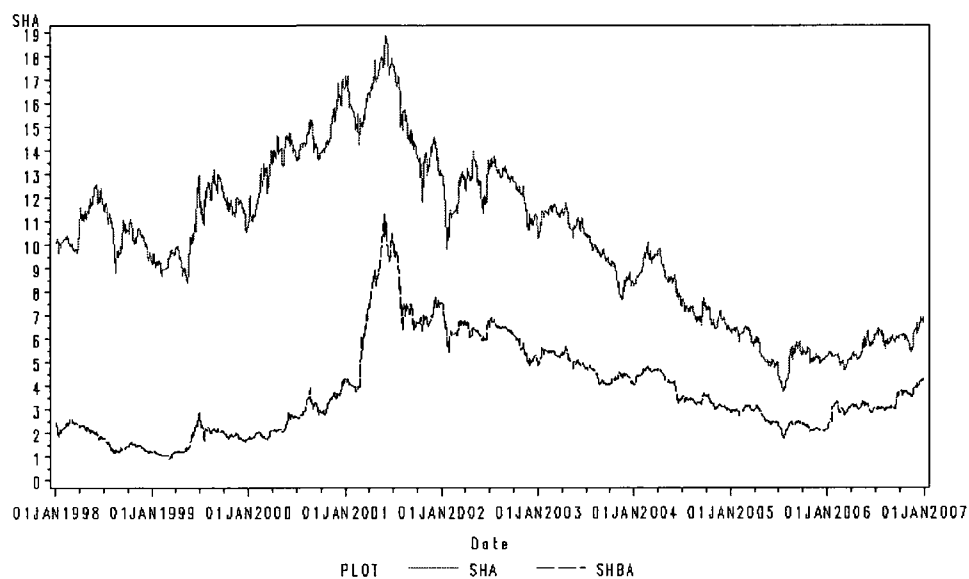
This figure illustrates the time frame of estimation. As indicated, the two regulatory reforms (i.e., the opening of the foreign B-share market to Chinese domestic investors on February 19, 2001 and the opening of the local A-share market to QFII on November 5, 2002) have divided the sample into three subperiods: the pre-market-liberalization period, the post-market-liberalization period, and the period of market restructuring.



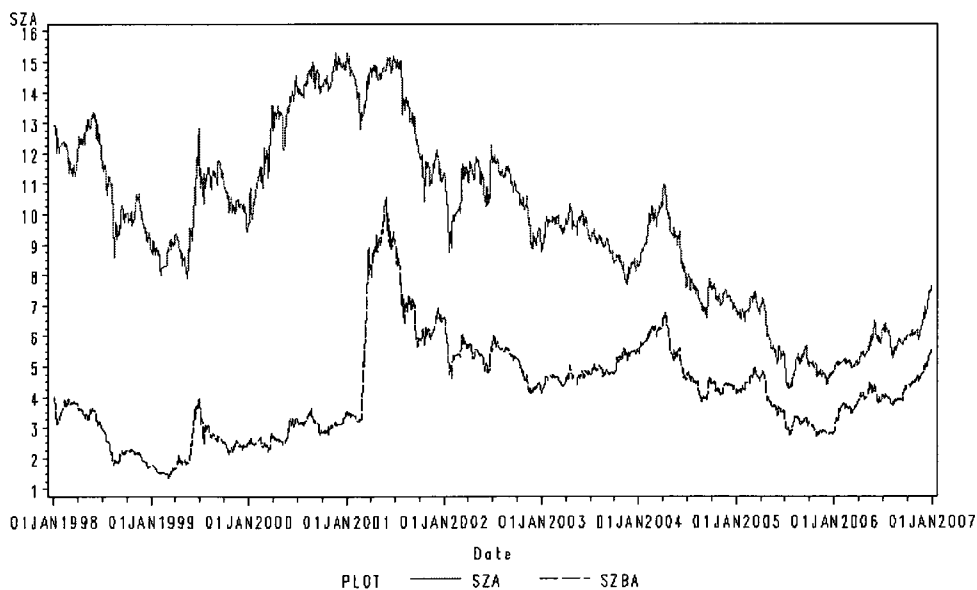
**Figure 2.2. Plotting the price divergence between the twin-share portfolios.**

These figures plot the dynamic pattern of the price differential between the local A and foreign B shares that are issued by the same companies. The estimation period spans the two regulatory reforms (i.e., the opening of the foreign B-share market to Chinese domestic investors in 2001 and the opening of the local A-share market to QFII in 2002).

Price Divergence between the Twin-Share Portfolios (SSE)



Price Divergence between the Twin-Share Portfolios (SZSE)





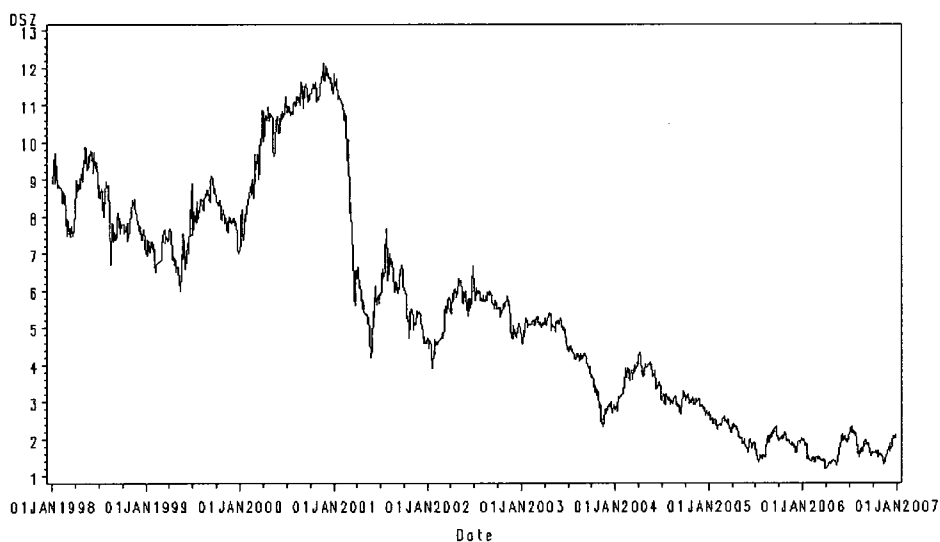
**Figure 2.3. Plotting the B-share discount.**

These figures plot the B-share discount over the sample period from October 1997 to September 2007. The estimation period spans the two regulatory reforms (i.e., the opening of the foreign B-share market to Chinese domestic investors in 2001 and the opening of the local A-share market to QFII in 2002).

**The B—Share Discount (SSE)**



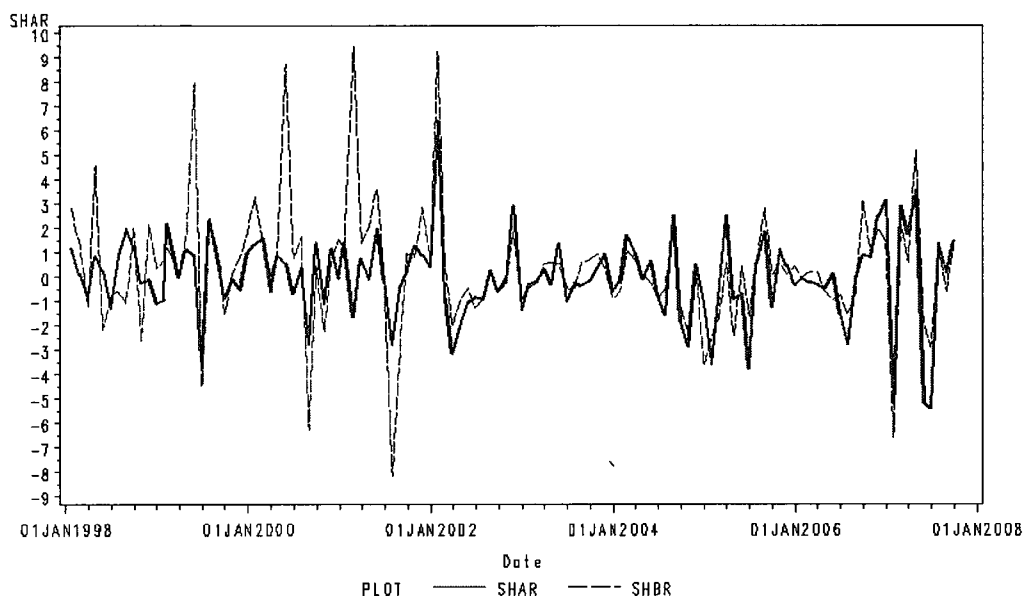
**The B—Share Discount (SZSE)**



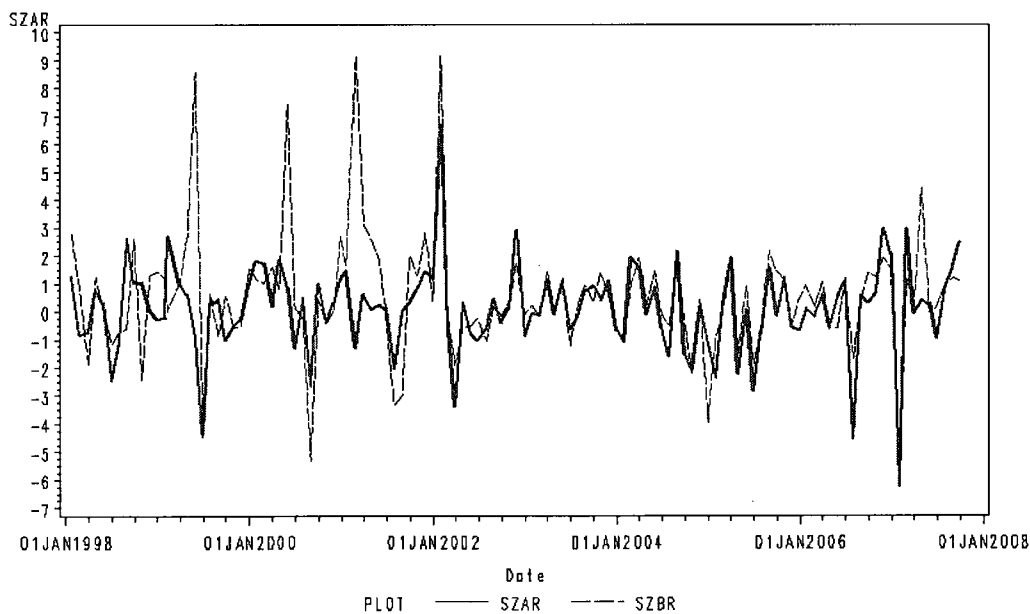
**Figure 2.4. Plotting the twin-share portfolio returns.**

These figures plot the stock returns of the twin-share portfolios over the sample period from October 1997 to September 2007. The estimation period spans the two regulatory reforms (i.e., the opening of the foreign B-share market to Chinese domestic investors in 2001 and the opening of the local A-share market to QFII in 2002).

#### Plotting the Twin Share Portfolio Returns on SSE

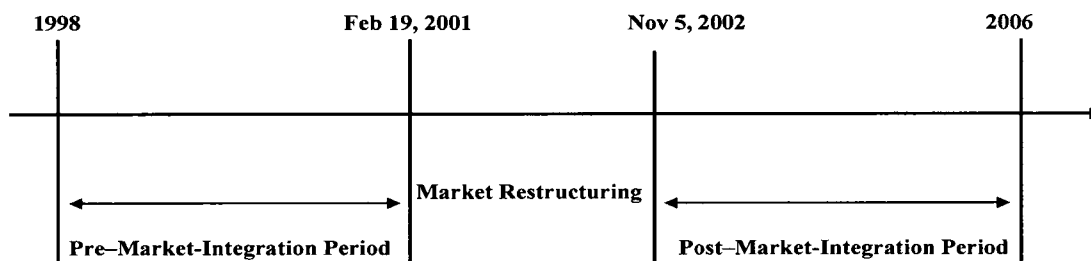


#### Plotting the Twin Share Portfolio Returns on SZSE



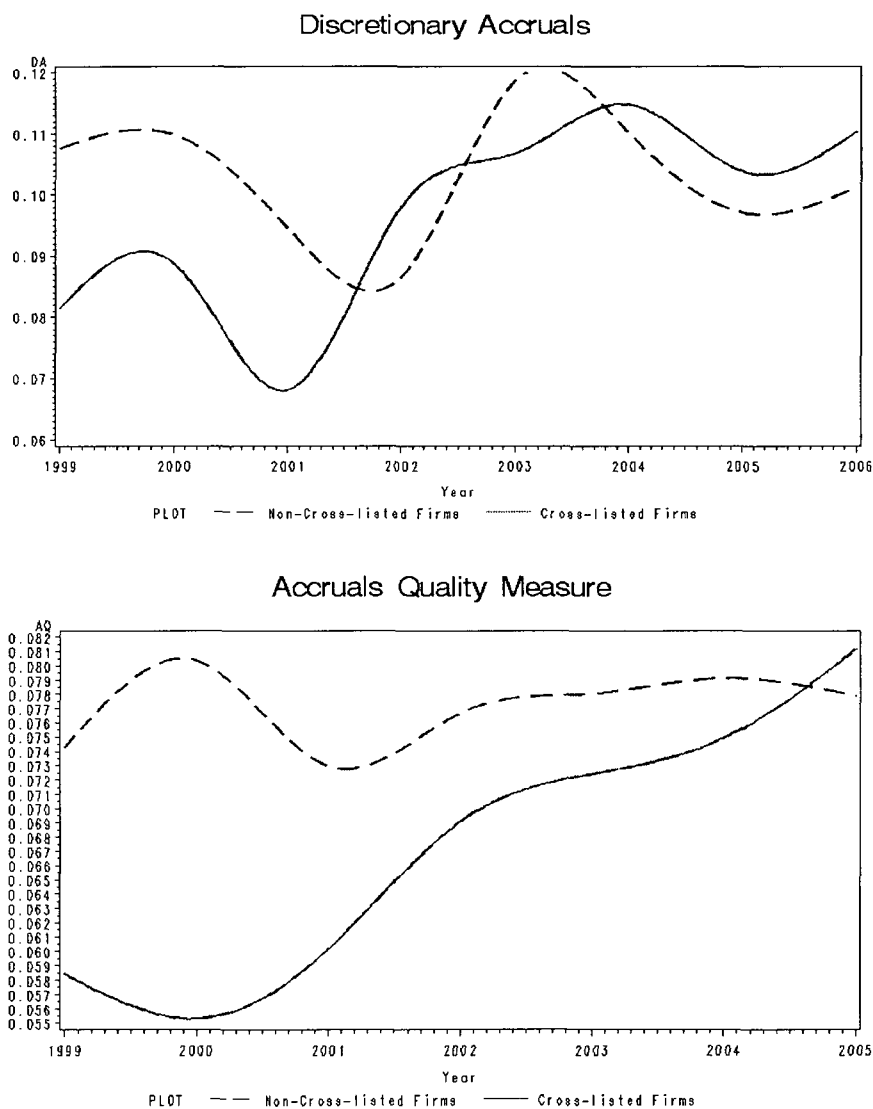
**Figure 3.1. Estimation time frame.**

This figure illustrates the time frame of estimation, contingent upon the processes of Chinese stock market liberalization. As indicated, the two regulatory reforms (i.e., the opening of the foreign B-share market to Chinese domestic investors on February 19, 2001 and the opening of the domestic A-share market to QFII on November 5, 2002) have divided the sample into three subperiods: the pre-market-integration period, the post-market-integration period, and the period of market restructuring.



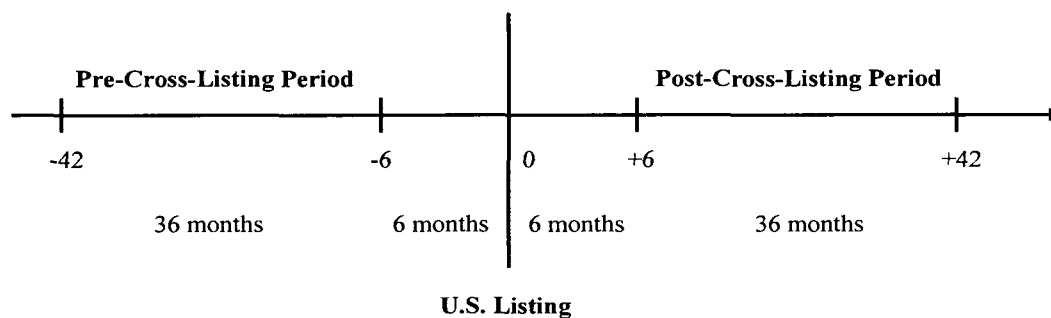
**Figure 3.2. Earnings management over time.**

These figures compare the magnitude of earnings management between cross-listed and non-cross-listed firms over the sample period from 1999 to 2006. For a rigorous analysis, earnings quality is measured using two alternative approaches: the absolute value of discretionary accruals,  $|DA|$ , and accruals quality,  $AQ$ . Here,  $|DA|$  is calculated using the modified Jones (1991) model and  $AQ$  is measured as the standard deviation of residuals from the model that regresses current accruals on the lagged, current, and future values of CFO, change in sales revenues, and gross PPE. The time frame of estimation spans the two regulatory reforms (i.e., the opening of the foreign B-share market to Chinese domestic investors in 2001 and the opening of the domestic A-share market to QFII in 2002).



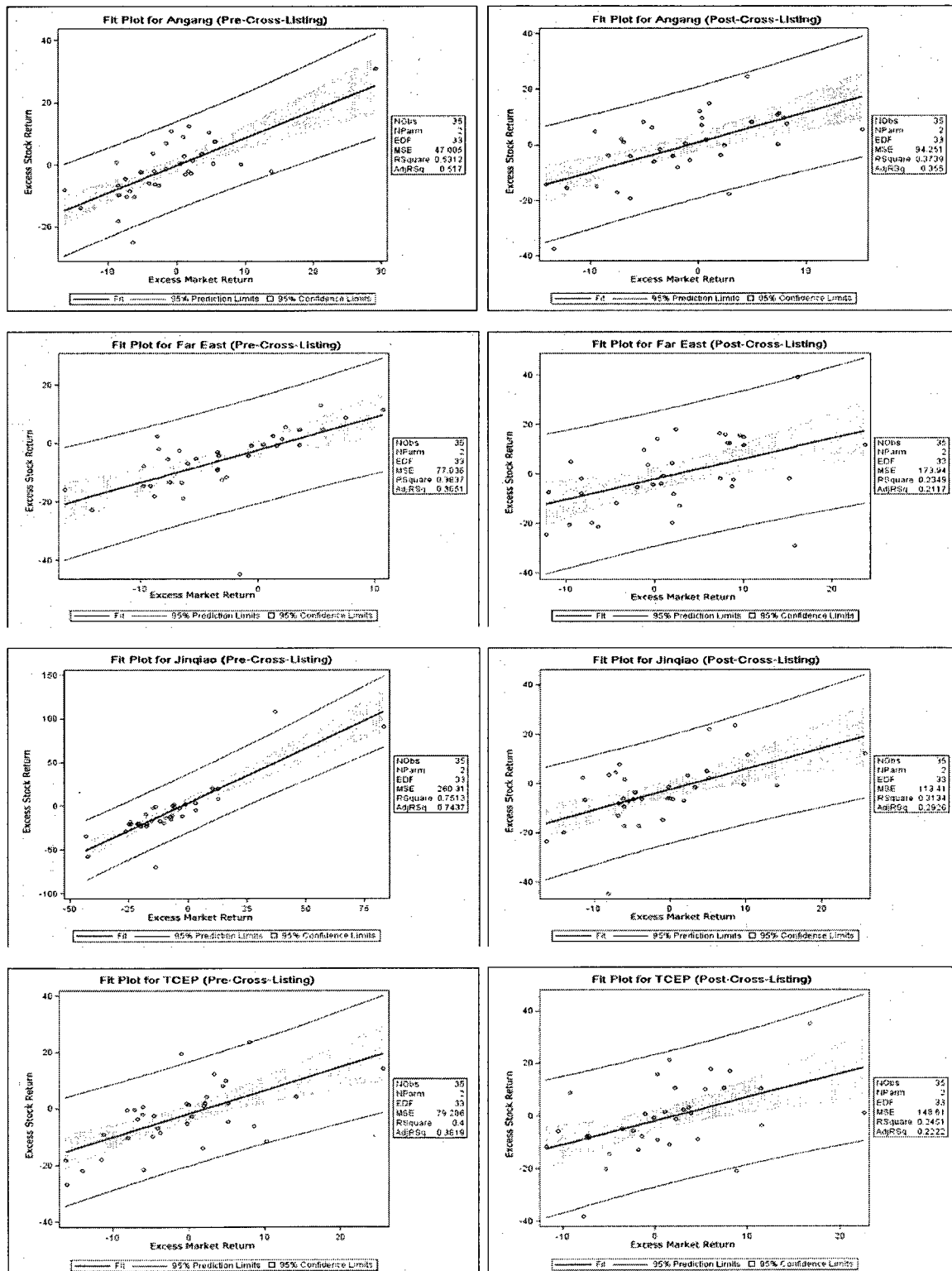
**Figure 4.1. Estimation time frame.**

This figure illustrates the time frame of estimation in testing stock price synchronicity before and after U.S. listing. To ensure a rigorous analysis, I require the sample firms to have at least three years of domestic A-share listings before and after their U.S. listings. In order to rule out short-run disturbance around U.S. listings, the pre- and post-cross-listing periods are constructed with a gap of six months before and a gap of six months after the listing events.



**Figure 4.2. Fit plots before and after U.S. listing.**

These figures compare the fit plots before and after U.S. listings for the 4 firms that have sufficient pre-cross-listing histories. The fit plots during the pre- and post-cross-listing periods are presented on the left-hand side and the right-hand side, respectively.



## VITA

Liu Wang received her Ph.D. in finance from Old Dominion University in 2010, her M.Sc. in management economics (with honor) from the University of Essex in 2004, and her B.A. in finance from Shandong University of Finance in 2002. Currently, her primary research interests include international corporate finance, investment, market liberalization and reform, and corporate governance, with a special focus on emerging economies. She has served as a reviewer for many internationally recognized journals and conferences, including *Corporate Governance: An International Review* and *Academy of International Business* annual meetings. She has presented her papers at many prestigious conferences during her doctoral study and has a number of manuscripts either forthcoming or in different stages of the review process at several well-respected peer-reviewed journals.