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Stock Price Anomalies and Corporate Dividend Policies in China

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STOCK PRICE ANOMALIES

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CORPORATE DIVIDEND POLICIES

IN CHINA

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CERTIFICATE OF ORIGINALITY

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ABSTRACT

The dissertation consists of two stand-alone but interrelated research projects. Specifically, the two studies try to improve our understanding of the anomalous behavior of stock prices and the corporate policy decisions in China. The first study investigates what drives the price disparity between Chinese "twin" shares (A shares traded largely by domestic investors; B- and H- shares traded mainly by foreign investors). Extending the variance decomposition framework of Vuolteenaho (2002), we decompose the unexpected price disparity into two terms: the difference in expected return news and the difference in cash flow news. The results show that the difference in expected return news overwhelmingly dominates difference in cash flow news in driving the variation of the price disparity. This suggests that to a large extent, market or macro news, rather than firms' specific news, moves the price disparity of the twin shares. The reason is that investors in the two segmented markets react to cash flow news similarly, but react to expected return news quite differently. Moreover, consistent with the literature, the returns of A-shares show a much higher variance in expected return news than cash flow news, whereas cash flow news component is the more important driving force of the returns of B-shares. In other words, the foreign shares of Chinese firms behave more like the shares in the US (cash flow news dominates), while domestic shares are more alike those in other

emerging markets.

The second study examines whether the evidence in prior studies regarding contracting explanations for dividend policies in U.S., Australia and other western countries, is also applicable to a country with weak legal institutional arrangements (e.g corporate governance and different legal and regulatory environment). Using pooled cross-sectional observations of pure A-companies listed on Shanghai and Shenzhen stock exchanges from 1996 and 2006, I examine the relationship between state ownership, growth opportunities and corporate dividend policies decisions. Low growth firms are found to be negatively associated with dividend policies. The results are even stronger for firms with lower state ownership concentration. Firms with high state ownership tend to pay lower dividends suggesting that these firms have more severe agency problems. Overall, the study provides a new perspective of dividend policy in China. Although the governance and the ownership structure in the corporate sector of China differs largely from those in developed countries, the results suggest that to some extent that contracting costs explanations for dividend policies can apply in China.

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CHAPTER 1

Introduction

1.1 Objectives and Motivations

This dissertation empirically examines two finance topics in China. The first topic studies the drivers of price disparity between Chinese "twin" shares (A shares traded largely by domestic investors, B- and H-shares traded mainly by foreign investors) over time. I evaluate the contribution of cash flow news and expected return news in driving the variability using the variance decomposition framework of Vuolteenaho (2002). Specifically, I examine which term dominates the variation of unexpected price disparity. The second topic investigates the association between state ownership, growth opportunities, and dividend policy of listed companies (pure A shares) in China. In this study, I examine the relationship between growth opportunities and dividends in pure "A" share companies and whether state ownership and firm size affect the relationship. State ownership enterprises (SOE) are unique to the Chinese economy and China operates under a civil law regime. Thus, traditional contracting explanations based on the U.S and other western countries for the link between growth opportunities and dividend policies (see Smith and Watts, 1992) may take a different complexion in this unique environment.

The two studies are motivated by the following factors. First, the majority of studies that examine the link between finance and ownership structures have been conducted in the developed countries where investor protection and the rule of law (e.g. U.S.) are relatively strong unlike the emerging Chinese market. The Chinese stock market is different in many aspects such as its development process and its regulatory environment. For instance, the two Chinese stock exchanges (Shanghai and Shenzhen stock exchanges) were set up in the nineties and the regulation of the securities market is comparatively less sophisticated than the U.S. market.

Second, as the country moves away from a centrally planned economy, attracting foreign investment would be one of the essential steps in facilitating the country's economic development. Thus, the government established the B- and H-share markets by allowing a few companies to issue stocks to foreign investors in order to raise foreign currency capital. Unlike other countries where foreigners pay a premium above the price paid by local investors when countries impose restrictions on foreign investment, China is an exception. The anomalous differential pricing of identical shares to different investor groups and specifically with the foreign designated shares trade largely at a discount relative to domestic A-shares has

spawned much research interest amongst finance scholars. There are a few major explanations for this price discount phenomenon so far. The differences in risk attitudes between foreign and domestic investors (Ma, 1996 and Eun, Janakiramanan and Lee, 2001) coupled with concerns over corporate governance (Tong and Yu, 2007) are often blamed as the culprit for the discount. It is also suggested that the discount is due to information asymmetry which is associated with illiquidity as a greater degree of informed trading will increase the adverse selection cost which deters trading activity (Chan, Menkveld and Yang, 2008). Unlike the prior literature that focuses on analyzing the mean effects, it may be worth to examine the drivers of the price discount variation over time.

Third, since China has adopted a more gradual approach in privatization, most listed firms in the Shanghai and Shenzhen stock exchanges are carved out from the SOE in China firms. As such, a large fraction of the shares of the listed firms is still held by SOE which is not circulated in the stock market. Since the ownership structure in China's corporate sector differ from the mature markets significantly, hence, the differences in institutional arrangements between high state ownership firms versus low state ownership firms may influence the behavior of shareholders as monitors. Moreover, given the almost non-existence of corporate governance, and weak

enforcement power of regulatory authority, controlling shareholders would expropriate at the expense of minority shareholders. The unique Chinese institutional settings can therefore provide an interesting backdrop to investigate whether contracting cost explanations for dividend policies are applicable in view of these differences.

To date, much of the theoretical and empirical basis for dividend decisions in China is drawn from the existing theories using developed countries or U.S. as sample data. However, they failed to show consistent results. The first interpretation follows the signaling effect that dividend policy can be used as a means of conveying private information to the public. Eun and Huang (2007) study the asset pricing mechanism in China stock markets and argue that dividends directly reveal the prospects of the firms. As a result, investors prefer dividend-paying stocks to those that do not. The second interpretation adopts the argument from Johnson et al. (2000) that controlling shareholder could tunnel minority shareholder. Lee and Xiao (2004) examine the propensity of state dominant firms paying cash dividend and the propensity of these firms to subscribe rights offering. They find that these firms often increase the distribution of cash dividend after rights offering. Thus, cash dividends are used to drain off profits out of companies for the benefit of controlling shareholders. Hence,

market reacts negatively to cash dividend announcement of firms with concentrated ownership. Chen, Jian and Xu (2009) confirms the tunneling issue by examining the differential pricing for tradable and non-tradable shares during the IPO of the listed companies. Since researchers have examined the signaling hypothesis and the tunneling hypothesis and have not shown consensus arguments, the dividend chapter adopts the position of linking contracting theory with dividend policy in China. The second topic aims at providing some evidence as to whether the contracting theory is still applicable to different legal and regulatory environment.

1.2 Developments of China's Stock Market

Since the establishment of the Shanghai Stock Exchange in December 1989 and the Shenzhen Stock Exchange in April 1991, the Chinese stock market has expanded rapidly. Thus, this provides a rich environment for investigation of equity price behavior in an emerging market.

The nascent Chinese stock market plays a dominant role in the emerging stock market for international investors in recent decades (Eun and Huang, 2007). Growing at a phenomenon pace following the inception of the stock markets in the 1990's, the number of listed stocks has increased from 13 in 1991 to more than 1700 in 2008.

Evidently, the Chinese government attempts to privatize and liberalize the nation.

1.2.1 History of the Stock Exchange in China

The Shanghai Stock Exchange became the financial center for the Far-East in the 1930s (Goetzmann, Ukhov and Zhu, 2001). At its peak, there were 76 companies trading in the market and of which 22 were banks. Both local investors and foreign investors could trade stocks, government bonds, debentures, and futures on the stock exchange. Nevertheless, the stock exchange suffered two major blows; one being the Japanese forces occupying the Shanghai International Settlement in 1941 and the other being the suspension of securities exchanges after the establishment of the People's Republic of China.

1.2.2 State Owned Enterprises (SOE) Pre-Reform

The economy was under a planned system between 1949 and 1978 (Hong, 2005, p. 7). Large companies in significant fields of industry were nationalized. All sectors except agriculture were financed by the state budget. In particular, the communist government prioritized the development of heavy industry as the strategy to upgrade the economic structure of the country. Though agriculture was the main sector in the economy, the system was too backward for the government to develop both heavy

industries and agricultural sectors at the same time. SOEs were formed to implement this development strategy. With scarce capital and abundant labour, light industries, which require more man-power, would be used as the fundamental way of generating residual income to subsidize the heavy industries (Lin, Cai and Li, 2001, p. 23).

Under a system in which state is the principal owner, it would be impossible for State Council to operate all the numerous SOEs directly, and thus had to entrust enterprise managers with the operation of SOEs. This was carried out through a series of intermediary management levels (Lin, Cai and Li 2001, p. 28). Like any other enterprises where ownership and control are separable, agency problems arise. Obviously, information asymmetry and conflict of interests between owners and managers were inevitable in the SOEs' context. Since managers lacked the autonomy in deciding what to produce, whom to hire and how much to pay workers, these led to serious moral hazard in SOEs. Managers who were involved in direct operation of the SOEs could report lower profits by overstating total costs or understating revenues. Moreover, since the government suppressed the cost of heavy industry development by keeping interest rate low and distorted the price of series of factors and products, it was difficult to evaluate the enterprise performance (Lin, Cai and Li, 2001, p. 39). Hence, monitoring costs were even higher and the incentive

incompatibility between owners and managers was even harder to solve. Obviously, the consequences of managers for poor enterprise performance would be even smaller than in the competitive market. Job security and level of wages were not related to job performance but was adhered to party doctrine. As a result, managers had no incentives to improve productivity and failed to pursue technological innovation. Thus, the traditional economic system that took place between 1949 and 1978 was referred to as "The Iron Rice Bowl" as the system guaranteed lifetime employment in state enterprises.

1.2.3 Economic and Financial Reform

In 1978 after the Cultural Revolution, Deng Xiaoping re-opened China to the world. It was also the time when the government attempted to solve the lack of efficiency endemic to SOEs. The over-emphasis on developing heavy industries led to serious shortage of industrial consumer products (Lu, 2001). A vast number of farmers were living in poverty with inadequate necessities. In addition, the economic gap between China and the developed countries and even the Asian "Four Little Dragons" continued to widen. Thus, there was an urge for the country to "leap forward".

The reform started in 1978 and since then the economic development in China was

special and dramatic in the following 30 years. The decentralization of SOEs to increase autonomy and improve incentives was the key item in the reform programme. Initially, it undertook experiments in Sichuan province, followed by pilot programme before it became institutionalized (Green, 2004). Since then, managers were given the right to run the operations; firms were allowed to produce more than the plan quota under the asset operation responsibility system. As a result, firms were able to make profits from the extra output they produced.

On one hand, the reforms proved to be successful in increasing the productivity and efficiency of SOEs. On the other hand, the incentive incompatibility problem between the enterprises and the state was not solved. Managers tried to hide information regarding the profit level when negotiating their contracts with the state agencies. Despite the increase in productivity, many SOEs that were profitable in the past started to face losses since managers drained away the state assets for their own benefits. At the same time, enterprises could continue asking for subsidies from the government. Moreover, firms could seek additional fundings either from banks that were controlled by the government or from other firms to cover losses. Hence, firms became more and more in debt to the banks (Lin, 1996). To keep the firms running, the government ordered banks to provide loans even to firms with heavy losses.

Loss firms became indebted to other firms thus creating the phenomenon of "Triangle Debts" (Wang, 2001).

The rapid growth of domestic lending, and imprudent use of foreign reserves led to tough new restrictions on bank lending in China. This gave incentives to corporations to raise funds through share issuance. Evidently, a primary market would malfunction without a secondary market. Therefore, to facilitate public issuing and trading of securities, securities centers were established in Shanghai and Shenzhen in 1990/91, the major business centers in China. The Shanghai Stock Exchange was back in action after it suspended operations since 1949.

At that time, the SOEs were still the dominant players in the economy and they were running rather inefficiently. It was estimated that the non-performing loan ratio was around 25% in 1997 (Garcia-Herrero and Santabarbara, 2004). To support the economic growth, the Chinese government accepted the fact of the need for a shareholding system. Initially, the system allowed enterprises to issue shares to employees. The transformation tried to distribute more benefits to their staff and workers. The shares were like hybrid of preferred shares and bonds. The system attempted to tie the performance of the shareholding company to the incentive system

of employees through share issuance and dividend payment (Lin, Yang and Wang, 1998). Gradually, selling shares to the public was recognized as a useful tool to save state industries out of the doldrums (Ayling and Jiang, 1995). Setting up the stock markets and pushing the SOE to the stock markets were “brave” experiments in mainland China at that time, as a big transition from a planned economy to a market-oriented economy.

The SOEs took the key assets to form "new companies" (often been called the "beautiful girls") and pushed the "new companies" to the stock markets ("helping the beautiful girls find rich husbands). When a SOE went public, it was required to split the shares into three parts. One part of the company’s shares was freely traded, another part was held by the state and the remaining was held by “legal persons.” Legal person shares are defined as the issuance of shares to domestic institutions, namely securities companies and SOEs with at least one non-state owner.

Tradable shares can be categorized into many types (A-shares, B-shares, H-shares and ADRs etc). Specifically, since the establishment of China’s stock exchanges, a number of firms have issued identical shares to different investor groups. Out of which, A-shares were originally available only to local investors while B- and

H-shares were initially available to designated foreign investors.[1] A- and B-shares are traded on the two domestic stock exchanges, the Shanghai and the Shenzhen stock exchanges. A-shares are traded in local currency while Shanghai B-shares are traded in U.S. dollars and Shenzhen B-shares are traded in Hong Kong dollars. H-shares are listed on Hong Kong Stock Exchange and traded in Hong Kong dollars. Although voting rights and cash flow rights are the same for both A- and B- or H-shares, they are traded at different prices due to the market segmentation. In contrast to other segmented markets including Indonesia, Korea, Malaysia, Mexico, Norway, Philippines, Singapore, Switzerland, Taiwan, and Thailand. (Bailey, Chung and Kang, 1999) where foreign designated shares trade largely at a premium relative to local shares, foreign B- or H- shares are often traded at a discount when compared with the corresponding domestic A-shares in China. Not surprisingly, extensive research has been done to explain why there is a foreign share price discount. However, unlike previous literature, Chapter 2 provides a new perspective by examining the drivers of the price discount variation between the twin shares (A- and B-shares and A- and H-shares) over time using the variance decomposition framework of Vuolteenaho (2002).

[1] These restrictions were relaxed subsequently. Domestic investors were allowed to trade in the B-share market on the 19th February, 2001 and Qualified Foreign Institutional Investors were allowed to trade in the A-share market on 1st December, 2002.

Non-tradable shares, which account for two-thirds of the shares in essence, are owned by the SOE. Their ultimate owner is the State Council and the titles of the shares are not freely transferable. The two-thirds of the shares owned by the state and the tradable shares have the same voting and cash flow rights (Lu, Balatbat and Czernkowski, 2008). Against such a backdrop, Chinese authorities attempted on two occasions – in 1999 and in 2001 – to sell off state-owned shares. However, this prompted fears that further privatization of SOEs would create imbalance in the demand and supply relationship and thus caused the depression of stock markets. Finally, in April 2005, CSRC released the "Circular on Issues relating to the Pilot Reform of Listed Companies Split Share Structure" by gradually encouraging listed SOEs to transform the non-tradable A-shares into tradable shares on Shanghai and Shenzhen stock exchanges. The share structure reform seems to strongly suggest that the split share structure distorted the valuation mechanisms. The prices of a non-tradable share were based on net asset value while the prices of tradable shares were determined by the open market.

In spite of the share structure reform, a high percentage of shares of listed firms are still not fully tradable especially before 2007. Moreover, since companies that are

less efficient and that cannot go public need to depend on the state, the state is still facing an enormous burden. Further, SOEs in sectors vital to the national economy or national security are still keeping the pre-reform structure. This is due to the fact that China subscribed to a socialist framework. With high concentrated ownership and with most of the listed companies still controlled by the State, the divergence of the control rights and cash flow rights provide incentive for dominant shareholders to seek rents from shareholders with minority control rights (Bradford, Chen and Zhu, 2004). This distinctive institutional setting shows that weak investor protection exists in the Chinese market and affects corporate decisions such as dividend policy. Usually, the dividend payout ratio is very high as the parent companies need the cash and it is actually one way of transferring the value from tradable shareholders to them. As a result, a number of studies attempted to examine the determinants of the dividend policy but fail to find any consensus on the subject. Chapter 3 aims at shedding some light in this area. The study endeavors to examine which term dominates the variation of state ownership, growth opportunities, and dividend policy of pure "A" share companies in China using contracting theories.

1.3 Overview of Research Methods and Major Findings

1.3.1 Variance Decomposition

In a technical context, I extend the variance decomposition methodology of Campbell (1991), Vuolteenaho (2002), and Callen and Segal (2004) to evaluate the variance contribution of the two pieces of news: cash flow news and expected return news.

While prior studies using U.S. data find that the firm-level stock returns are mainly driven by cash-flow news and the market level stock returns are primarily driven by expected return news (Campbell (1991) and Vuolteenaho (2002)), a strand of finance literature has shown that emerging stock markets are different from the developed stock markets. For example, Morck, Yeung and Yu (2000) find an interesting pattern that more developed economies are associated with less synchronous stock prices.

Using the sample that consists of the entire population of firms listed on the A-share, B-share and H-share markets obtained from the Taiwan Economic Journal (*TEJ*) for the period 1995 to 2006, I find that differences in expected return news significantly dominate differences in cash flow news in driving the variation of the price discount. This suggests that investors in the two segmented markets react to cash flow news similarly, but react to expected return news quite differently. For example, market

regulatory reforms, quite typical in China, affect the two markets differently. Further, consistent with the literature, cash flow news plays a more important role in explaining the unexpected variability of the stock returns of B- or H-shares. In contrast to the B- or H- shares, expected return news dominates significantly in explaining the unexpected variability of stock returns of A-shares. One possible reason for this diversity is that investors in B- or H- share markets behave like U.S. investors who place heavier reliance on companies' financial reports. Conversely, investors in the A-share market do not rely that much on companies' financial reports. Instead, they consider market level news, new policies, regulation changes, governmental interventions, etc. as essential issues to determine A-share prices. It turns out that accounting information captured by cash flow news is less relevant in China stock market.

1.3.2 Dividend Policy

Two hypotheses are tested in this study. The first hypothesis is to test whether low growth firms as proxied by sales growth have significantly higher dividend payouts than high growth firms consistent with contracting explanations. Using 3,320 firm-year observations from 1996 to 2006, I find evidence consistent with a strand of prior studies that examine the link between growth opportunities and dividend policies

(Smith and Watts (1992), Gaver and Gaver, (1993), Gul (1999a, 1999b) and Gul and Kealy (1999)). The results also suggest that firms with lower state ownership are able to force managers of firms with high free cash flow (FCF) to pay out higher dividends.

The second hypothesis is to test whether firms with large state ownership pay lower dividends. This follows Jensen's argument that firms with FCF problem and higher agency costs can be mitigated by increasing dividend payout to shareholders. To test Hypothesis 2, I partition the full sample into low growth and high growth subsamples. The low growth and high growth firms are defined according to their sales growth percentages between year *t* and year *t-1*. The regression results reveal that the negative association between low growth firms and dividend payout is stronger for firms with lower state ownership concentration. Specifically, I find that the size effect weakens the positive association between state ownership concentration and dividend payout. In other words, low growth and small-sized firms distribute the highest percentage of dividends from their earnings. Moreover, instead of using dividends to expropriate minority shareholders, I argue that large and high state ownership firms can find alternative ways to tunnel cash out of the company. Hence, their preference for cash dividend would be considerably reduced. This suggests that

state ownership intensify agency costs as manifested by firms paying lower dividends to shareholders. The results show that firms with high state ownership have more severe agency problems.

1.4 Contributions

These two studies contribute to the literature in the following ways. First, to the best of my knowledge, the second chapter is the first study that directly links the variation of price discount of dual listed shares in China using the variance decomposition methodology.

Second, although research studies focus on the relative pricing of B-shares and their A-share counterparts, little is known about the movement of the drivers of the price discount variation over time. Since share price is the sum of the discounted expected future cash flows over the lifetime of the firm, revisions to share price are necessarily driven by shocks (revisions) to future expected cash flows, called cash flow news, and/or shocks to future expected returns, called expected return news. The second chapter tries to provide a new perspective on this literature by extending the variance decomposition methodologies.

Third, the third chapter provides a new perspective of dividend policy in China. Although the governance and the ownership structure in the corporate sector of China differs largely from those in developed countries, the paper can still prove to some extent that contracting costs explanations for dividend policies can apply in China given these differences. This contributes to the literature on the link between investment growth opportunities set and the corporate policies.

1.5 Organization of the Dissertation

The rest of the dissertation is structured as follows. Chapter 2 studies the variation of the foreign price discounts of A-B and A-H shares by reviewing the related literature and extending the variance decomposition framework. Chapter 3 examines the cash dividend polices of pure A shares and whether contracting theory can applied in the unique institutional setting in China. I conclude this study and discuss the limitations as well as suggest future research opportunities in Chapter 4.

CHAPTER 2

Understanding the Variation of Foreign Share Price Discounts – A Study of Dual-listed Chinese Firms

This chapter provides an investigation as to what drives the price disparity between Chinese "twin" shares (A shares traded largely by domestic investors; B- and H-shares traded mainly by foreign investors). The unexpected price disparity is decomposed into two terms: the difference in expected return news and the difference in cash flow news by extending the variance decomposition framework of Vuolteenaho (2002). The chapter is organized as follows. Section 2.2 provides institutional background on the dual-listing stock market in China. Section 2.3 reviews the literature. Section 2.4 extends the variance decomposition framework to encompass the price discount. Section 2.5 discusses the data and the methodology employed. Section 5 presents the empirical results. Section 2.6 tests the robustness of the results. Section 2.7 concludes.

2.1 Introduction

Since the establishment of the Shanghai and Shenzhen stock exchanges in the early 1990's, a number of Chinese firms have issued identical shares to different investor groups, specifically, A-class shares to domestic investors and B-class and H-class

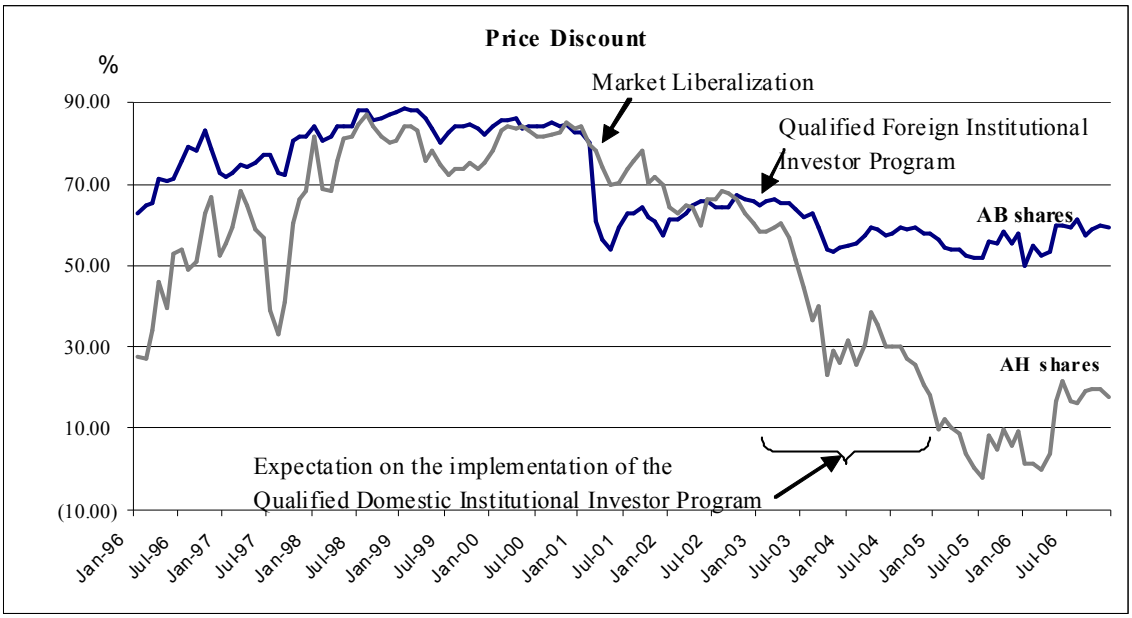
shares to foreign investors.[2] Although voting and cash flow rights are the same for both A- and B-shares, they often trade at different prices ostensibly because of market segmentation that limits arbitrage. Moreover, in contrast to other segmented markets, such as Indonesia, Korea, Malaysia, Mexico, Norway, Philippines, Singapore, Switzerland, Taiwan, and Thailand (Bailey, Chung and Kang, 1999), where foreign designated shares trade largely at a premium relative to local shares, foreign-held B-shares often trade at a discount relative to the corresponding domestic A-shares.

Subsequent regulatory developments in these markets served to reduce market segmentation and the size of the average discount but, nevertheless, the phenomenon persists. The Chinese Securities Regulatory Commission opened the B-share market to local retail punters in 2001 in an attempt to increase trading volume. Domestic investors were permitted to trade in the B-share market by using US dollars in Shanghai and Hong Kong dollars in Shenzhen. Yet, except for the initial months after the partial liberalization of the B-share market, little improvement obtained either in terms of liquidity or the discount in the B-share market. Changes to the A-share market from growing access by foreign institutions under the Qualified Foreign Institutional Investor (QFII) rules of 2002 that announced in November 2002 were

[2] For simplicity, in what follows, I refer only to A- and B-shares shares until the empirical section of this paper.

relatively ineffective. By contrast, the announcement of the Qualified Domestic Institutional Investor Program (QDII) in April 2006 and the burgeoning new share listings in late 2006 and 2007 were more effective in reducing the price gap between A- and H- shares.[3] Nevertheless, in mid 2007, listed B-shares sold at an average discount of 35% relative to A-shares.

Figure 2.1 Price Discount of Dual-Listed Shares



The anomalous differential pricing of identical shares, not to mention the relative discounting of foreign to domestic shares, has generated extensive research by finance scholars to explain these phenomena. A number of potential explanations of the discount have been offered by the literature, most prominently, differences in risk

[3] China's securities regulators allow companies to convert non-tradable shares usually held by government companies into tradable shares.

attitudes between foreign and domestic investors (Ma, 1996 and Eun, Janakiramanan and Lee, 2001) coupled with concerns over corporate governance (Tong and Yu, 2007) and information asymmetry by foreign investors relative to domestic investors (Chan, Menkveld and Yang, 2008). The latter is also presumed to be the cause of illiquidity in the B-share market relative to the A-share market because informed trading increases adverse selection costs which, in turn, deter trading activity.

This study provides a new perspective on this literature by examining the drivers of the price discount variation over time. Since share price is the sum of the discounted expected future cash flows over the lifetime of the firm, revisions to share price are necessarily driven by shocks (revisions) to future expected cash flows, called cash flow news, and/or shocks to future expected returns, called expected return news. This chapter extends the variance decomposition methodologies of Campbell (1991), Campbell and Ammer (1993), Vuolteenaho (2002), and Callen and Segal (2004) to evaluate the contribution of cash flow news and expected return news in driving the variability of the price discount between B-shares and A-shares.

Prior to evaluating the discount, the analysis is focused on each of the A-share and B-share markets separately. While prior studies using U.S. data find that the

firm-level stock returns variations are mainly driven by cash-flow news, those in emerging stock markets may be driven (at least partially) by other factors. The finance literature has shown that emerging stock markets are different from the developed stock markets. For example, Morck, Yeung and Yu (2000) find that stock prices are less synchronous the more developed is the economy. Indeed, in contrast to US studies, my findings show that expected return news significantly dominates earnings news in driving the variability of A-share returns. Conversely, and consistent with US studies, I find that cash flow news significantly dominates expected return news in explaining the variability of share-B returns. Since this study measures cash flow news using accounting earnings and book values, these results suggest that investors in the foreign B-share market behave more like U.S. investors, who rely primarily on corporate financial reports in forming valuation expectations. Hence, for these foreign investors, cash flow news tends to dominate expected return news in determining stock return variation. In contrast, these results also suggest that domestic Chinese investors in the A-share market do not overly rely on corporate financial reports in determining A-share prices, but focus instead on macro-level news such as interest rate changes, currency exchange rate changes, regulatory changes, and government interventions. It appears that accounting information captured by cash flow news is less relevant in the domestic China stock

market by comparison to the foreign B-share market.

The variance decomposition framework is further extended to show that the variation in the price discount is determined by the relative impact of earnings news and expected return news in both the domestic A-market and the foreign B market. Specifically, the unexpected price discount is decomposed into two terms: the *difference* in expected return news between the A-share and B-share markets and the *difference* in cash flow news between the A-share and B-share market. Thus, the revision to the foreign share price discount increases (decreases) either because expected return news for domestic A-shares is greater (smaller) than expected return news for the foreign B-shares, or because cash flow news for A-shares is smaller (greater) than cash flow news for B-shares, or both.

The findings document a large variation in the foreign share price discounts between 1995 and 2006. Most crucially, the difference in expected return news between the domestic and foreign markets has a much greater effect on driving the price discount than cash flow news differences. Indeed, while the difference in cash flow news between domestic and foreign investors is minimal, the difference in expected return news between foreign and domestic investors accounts for about 74% of the total

variation of the price discount, suggesting that it is primarily macro-economic news that drives the price discount rather than idiosyncratic cash flow news.

2.2.1 Dual Listing and Institutional Details

2.2.1 Segmented Stock Markets

In an attempt to attract foreign investment to the equity market, the Chinese government established the B-share market in Shanghai and Shenzhen stock exchanges to allow a few companies to issue stocks to foreign investors. To establish separate classes of shares for domestic and foreign investors, China has explicitly segmented its stock markets. Thus in each of stock exchanges, there are two classes of shares traded. A-shares are denominated in renminbi (RMB), and were available to domestic Chinese residents only before the QFII was implemented. B-shares are denominated in U.S. dollars in Shanghai and Hong Kong dollars[4] in Shenzhen, and were opened to foreign investors only before 2001. Most of the companies that issued B-shares would have issued A-shares. The two classes have identical voting rights and cash flow rights. To be an eligible shareholder of B-share, one must satisfy two conditions in order to open an account to purchase the share.

[4] Before 22 March, 1993, B-shares on Shenzhen Stock Exchange were denominated in RMB. After 29 June, 1993, they were denominated in Hong Kong dollars. Between 23 March, 1993 and 28 June, 1993, they were denominated in US dollars.

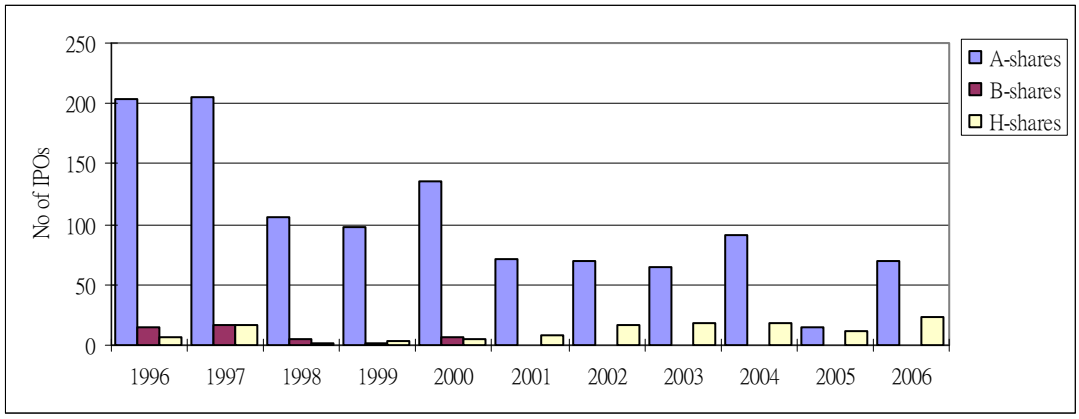
The buyer has to prove his or her foreign residence and must have a foreign exchange account. No individual investor can hold more than 25% of B shares in a firm and firms are not allowed to issue more than 49% of their total shares as B-shares. This is clearly designed to retain domestic control of listed companies. (Li, 2004)

On 21 February 1992, Shanghai Vacuum Electronics Inc. was the first company that issued B-shares in China. Subsequent to the opening of the market, the government further pushed some of the Chinese firms to list in U.S and other places around the world. On 29 June, 1993, Tsingtao Brewery made its debut on the Stock Exchange of Hong Kong as H-shares. It became the first Chinese SOE to list in Hong Kong. Aside from H-share companies which are incorporated in Mainland China, some Chinese firms acquired companies already listed in Hong Kong or issued shares via their overseas incorporated subsidiaries. They are referred to as “red chips”. These are companies incorporated in Hong Kong, are listed on the Hong Kong Stock Exchange and are controlled by mainland Chinese shareholders (with the general criterion of 35% shareholding (Zhang, 2008). The concept of a red chip stock began in the early 1990’s. The return of Hong Kong to Chinese sovereignty in 1997 coupled with the resurgence of economic growth in China caused a new wave of positive sentiment towards Mainland stocks from investors in Hong Kong. In

general, red chip stocks are conglomerate-like stocks in which companies would hold numerous assets of provincial or city governments in China. For example, the red chip stock company, Shanghai Industrial, has holdings in over 100 companies in Shanghai. Guangdong Investment, another red chip stock company, manages the commercial activities of one of China's wealthiest provincial governments. However, the flush of enthusiasm for foreign listings were short-lived.

Foreign investors were not keen on investing in the China's stock market. Given the various choices of investing around the world, their appetite for China's poor quality, illiquid B-shares has been low compared with trapped domestic investors. The number of companies listed simultaneously as A- and B-shares in the same period are relatively less as shown in Figure 2.

Figure 2.2: Number of IPOs for A-share, B-share and H-share (1996 and 2006.)



Source: CSMAR

2.2.2 Partial Liberalization of B-shares in 2001

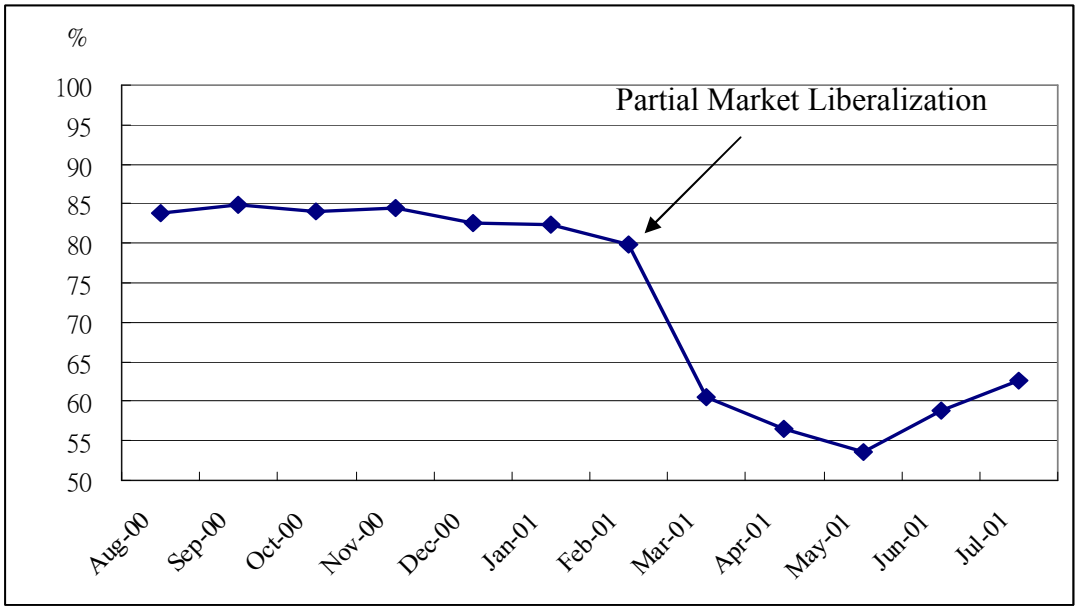
The inactive trade volume had concerned the Chinese government and the Chinese Securities Regulatory Commission (CSRC) for almost a decade. Despite the concerted effort made by the Chinese government like using securities laws and regulations to reduce market segmentation, (E.g. the passage of the Securities Law of China on July 1, 1999, recognizing equal status of shareholders of A- and B-shares (Karolyi and Li, 2003)) and to decrease the size of the average discount, this phenomenon persists.

In February 2001, the CSRC announced the opening of B-share market to local retail investors who held foreign currency accounts in an attempt to improve the trading volume of the market. In June 2001, the authority[5] further decided to open the market to all domestic residents, regardless of whether they had foreign currency accounts. Domestic individuals are allowed to trade in the B-share market by using US dollars in Shanghai and Hong Kong dollars in Shenzhen. For the first three months (between 1 March 2001 and 1 June 2001) after the opening of the B-share market, the Shanghai and Shenzhen B-share indices rose more than twice and 2.5

[5] The announcement from CSRC was stated in the "Notice on Issues related to Individual Domestic Residents Investing in Foreign Currency Stocks Listed in the Domestic Stock Markets (B-share Market)" in 2001.

times, respectively. Average daily turnover also increased to all-time high levels during the initial three-month period. In the second half of 2001, however, the B-share indices fell sharply along with the rest of the market after the announcement of a plan to reduce state-enterprise shares in order to solve the non-tradable share problem. Besides the implementation of this scheme, CSRC had introduced other measures such as the delisting of debt-ridden firms, the reduction of stamp duty and the suspension of the controversial state-enterprise shares reduction scheme (Green, 2004, p. 223). Evidently, the numerous changes were the results of the transition of policy from the short-term need for the stock market to maximize the revenues of state-controlled firms to the long-term need for market to productively manage the government's assets. However, administrative interference and direction by political interests were major obstacles to these institutional changes. The unstable rules and regulations undermined investors' confidence. As a result, average daily volumes of B-shares had fallen back to the anemic levels of the pre-reform period. The opening of the market to domestic investors should have resulted in much higher turnover but somehow, with the exception of a few months in 2001, this didn't happen. Figure 3 illustrates the short term dramatic narrowing of the price discount between the two classes of shares as B-share prices skyrocketed for the few months after the market liberalization.

Figure 2.3: B-share discount between August 2000 and July 2001



Source: Taiwan Economic Journal (TEJ)

One explanation to the poor response is that the policy does not create new opportunities to foreign investors. The A- and B-share markets remain segmented after the opening. (Ahlgren, Sjöö and Zhang (2003)). Hence, the Chinese government looked for ways to attract long-term investors to enter in the China domestic securities market.

2.2.3 Qualified Foreign Institutional Investor (QFII)

The QFII system was first introduced in November 2002. Effective from December 1, 2002, the program allows approved foreign fund institutions, insurers, securities

companies and other asset management institutions to access China's domestic capital markets including China's Class A share markets. To be qualified as a QFII, the participant needs to follow some restrictions including a capital lock-up period of between one to three years. The qualified member also needs to appoint a domestic commercial bank to act as custodian of its assets and is required to name a domestic securities company to handle trading and foreign capital remittance activities.[6] The investment scope of QFII includes: A-share stock listed in securities exchanges, treasury bonds, convertible bonds, corporate bonds, warrants and other financial products approved by CSRC. Each QFII may not hold more than 10% of total outstanding shares in one listed company and the aggregate percentage of shares held by all QFIIs should not exceed 20% of the total outstanding shares of the listed company.

To further loosen the capital control, the CSRC, the People's Bank of China (PBOC) and the State Administration of Foreign Exchange (SAFE) superseded the original QFII and issued new rules effective from September 1, 2006. By lowering the QFII threshold, the new QFII rules allow more overseas foreign institutional investors to qualify as investors in the Chinese A-share markets.

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[6] These qualifications and approval procedures were stated in the decree of China Securities Regulatory Commission (CSRC) and the People's Bank of China (PBC) on November 5, 2002.

Under the new rules, the minimum securities assets managed by QFII applicants; those that focus their businesses on long-term investment such as fund management institutions and insurance companies; should amount to 5 billion U.S. dollars for the current fiscal year, half the earlier QFII provisions. All applicants operating in insurance business must exist for at least five years before becoming eligible for QFII, a much shorter period than the previous rule of 30 years. Each QFII is now allowed to hold three securities investment accounts with each of the country's two stock exchanges as opposed to one account with each stock exchange in cooperation with their trustees and local partners in the past.

With the partial market liberalization adopted in 2001, it had attracted substantial investments into B-share market thereby narrowing the price differential in the first few months after the announcement. Only minor improvements occurred in terms of liquidity in the B-share market and reduction in average discount subsequently. Even with the announcement of growing access of foreign institutions to A-share market under the Qualified Foreign Institutional Investor (QFII) rules in November, 2002, the gap in prices between A- and B-shares still persist. In mid 2007, the listed B-shares still had an average discount of 35% to their A-shares.

2.2.4 Qualified Domestic Institutional Investor (QDII)

Apart from expanding the investment base in A-share market, Chinese regulators are also keen on draining some domestic liquidity as well as moving some of China's foreign reserves aboard in order to reduce upward pressure on the strong RMB.

Converse to QFII, QDII is an investment scheme first launched in April 2006 to let approved financial institutions in China to invest in the overseas capital markets, both for themselves and on behalf of the retail clients. The scheme was initially proposed by the Hong Kong Government in an attempt to boost the bear market in Hong Kong after the Asian financial crisis (China Daily, 2006-09-26). However, due to foreign exchange control concerns, the proposal received lukewarm response from the SAFE. With the growing pressure on the revaluation of RMB, the SAFE finally gave green light to the scheme. Banks were the first group that granted QDII licenses and quotas. As the investment was only limited to fixed-income and money market products, very low quota of QDII had been utilized. Thus, the Chinese government announced on 11 May 2007 to widen the scope by including offshore equities products. To tackle burgeoning capital further, the government has proposed to allow mainlanders to directly invest in Hong Kong. This "through train" measure scheme is indeed a welcoming scheme for investors in Hong Kong. However, till

now the plan is still on hold as the Chinese government needs to study more carefully before implementation.

The increase in spectrum of QDII products boosted the mainland's capital investing in Hong Kong equities. By increasing the quota of domestic investment in Hong Kong stock markets, the QDII program should enable an increase in information transmission and further integrate the two markets. Indeed, a convergence process in A- and H-shares took place when investors expected the imminent QDII scheme to come underway between 2003 and 2005. Yet, the benefit from the scheme did not last long. Same as with A- and B-share market, the narrowing of price discounts have subsided a few months subsequent to the announcement.

Due to this anomaly, previous academic research has tried to understand this phenomenon by asking why foreign share price discount still persists.

2.3 Literature Review

Since the introduction of B-shares in 1991, Chinese domestic and foreign markets were segmented. Domestic investors are restricted to trading only in A-shares while foreign investors only trade in B-shares. Typically when there is segmentation

between domestic and foreign investors, foreign shares trade at a premium over domestic shares and the premium is stationary (Ahlgren, Sjoo and Zhang, 2003). Stationarity likely occurs because domestic and foreign investors have the same information sets in the long run. In contrast, China's foreign B-class shares trade at a significant discount over domestic A-class shares. Moreover, since direct arbitrage is infeasible and information sets potentially different, the two investor groups determine equity prices independently of each other.

Beginning with Bailey (1994), price discovery and information diffusion between domestic and foreign investors in Chinese markets have been the subject of many papers. Research regarding the relationship between A-share and B-share pricing behavior has been conducted along several dimensions.

2.3.1 The pricing behavior and efficiency of the Chinese stock markets

The first strand of the literature uses A- and B- individual shares and market indices to examine pricing behavior and market efficiency in Chinese equity markets. Bailey (1994) examines early 1990's share prices of eight companies listed on the Shanghai stock exchanges (China Textile Machinery and Shanghai Vacuum Electron) and Shenzhen stock exchanges (China Southern Glass, China Bicycle Holdings, Huafa

Electronics, Konka Electronics, Shenzhen Petrochemicals, and Shenzhen Property & Resources Development) and finds little evidence of association between China's B-share returns and international stock returns. The paper also offers preliminary evidence on the price behaviour in China's new stock market at that time. It investigates the divergence between B-share prices and prices for their counterpart A-shares which are only available to local citizens. It concludes that discounts on B-shares relative to A- shares are inconsistent with premiums observed in other Asian capital markets and are hard to explain quantitatively. Bailey also suggests that the lack of investment alternatives and low-yield on bank deposits drive bank savings to stock investment. The high demand pushes the prices beyond what foreigners are willing to pay.

Bailey, Chung and Kang (1999) later confirm the extraordinary finding that Chinese investors pay large premiums for restricted shares relative to foreigners. The paper investigates why premiums for unrestricted equities vary widely over time, across firms and across countries. It conjectures that price differences between restricted and unrestricted shares are caused by differences in the risk exposures and risk premiums perceived by local versus foreign investors. Using stock returns of 11 countries whose stock markets feature shares restricted to locals and unrestricted

shares to foreigners, the study concludes that larger price premiums are positively correlated with foreign investor demand (e.g. international fund flows, market liquidity, country credit rating and firm size). In particular, they include a special section that discusses "the strange case of China". They offer few explanations by checking the speculative behavior in the monthly data of 10 Chinese firms. Among the tested firms, they discover that there are 4 firms with increments in unrestricted share discount when restricted share trading activity is relatively high. Apart from using "momentum" or "positive feedback trading" to explain the anomaly of discounts, they further adhere to the argument by Sun and Tong (2000) that the existence of H-share and "red chip" markets in Hong Kong provide good substitutes for the B-share market. The increase in supply of these shares traded offshore will lead to a larger B-share discount.

Ma (1996) tries to examine the mystery why China B-shares are sold at a discount unlike other markets. He considers that a lower interest rate may result in a higher A-share price; differential liquidity and trading costs may help explaining B-shares' discounts; and that if foreign investors are able to find highly correlated B shares in the market, they would invest in those stocks instead of B shares, thus making B-share prices lower. He also investigates whether change in government regulation such as

the adoption of new measures to control inflation would lead to change in price difference over time. Using weekly closing A- and B-share prices of 38 companies between August, 1992 and August 1994, he extends the international asset pricing model developed by Eun and Janakiramanan (1986). From the theoretical model, he confirms that the relative price of B share and A share depends on the investment betas. Full-period weekly returns are used to estimate the betas of A- and B-shares. The results show that cross-sectional differences between prices of A-shares and B-shares are correlated with investors' attitudes towards risk, regulatory changes and diversification value of the stocks in this emerging market.

Laurence, Cai and Qian (1997) provide early evidence regarding the weak-form efficiency of the four Chinese stock markets (Shanghai A, Shanghai B, Shenzhen A and Shenzhen B stock markets). Using 1000 daily observations for 4 Chinese stock market indices and applying the serial correlation tests, they conclude that the domestic A-share market is weak-form efficient, while the B-share market is not. They also explore the presence of causality influences between these markets but they find statistically weak linkages between the four Chinese stock markets.

Chui and Kwok (1998) examine cross-autocorrelations of A- and B- share returns.

They argue that owing to the inefficient flow of public news through Chinese media, prices of B shares may offer an important means of transmitting information to A-share investors in the Chinese stock market. They test on daily stock price between January 1993 and August 1996 and find there is a significantly positive cross-autocorrelation between B-share open-to-close returns on day_{t-1} and the corresponding A-share close-to-open returns on day_t and vice versa. This suggests that the information received from A-share investors to B-share investors or vice versa is affected by prior price movements. They also discover that returns on B-shares lead returns on A-shares. In reality, this may reflect the informational advantage of foreign investors. News reported in foreign newspaper, such as newspaper in Hong Kong, may flow back to China.

Mookerjee and Yu (1999) report evidence against the efficient market hypothesis. They use aggregate daily stock price to test for market efficiency and find both autocorrelation and seasonality in returns. The study conjectures that significant efficiencies are present on both Shanghai and Shenzhen stock exchanges. In addition, they assert that seasonal anomalies are present on both exchanges. After applying the serial correlation test and the time series model to the first differences of the logarithms of the two price index series, they document significant weekend and

holiday effects and reject the random walk implications of efficient market hypothesis.

Long, Payne and Feng (1999) analyze the impact of information transmission on market efficiency and on the price-volume relation in A- and B- shares listed on the Shanghai stock exchange. They argue that information disseminates more smoothly in the presence of institutional investors, and this might explain why B-shareholders are better informed than A-shareholders. Thus, the hypotheses mainly focus on testing the correlation between volume and price changes in A- and B-shares. Their findings are opposite to the conclusions of Mookerjee and Yu (1999). While the variance test shows that both class A and class B markets follow a random walk, the augmented Dickey-Fuller test supports the null hypothesis that Shanghai market follows a random-walk process with drift.

2.3.2 Market segmentation and price differentials

The second strand of the literature uses asymmetric information models and time series empirical tools to demonstrate that Chinese markets are not efficient. Evidently, with A-shares restricted to local residents and B-shares restricted to foreign investors, Chinese stock market was completely segmented before 2001. Thus, a number of researchers attempt to examine the cross-market differences in information

and interpretation between the two groups of investors.

Findings of a unit root in the A-share price premium and no co-integration between A- and B- share prices suggest that domestic and foreign investors have different information sets and do not share information in the long run. Sjöö and Zhang (2000) investigate what causes the information diffusion between domestic and foreign investors in emerging markets. First, they argue that financial institutions are the main foreign investors in China. These investors are more sophisticated and are able to have access to more advanced technology in analyzing data when compared with domestic investors. Domestic investors are able to obtain information from foreign investors and thus, causing prices of B-shares to lead the prices of A-shares. On the other hand, domestic investors may have better local sources and information. In this way, the prices of A-shares would lead the prices of B-shares. Hence, if different investor groups can have different comparative advantages in acquiring information, price information can flow in both directions. Contrarily, no correlation and lead-lag returns can be found if A- and B-share markets are completely segmented. By modeling the prices of 41 firms issuing both A- and B-shares as a multivariate vector correction process, they find that the direction of information diffusion is determined by the choice of stock exchange (Shanghai or Shenzhen). Foreign investors have

better information in the more liquid Shanghai stock exchange. Domestic investors have an informational advantage relative to foreign investors in the smaller and less liquid Shenzhen stock exchange. They also find that there is no co-integration between A- and B-share prices.

Chakravarty, Sarkar and Wu (1998) and Bergström and Tang (2001) argue that the A-share price premium is due to market segmentation and information differences. In particular, Chakravarty, Sarkar and Wu (1998) hypothesize that foreign investors have less information on Chinese stocks than domestic investors do. By testing on the daily prices and trading volume of 39 firms issuing both A- and B-shares and by extending an asset-pricing model based on Grossman and Stiglitz (1980) for the case of China, they document that A-share returns are more likely to lead the B-share returns. In addition, they find that B-share discount is significantly related to the proxies for informational asymmetry and to the media coverage variable. The attributes of information asymmetry are due to language barriers, different accounting standards, and lack of reliable information about the local economy and firms.

Likewise, Bergström and Tang (2001) confirm that information asymmetry between domestic investors and foreign investors is one of the significant determinants in

explaining the variation in the discount on B-shares. They explore the determinants by investigating the illiquid trading of B-shares, diversification benefits from investing in B-shares, clientele bias, and risk-free return differentials between foreign and domestic investors. Using daily closing prices of 79 companies for the period between January 1995 and August 1999, they investigate the company specific factors and confirms the findings of Chakravarty , Sarkar and Wu (1998) that information asymmetry and clientele bias are significant in determining the discount on B shares. Furthermore, they identify the significance of two more determinants; relative illiquidity of B shares and the diversification benefits of B-shares in the cross-sectional analysis. They further employ the time series analysis and confirm the explanatory power of risk-free return difference and foreign exchange rate risk for the time variations in the discount.

Chan, Menkveld and Yang (2008) examine the effect of information asymmetry on equity prices in the domestic A- and foreign B-share market based on micro-structure models – the price impact coefficient, the adverse selection component of the spread and the probability of informed trading. They find that their measures of information asymmetry explain a significant portion of cross-sectional variation in B-share discounts, even after controlling for the influence of other variables that proxy for

trading activity, speculative behavior and stock momentum.

Other researchers examine macro-economic variables to explain the discount phenomenon. Foreign investors are more sensitive to macro-economic factors like currency risk as explained by Sun and Tong (2000). B-share prices experience deeper discounts when China's inflation goes up and its official reserve deteriorates. The consistently high economic growth rates estimated by Chinese government officials may serve as a basis for domestic investors to expect higher firm's growth rates. They also propose another argument in their study that the existence of H-share and "red chip" stock markets provides good substitutes for B-share markets and thus makes demand for B shares quite elastic.

Karolyi and Li (2003) employ an event study and analyze the consequence of regulatory change by investigating the cross-sectional variation in the changes in the B-share discount before and after the opening of the B-share market in February 2001. Since small cap stocks experienced larger discount prior to February 2001 and lower discount after February 2001, the authors conclude that information asymmetries exist between local and foreign investors in China. The finding is consistent with evidence of home bias puzzle; foreign investors should have less of an information

disadvantage than local investors for large firms as suggested by Kang and Stulz (1997) when they analyze the foreign portfolio equity ownership in Japan.

Apart from the segmentation theory, other models have been proposed to explain the discount phenomenon. They include the liquidity differential model and the risk differential model.

2.3.3 Risk differentials

The third strand of literature relates to the assertion that domestic and foreign investors differ in their risk aversion. One possible reason is that Chinese markets are highly speculative and attract highly risk tolerant investors who tend to push up domestic share prices (Mei, Sheinkman, and Xiong (2003)). The paper examines the speculative behavior using overconfidence belief to derive the heterogeneous beliefs dynamics among investors. The study focuses on the cross-sectional correlation between A-B share premia and the turnover rates. They find that A-share turnover can explain a large portion of the monthly cross-sectional variation in A-B share premium between the period 1994 and 2000.

Another reason may be due to differences in risk exposures between domestic and

foreign investors arising out of capital controls that restrict the domestic investors from diversifying overseas. As a consequence, the risk of A- and B- shares is evaluated based on Chinese market return versus world market return which are two completely different investment benchmarks.

The empirical findings are mixed. Extending the equilibrium international asset pricing model of Eun and Janakiramanan (1986), Eun, Janakiramanan and Lee (2001) find that the B-share discount is positively related to the covariance risk of B-shares with the Morgan Stanley world market index; yet, they fail to find a negative relation with the covariance risk of A-shares and the Chinese market index. While Sun and Tong (2000) also find a positive relationship between B-share discount and risk levels, Chen, Lee and Rui (2001) apply the same proxy to the ratio of A to B-share return variances but find no significant results.

Fernald and Rogers (2002) echo the use of risk differential as the explanation to price discount. They posit that the apparently low expected returns of Chinese investors reflect the lack of investment alternatives in China. The limited alternative investments such as bank deposits tend to pay interest below world level. The argument on fewer opportunities to diversify, the difficulties and the risks encountered

to arbitrage is consistent with the simplest asset pricing model.

2.3.4 Liquidity differentials

The fourth strand of the literature uses the trading activity framework of Amihud and Mendelson (1986) to explain the price difference. Since A-share markets have been consistently and predominately more liquid than B-share markets, B-shares should have a higher expected return and be priced lower to compensate investors for increased trading costs. Chen, Lee and Rui (2001) find supportive evidence based on the relative trading volume (the ratio of trading volume in B-share stocks to total trading volume) and relative turnover of B- and A-shares. They find that both proxies are strongly negatively related to the discount using the GMM estimation and monthly observations from 1992 and 1997 on the panel data model.

Chen and Xiong (2001) find similar results by comparing restricted institutional shares with their unrestricted counterparts. Using two sets of transaction data (2577 auction transactions and 242 private transfers) from the period of August 2000 to July 2001, the results show that the average discount for restricted institutional shares relative to their floating counterpart is 77.93% and 85.59% respectively, based on auction and private transfers. Thus they conclude that the price for illiquidity is high,

significantly raising the cost of capital. Moreover, the better liquidity afforded by auctions can be observed by the better prices for restricted institutional shareholders.

Jiang and Wang (2004) also find support for the liquidity hypothesis. They investigate the relationship between H-share and A-share returns and examine why H-shares sell at huge discounts relative to A-shares. In general, H-shares have higher trading volumes and larger bid-ask spreads but lower turnover relative to A-shares. To examine the liquidity effect on the H-share price discount, they adopt two measures in the regression model: a bid-ask spread-based measure and a volume-based proxy. Their result shows a time-varying H-share price discount relative to A-shares, and this discount is highly correlated with domestic and foreign market factors and relative market illiquidity. Specifically, they find that the coefficient for the relative liquidity measure is significant and negative for all sample firms which confirm their hypothesis that H-share price discount is an inverse function of the relative liquidity.

Unlike the prior literature which focuses primarily on analyzing mean effects, the purpose of this study is to determine the major factors that drive the *variability* of the discount using the variance decomposition methodology. The next section describes

the variance decomposition methodology as it applies to the discount.

2.3.5 The development of Variance Decomposition Model

Following Campbell and Shiller's (1988a, b) log-linear model, Campbell (1991) expresses the unexpected real stock return as a linear function of changes in rational expectations of future dividend growth and future stock returns. He decomposes the variance of the market returns into the variances and covariance terms of the dividend growth news and the expected-return news, and finds that stock returns move primarily by the latter. Campbell and Ammer (1993) document similar results when adding bond market data to the VAR system. Recently, Vuolteenaho (2002) extends the log-linear dynamic dividend models at the firm level. He incorporates accounting numbers for dividends via the accounting clean surplus identity. Using the framework, we try to explore and explain the relative value relevance of cash flow and expected return components as drivers of price differences of the inter-listed firms in China. Based on the same analogy that cash flow information is largely firm specific whereas expected-return information is predominately driven by systematic or macroeconomic components, I aim to give details as to whether the variation of the price discount of B- or H- shares relative to A-shares is mainly driven by expected return news or cash flow news. If an expected return shock takes place, it would

cause changes in expected return news in both domestic A-share and foreign B- or H-share markets. Yet, the two changes will move independently due to the market segmentation. This difference between the two changes would cause variation of the price discount. Likewise, this argument can be applied to a cash flow shock.

2.4. The Variance Decomposition of the Foreign Share Price Discount

Campbell and Shiller (1988a, b), Campbell (1991) and Campbell and Ammer (1993) develop a return decomposition based on a log-linear dividend growth model. The stickiness of dividends for dividend paying firms and the fact that many firms do not currently pay dividends limit the potential empirical usefulness of the log-linear dividend growth model. To attenuate these problems, Vuolteenaho (2002) developed a return decomposition that uses the accounting Clean Surplus identity—the change in book value equity equals earnings less dividends--to replace dividends with return on book value equity (ROE). In addition to the clean surplus identify, two additional assumptions are required for this transformation. First, book equity, and market equity have to be strictly positive and net dividends have to be non-negative. Second, the difference between log book equity and log market equity has to be stationary.

In what follows, the Vuolteenaho (2002) model is applied to decompose returns to A-shares, to B-shares and to the price discount. The basic Vuolteenaho (2002) model can be written in the form:[7]

$$b_t - p_t = k_t + E_t\left[\sum_{j=0}^{\infty}\rho^j r_{t+1+j} - \sum_{j=0}^{\infty}\rho^j e_{t+1+j}\right] \quad (1)$$

where E_t is the expectation operator based on all information available at time t, the log cum dividend stock return (gross of the risk-free rate) is denoted by r_t, the log return on book value equity by e_t, and an approximation error (which ensure the equality of the relation) by k_t.[8] Following Vuolteenaho (2002), I also assume that the discount rate ρ--which is estimated as one less the aggregate dividend-price ratio--is a constant close to (but below) one.

Equation (1) permits the decomposition of the log book-to-market ratio for each share type into an expected return news component and a cash flow news component based on accounting numbers underlying the specific share. However, in order to obtain a similar decomposition for the price discount, I need to assume further that the book

[7] In contrast to Vuolteenaho (2002) who decomposes unexpected returns, our focus is on the price discount. As a consequence, I use his approach to decompose the unexpected (log) book-to-market ratio instead.

[8] Since Vuolteenaho (2002) elects to subtract the risk-free rate from market returns, he is forced to subtract the risk-free rate from either earnings news or expected return news on the right-hand side of the equation. To avoid complexity of notation and without loss of generality, I define returns gross of the risk-free rate.

values of equity are identical based on the accounting for A-shares and B-shares. As I show further below, this assumption is often satisfied empirically, at least to a close approximation.[9] Appendix A formally derives the decomposition for the price discount, which takes the form:

$$\begin{aligned}\left(p_t^B - p_t^A\right) - E_{t-1}\left(p_t^B - p_t^A\right) = &\left[\Delta E_t^B\left(\sum_{j=0}^{\infty}\rho_B^j(e_{t+1+j})\right) - \Delta E_t^A\left(\sum_{j=0}^{\infty}\rho_A^j(e_{t+1+j})\right)\right] \\ &-\left[\Delta E_t^B\left(\sum_{j=0}^{\infty}\rho_B^j(r_{t+1+j}^B)\right) - \Delta E_t^A\left(\sum_{j=0}^{\infty}\rho_A^j(r_{t+1+j}^A)\right)\right] + k_t\end{aligned} \tag{2}$$

where ΔE_t^B and ΔE_t^A denote the revision in expectations from time t-1 to t for A-shares and B-shares, respectively.

I define $E_{t-1}(p_t^B - p_t^A) \equiv E_{t-1}^B(p_t^B - b_t^B) - E_{t-1}^A(p_t^A - b_t^A)$; and I add the subscript to ρ to distinguish it for A-shares and B-shares. The left-hand side of equation (2) represents the revision to the foreign share price discount. The first square-bracketed term on the right-hand side of Equation (2) is the difference in cash flow news between B-shares and A-shares. The second term on the right-hand side of Equation (2) is the difference in cash flow news between the two share types. Thus, an unexpected upward revision in the B-share price discount is due either to an increase of expected return news for A-shares relative to B-shares, or a decrease in cash flow

[9] I make this assumption at the end of the derivation of equation (2) in order to minimize its impact on the theoretical relation.

news of A-shares relative to B-shares, or both. To further analyze which of the two effects dominates, it is convenient to define the two components of price discounts as the difference in cash flow news (η_t^{CN}) and the difference in discount rate news (η_t^{DN}) where:

$$\eta_t^{CN} \equiv \Delta E_t^B \left(\sum_{j=0}^{\infty} \rho_B^j (e_{t+1+j}^B) \right) - \Delta E_t^A \left(\sum_{j=0}^{\infty} \rho_A^j (e_{t+1+j}^A) \right) \quad (3a)$$

$$\eta_t^{DN} = \Delta E_t^B \left(\sum_{j=0}^{\infty} \rho_B^j (r_{t+1+j}^B) \right) - \Delta E_t^A \left(\sum_{j=0}^{\infty} \rho_A^j (r_{t+1+j}^A) \right). \quad (3b)$$

Substituting (3a) and (3b) into (2) and taking variances yields the three component variance decomposition:

$$Var\left[Disc_t - E_{t-1}\left(Disc_t \right) \right] \approx Var\left(\eta_t^{CN} \right) + \text{var}(\eta_t^{DN}) - 2Cov\left(\eta_t^{CN}, \eta_t^{DN} \right) \quad (4)$$

where the discount is denoted as $Disc_t = p_t^B - p_t^A$.

2.5 Sample and Descriptive Statistics

2.5.1 Data Selection

The sample consists of all the firms listed on the A-share, B-share and H-share markets. All accounting data and stock information (monthly stock returns, earnings, shares outstanding, dividends, and book values) are obtained from the Taiwan Economic Journal (*TEJ*) for the period 1995 to 2006. No financial firms (banks and insurance companies) are listed during this period. Firms that are missing annual

data on one of the three variables, stock price, earnings or book values are deleted from the sample for that year. Each of the monthly stock returns, earnings and book value must have at least one observation during each preceding year. I also require two lags of annual returns. Annual returns are measured from April of year t to March of year $t+1$. Imposing these restrictions yields a sample of 56 firms (335 firm-year observations) with A- and B-shares, and an additional 30 firms (165 firm-year observations) with A- and H-shares. Because aggregate dividend-price ratios differ across markets, I set $\rho = 0.9809$ for A-shares, $\rho = 0.9207$ for B-shares and $\rho = 0.9660$ for H-shares based on the discussion in Campbell, Lo and MacKinlay (1997, p. 261).

2.5.2 Variable Definitions

Annual stock returns are computed using the geometric mean of the monthly returns. Missing book values are estimated via the Clean Surplus identity by adding current net income less current dividends to last year's book value of equity. Market values are measured three months after the fiscal year end. Consistent with Vuolteenaho (2002), ROE is computed as earnings over last period's book value.

2.5.3 Descriptive Statistics

Tables 2.1a and 2.1b provide descriptive statistics. The descriptive statistics in Table 2.1a are computed for the entire sample of A- and B-shares listed on the Shanghai Stock Exchange (SHSE) and the Shenzhen Stock Exchange (SZSE); the two national exchanges of China during the period 1995 to 2006. The descriptive statistics shown in Table 2.1b are computed for the entire sample of A- and H-shares listed on the SHSE, SZSE and the Hong Kong Stock Exchanges. The results for each panel are reported for three periods: the total sample period (1995-2006), the sub-sample period from 1995 to 2000 and the sub-sample period from 2001 to 2006. I break down the data into two subsample periods (1996 – 2001 and 2001 – 2006) for three reasons. First, the breakpoint is roughly the middle point of my sample, which offers two balanced subsamples for a robustness check. Second, before 2001, the price discount phenomenon was far more significant in both B- and H-share markets absent the implementation of substantive market regulations and also because the H-share market was gravely affected by the Asian Financial crisis (in 1997 and 1998). Third, the relaxation of restrictions on local investment in 2001 and the increased access by foreign institutions under the QFII program (as well as the expectation of its enactment) caused the price discount between domestic and foreign shares to narrow.

The data presented in tables 2.1a and 2.1b are comparable to those of the extant studies on China's stock market for the period under consideration (Jiang and Wang, 2004; Jia, Sun and Tong, 2005 and Lin and Chen, 2005). Panel A of Table 2.1a (Table 2.1b) reports the distribution of the price discount and the log book value differences between A-shares and B-shares (H-shares). The price discount is the log transformed relative price difference between A-shares and B-shares (H-shares). Thus, a -1.0 in these tables signifies that the price of the B- or H-share is about 37% of the price of the A-share of the inter-listed firm.

These tables reveal that the price discount decreased in the more recent period. As already noted, the partial price convergence in A- and B-shares can be explained partly by regulatory changes such as the market liberalization in 2001 and the QFII program of 2002.[10] The new administrative rule on the investment of QFIIs induced institutional investors (including fund management companies and insurance companies managing long-term fund assets) to invest in the A-share market. Although this should have increased the discount, in fact, the discount narrowed since foreign and domestic investors expected the Chinese government to gradually merge

[10] On November 5, 2002 the China Securities Regulatory Commission (CSRC) and the People's Bank of China (PBOC) introduced the Qualified Foreign Institutional Investor program as a provision for foreign capital to access China's financial market.

the two share types. While the impact was limited, the price differential in fact narrowed. For example, the average price discount of Eastern Communications (A-share code: 600776; B-share code: 900941) dropped from -1.85 in earlier sub-sample period to -1.02 in the more recent sub-sample period.

The convergence process in A- and H-share prices stemmed initially from expectations regarding the imminent implementation of the QDII proposal, designed to allow controlled and limited capital outflows from China to Hong Kong between 2003 and 2005. The PRC state authorities eventually launched the QDII programme in April 2006 allowing domestic financial institutions to invest in overseas fixed income, equities and derivatives in foreign currencies. However, three months after implementation in July 2006, China's foreign exchange authority granted only limited overseas investment of 10.3 billion U.S. dollars to eight qualified domestic institutional investors. In 2007, the scheme was expanded to include trust companies and brokerage houses.

One notable feature of the summary statistics in Panel A of Tables 2.1(a) and 2.1(b) is that differences in (log) book value per share of A- and B- shares appear to be quite small. This result facilitates simplification of the variance decomposition for the

price discount (See Appendix A).

Panels B of Tables (2.1a) and (2.1b) show the distribution of the log return on equity, log market returns, and the log book-to-market ratio for A-shares. Panel C of Table 2.1a (Table 2.1b) lists the distribution of the log return on equity, log market returns, and the log book-to-market ratio for B-shares (H-shares). These panels illustrate that the earlier subsample period exhibits a higher return on equity and a higher market return on average than the later subsample period in the case of A-shares and B-shares. Conversely, in the case of H-shares, the later sub-sample period has a higher return on equity and a higher market return on average as compared to the earlier sub-sample period. This is a consequence of the resurgent H-share market between 2001 and 2006 which was positively affected by expectations of the QDII program and with the move to allow China's National Social Security Fund to invest in Hong Kong during the upward stock movement period after the recovery from the SARS outbreak. In addition, since H-shares are listed on the Hong Kong stock exchange, geographical trading proximity and the well-known home bias effect may have lead to the co-movement of H-shares with the increasing Hong Kong share prices.[11]

[11] These reforms may help to partially explain why unexpected price discounts are largely driven by the difference in discount rate news rather than cash flow news.

Finally, there are large differences between the log book-to-market ratios of A-shares and B-shares (and H-shares) arising out of price discounts in the B-share (H-share) markets. With the exception of the later sub-sample period in the case of H-shares, average and median ratios are positive indicating that book values are greater than market values. Indeed, the mean log book-to-market ratio of 1.29 for B-shares in the earlier sub-sample period, translates into a book value per share 3.6 times greater than the market value per share.

[Table 2.1: here]

2.6 Empirical Results

2.6.1 VAR Estimation

To implement the variance decomposition of equation (4), I follow Campbell (1991), Campbell and Ammer (1993), Vuolteenaho (2002) and Callen and Segal (2004) and use a log-linear vector autoregressive (VAR) model. Formally, let $z^M{}_t$ be a vector of state variables describing market M at time t, where M = A, B, H. The first element of $z^M{}_t$ is the inter-listed firm's log book to market ratio, log (one plus) cum dividend market return and the log (one plus) return on equity. A dual-listed firm state vector is assumed to follow the log-linear dynamic:

$$z_t^M = C^M + \Gamma^M z_{t-1}^M + \varepsilon_t^M \tag{5}$$

where

$$z_t^M = \begin{pmatrix} b_t^M - p_t^M \\ r_t^M \\ e_t^M \end{pmatrix}, \quad C^M = \begin{pmatrix} c_1^M \\ c_2^M \\ c_3^M \end{pmatrix} \text{ and } \varepsilon_t^M = \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{pmatrix}.$$

The error term $\varepsilon^M{}_t$ is assumed to have a covariance matrix $\Sigma^M = E(\varepsilon^M{}_t \varepsilon^{M\prime}{}_t)$ and to be independent of everything known at *t-1*.

The parsimonious short VAR specification is limited to one lag of log return on equity, log market return, and log book-to-market ratio. Taking expectations on both sides of equation (5) yields:

$$E_{t-1}^M \left(z_{t+1+j}^M \right) = \left[I + \Gamma^M + \left(\Gamma^M \right)^2 + \ldots + \left(\Gamma^M \right)^j \right] C^M + \left(\Gamma^M \right)^{j+1} E_{t-1}^M \left(z_t^M \right). \tag{6}$$

Substituting equation (6) into the equations (3a) and (3b) yields the difference in expected return news and the difference in cash flow news between the A-market and the B-market (or H-market). In particular, Appendix B shows that:

$$\eta_t^{CN} = e_3' \Gamma^B (I - \rho_B \Gamma^B)^{-1} \varepsilon_t^B - e_3' \Gamma^A (I - \rho_A \Gamma^A)^{-1} \varepsilon_t^A \tag{7}$$

$$\eta_t^{DN} = e_2' \Gamma^B (I - \rho_B \Gamma^B)^{-1} \varepsilon_t^B - e_2' \Gamma^A (I - \rho_A \Gamma^A)^{-1} \varepsilon_t^A \tag{8}$$

where $e_3 = (0,0,1)$ and $e_2 = (0,1,0)$. Taking variances of equations (7) and (8), respectively, gives the expressions:

$$
\begin{aligned}
Var(\eta_t^{CN}) = {} & e_3' \Gamma^B (I - \rho_B \Gamma^B)^{-1} \Sigma^B \left[e_3' \Gamma^B (I - \rho_B \Gamma^B)^{-1} \right]' \\
& + e_3' \Gamma^A (I - \rho_A \Gamma^A)^{-1} \Sigma^A \left[e_3' \Gamma^A (I - \rho_A \Gamma^A)^{-1} \right]' \\
& + 2 e_3' \Gamma^B (I - \rho_B \Gamma^B)^{-1} \Sigma^{AB} \left[e_3' \Gamma^A (I - \rho_A \Gamma^A)^{-1} \right]'
\end{aligned} \tag{9}
$$

$$
\begin{aligned}
Var(\eta_t^{DN}) = {} & e_2' \Gamma^B (I - \rho_B \Gamma^B)^{-1} \Sigma^B \left[e_2' \Gamma^B (I - \rho_B \Gamma^B)^{-1} \right]' \\
& + e_2' \Gamma^A (I - \rho_A \Gamma^A)^{-1} \Sigma^A \left[e_2' \Gamma^A (I - \rho_A \Gamma^A)^{-1} \right]' \\
& + 2 e_2' \Gamma^B (I - \rho_B \Gamma^B)^{-1} \Sigma^{AB} \left[e_2' \Gamma^A (I - \rho_A \Gamma^A)^{-1} \right]' .
\end{aligned} \tag{10}
$$

Proofs of these formulations are found in Appendix B.

The long VAR specification allows for richer lag structure of two lags for each of the three state variables. The details of the derivation of the long-VAR are presented in Appendix C.

I follow Vuolteenaho's (2002) approach for estimating the VAR coefficient matrix by trading off efficiency for robustness and simplicity. The VAR is estimated using weighted least squares on the panel data, with one pooled prediction regression per state variable. Each annual cross-section is weighted equally by deflating the data for each firm-year by the number of firms in the cross-section of that year.

2.6.2 Variance Decomposition Results in the Separate Markets

Panel A of Table 2.2a (Table 2.2b) show the estimated parameters of the short VAR for

the A-shares and B-shares (H-shares) and the associated robust standard errors derived from the Shao and Rao (1993) jackknife procedure. Based on the significant (two-tailed) parameter estimates, Table 2.2a indicates that the book-to-market ratio is positively affected by its own lag in the A-market and also by the return on equity in the B-market. Return on equity is positively affected by its own lag in both markets and also by past market returns in the A market. Market returns are related positively to the past book-to-market ratio in both markets. The results for Table 2.2b indicate that the book-to-market ratio is positively affected by its own lag in the H-market and also by the return on equity in the A-market. Returns are positively affected by past book to market ratios and past returns. Return on equity is negatively related to the past book-to-market ratio in the H-market and market returns are positively affected by the past book-to-market ratio in both markets.

Panel B of Table 2.2a (Table 2.2b) shows the short and long VAR variance decompositions for A- and B-shares (A- and H-shares). Variance terms are almost always statistically significant but some covariance terms are not. Also, covariance terms tend to be smaller in absolute value than the corresponding variance terms. The variance decomposition of expected return news and cash flow news for A-shares differs markedly from the variance decomposition of B-shares and H-shares. More

specifically, I find that the A-shares show highly significant (1% level) expected return news variances and cash flow news variances (5% level) for both the short and long VAR estimates. Covariances are small and not significant. Importantly, expected return news variances are significantly greater than cash flow news variances for three of the four VAR decompositions (Tables 2.2a and 2.2b). B-shares show (highly) significant expected return news and cash flow news variances (1% level) for both the short and long VAR. Covariances are significant as well. H-shares show insignificant expected return news variances and significant cash flow news variances (5% level) for both short and long-VAR estimates. Importantly, expected return news variances are not significantly different from cash flow news variances both in the case of B-shares and H-shares for both short and long-VARS. Overall these results suggest that expected return news is the dominant driver of returns in the domestic A-market but not in the foreign B- or H-markets.

These results are accentuated by the analyses in Panel C of Tables 2.2a and 2.2b. This Panel shows that expected return news explains from 67% to 85% of the return variation in the domestic A-market by comparison to cash flow news which explains only from 34% to 47% of the return variation.[12] In contradistinction, expected return

[12] These percentages do not add to 100% because of the covariances.

news explains only from 16% to 23% of the return variation in the foreign B- and H-markets by comparison to cash flow news that explains from 36% to 56% of the return variation in these markets. The remaining percentage is explained by the covariance between cash flow news and expected return news.

[Table 2.2: here]

2.6.3 Variance Decomposition Results for the Price Discount

Tables 2.3a and 2.3b provide the variance decomposition results for the price discount, the primary focus of this study. Panel A of Table 2.3a shows that the variances of the expected return news differences between A-shares and B-shares are significant (5% level) both for the short-and long-VARs, whereas the variances of the cash flow news differences are not significant. Moreover, the variances of these expected return differences are significantly greater than the variances of the cash flow differences for both the short- and long-VAR estimates. Panel B of Table 2.3a shows that the variances of the expected return news differences between A-shares and B-shares explain from 40% to 74% of the variability of the price discount. Table 2.3b shows similar results for differences between A-shares and H-shares.

Overall, Tables 2.3a and 2.3b indicate that expected return news is far more crucial

than cash flow news in driving the variation of the price discount. This appears to come abut because investors in these segmented markets react relatively similarly to cash flow news but react very differently from expected return news. These results are consistent with the hypothesis that corporate financial reports are less important for driving the price discount than are systematic macroeconomic factors such as exchange rate changes, regulatory changes, and governmental large-scale interventions.

[Table 2.3: here]

2.7 Robustness Analysis

2.7.1 Further Evidence on Cash Flow News- ERC Analysis

Chen and Zhao (2008) argue that the approach of directly estimating discount rate news but backing out cash flow news residually from unexpected returns has potentially serious limitations. They find that minor changes in model specification can lead to opposite conclusions. In contrast to the findings of previous studies (Campbell and Ammer (1993) and Campbell and Vuolteenaho (2004)), they find that the estimated variance of the cash flow news at the aggregate level is at least equal to or larger than the discount rate news. To mitigate the concern that my findings may change with different specifications, I model cash flow news directly rather than

residually as suggested by Chen and Zhao (2008). One way to deal with this model uncertainty is to apply the earnings response coefficient model. The results of the variance decomposition analyses suggest that investors in Chinese markets A-shares are relatively unconcerned with accounting information by comparison to investors in B- and H-shares. To bolster this claim, I further undertake an Earnings Response Coefficient (ERC) analysis, which focuses on conditional mean drivers of returns as opposed to volatility drivers of a variance decomposition analysis (Callen (2009)). Specifically, I regress the change in the price discount on the standardized change in firm earnings (and firm cash flows):

$$(p_{it}^{B} - p_{it}^{A}) - (p_{it-1}^{B} - p_{it-1}^{A}) = \alpha + \beta^{B} SU_{it}^{B} + \beta^{A} SU_{it}^{A} + \varepsilon_{it}$$

where $(p_{it}^{B} - p_{it}^{A}) - (p_{it-1}^{B} - p_{it-1}^{A})$ denotes the change in the logarithms of the price discount between A- and B-shares of firm i, and $E_{it}^{B} - E_{it-1}^{B}$ and $E_{it}^{A} - E_{it-1}^{A}$ denote the changes in earnings of A- and B-shares, respectively. The standardized unexpected earnings (cash flows) is measured as:

$$SU_{it}^{B} = \frac{E_{it}^{B} - E_{it-1}^{B}}{P_{it-1}^{B}} \text{ or } \frac{CF_{it} - CF_{it-1}}{P_{it-1}^{B}} \text{ and } SU_{it}^{A} = \frac{E_{it}^{A} - E_{it-1}^{A}}{P_{it-1}^{A}} \text{ or } \frac{CF_{it} - CF_{it-1}}{P_{it-1}^{A}}$$

where CF_{it} is the cash flow of firm i. The latter terms are normalized by prior period prices, P_{t-1}^{B} and P_{t-1}^{A}, respectively in order to standardize the unexpected earnings. In an alternative approach, I replace earnings by operating cash flows (CF_{it}) and define SU_{it} as standardized unexpected cash flows.

The estimated regression for A- and B-shares, as reported in Table 2.4a, yields an adjusted R^2 of less than 1%. The estimated coefficients are also insignificant at conventional levels, suggesting that unexpected earnings fail to explain the change in the price discount between A- and B-shares. The mean of the standardized unexpected earnings of A- and B-shares are 0.000 and -0.004. Substituting the means back into the equation shows that the effect on unexpected return is trivial. Table 2.4a also regresses the change in the price discount on the individual standardized unexpected earnings with similar results. Qualitatively similar results are obtained by using operating cash flows instead of earnings. Table 2.4b shows similar results for A- and H-shares, which is consistent with my contention that corporate financial reports are less important for driving the price discount in Chinese markets.

[Table 2.4: here]

2.7.2 Violation of Clean Surplus

Most listed firms are carves-out of State Owned Enterprises (SOE) with the parent SOE controlling ownership using non-tradable shares. Since non-tradable shares do not have an estimable market value, I perform the analysis on a per share basis rather

than on a total share basis. However, per share valuation violates the Clean Surplus Identity if the number of shares increases or decreases. I perform a robustness check by re-estimating the model for a sub-sample of A- and B-share firms (298 observations) that had no change in shares outstanding during the period between 1996 and 2006. The results are consistent with my main findings as shown in Table 2.5 and Table 2.6. I did not perform a similar analysis for A- and H-shares because of the limited number of H-share observations that had no change in shares outstanding.

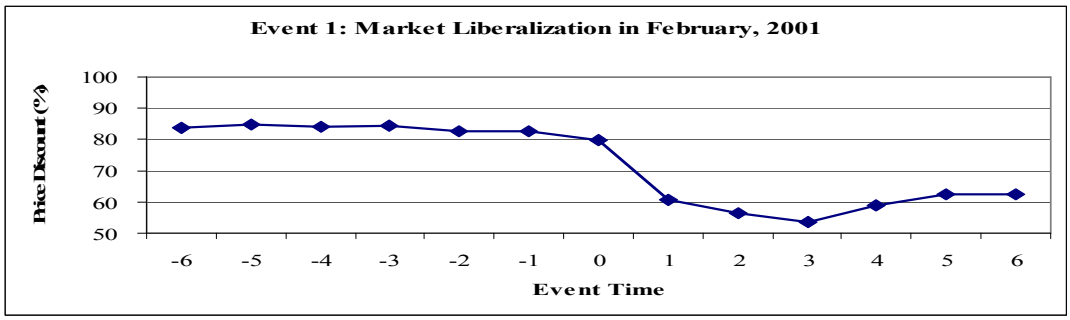
[Table 2.5-2.6: here]

2.7.3 Event Studies

To further examine the impact of the policy announcements on the price discount, I conducted three event studies (MacKinlay, 1997) using 41 firms for A- and B-shares and 24 firms for A- and H-shares to confirm my findings. All the three events support the hypothesize that the difference in expected return news between the domestic and foreign markets has a much greater effect on driving the price discount than cash flow news differences. The first price discount plot (Figure 2.4a) shows that the gap in prices on A- and B-shares has narrowed substantially after the announcement of partial market liberalization in February 2001. Panel A of Table

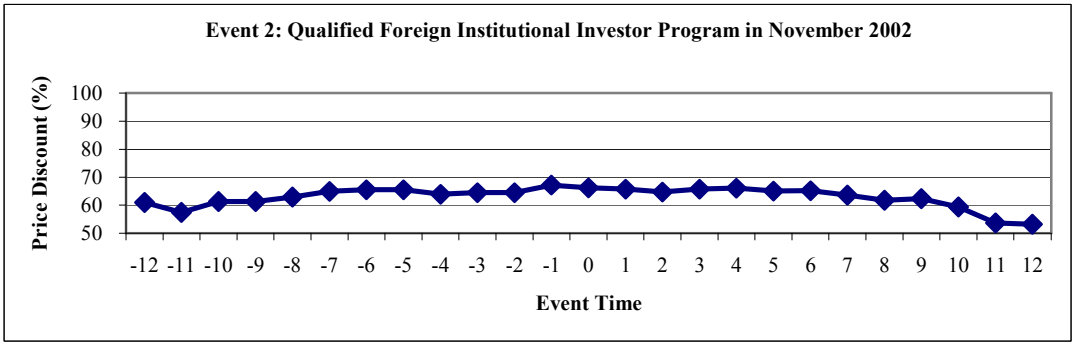
2.7 supplements the findings. The mean difference between the price discounts of the pre- and post-event windows is statistically significant.

Figure 2.4a:



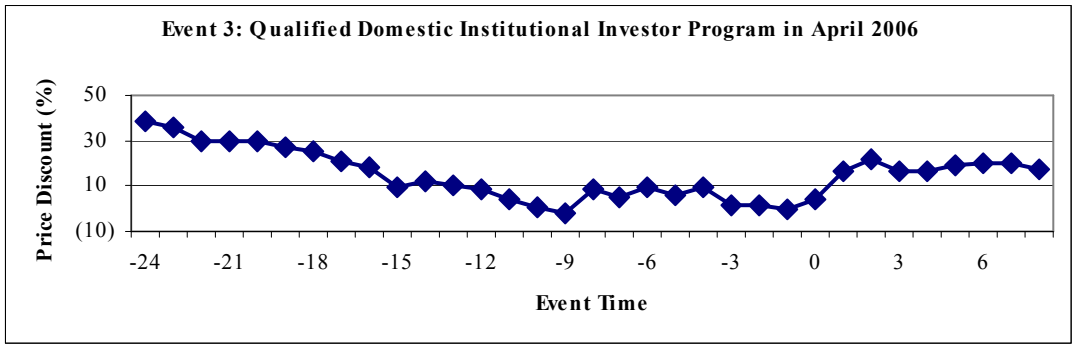
The second plot (Figure 2.4b) illustrates a less pronounced drift after the announcement of the QFII in November 2002 since the A- and B-share market learns about the forthcoming announcement and there was a convergence obtained from the first major macro-economic news between March 2001 and December 2001. As such, I do not see any significance between the mean difference of the price discounts between the pre- and post event windows in panel B of table 2.7.

Figure 4b:



The third plot (Figure 2.4c) further confirms that it is primarily macro-economic news that drives the price discount rather than idiosyncratic cash flow news. The downward drift started in 2003 when Hong Kong investors expected the imminent implementation of the QDII proposal, designed to allow controlled and limited capital outflows from China to Hong Kong. Subsequent to the two year speculation, the PRC state authorities eventually launched the QDII programme in April 2006 allowing domestic financial institutions to invest in overseas fixed income, equities and derivatives in foreign currencies. In the days after the announcement, the price discount slightly diverges before it becomes stable. This can be supported by the significance of the test for the mean difference between the pre- and post-event windows.

Figure 2.4c:



[Table 2.7: here]

2.7.4 The Parameter ρ

For annual US data, Campbell, Lo and MacKinlay. (1997) and Vuolteenaho (2002) choose ρ in the range [0.96, 0.97]. As ρ is the reciprocal of one plus the aggregate log dividend-price ratio (see Ch. 7 of Campbell (1997)), I employ other values of ρ for the A- and B-share market comparisons and the A- and H-share market comparisons since aggregate dividend-price ratios vary across markets. To ensure that the results are robust, I re-estimate the results for range of ρ values. Foreign B- and H- shares have lower share prices compared to A-shares so the former should also have higher average log dividend-price ratios. Therefore, I let ρ take values between 0.95 and 0.99 for domestic shares and between 0.90 and 0.95 for foreign shares. The results prove to be consistent with my previous findings.

2.8 Conclusion

Vuolteenaho (2002) argues that cash flow news is more likely to reflect firm-specific idiosyncratic news, whereas expected return news is more likely to reflect systematic macro-economic news. I extend his framework to investigate the drivers of the price discount phenomenon in Chinese equity markets.

I find that investors in the two segmented markets react to cash flow news similarly, but react to expected return news quite differently, thus causing expected return news to be a much more important driver of the price discount than cash flow news in determining the variation of price discount. The results indicate that market regulations and macro-economic policies seem to be more important for driving local share returns. Further, I find that the unexpected variability of the price discount of A-shares is driven primarily by expected return news, whereas the unexpected variability of the price discount of B- and H-shares is driven primarily by cash flow news. A possible reason for this finding is that the price discount of domestic A-shares is affected more by the perceptions of market regulatory reforms and macro-economic policy shifts, quite typical in the Chinese context, than idiosyncratic factors. Since B- and H-shareholders are typically foreign institutional investors, their investment behavior maybe more akin to US investors for whom the information contained in corporate reports is of central importance.[13]

[13] These results are consistent with the earlier study by Sami and Zhou (2004) who find that accounting information in the B- and H-share market is more relevant than in A-share market. This is a relative statement. Accounting information is likely to be important to Chinese investors as well but not as important as macroeconomic factors. For example, Lin and Chen (2005) show that accounting numbers based on domestic accounting standards are more relevant in the Chinese stock market by comparison to accounting numbers based on International Accounting Standards.

Table 2.1a

Descriptive Statistics for A- and B-shares

Variable	Period	Mean	St. Dev	Min	25%-pct	Median	75%-pct	Maximum
Panel A: Descriptive Statistics								
Price Disc	1	-1.0143	0.6945	-2.5556	-1.5548	-0.9652	-0.3842	-0.2609
	2	-1.1736	0.6857	-2.5556	-1.7027	-1.1098	-0.6514	0.1531
	3	-0.9323	0.6861	-2.2220	-1.5209	-0.6893	-0.3353	0.2609
Book Value	1	0.0012	0.0217	-0.0570	-0.0095	0.0000	0.0126	0.0599
Differences	2	0.0037	0.0271	-0.0570	-0.0124	0.0021	0.0210	0.0599
	3	-0.0001	0.0183	-0.0563	-0.0084	0.0000	0.0097	0.0462
Panel B: Descriptive Statistics for A Shares								
ROE	1	0.0885	0.16525	-2.1453	0.0422	0.0936	0.1430	0.4819
	2	0.1189	0.0888	-0.0902	0.0637	0.1090	0.1511	0.4819
	3	0.0729	0.1914	-2.1453	0.0380	0.0885	0.1338	0.4411
RET	1	0.0703	0.4801	-0.9813	-0.2316	-0.0325	0.3156	1.5670
	2	0.2082	0.4889	-0.9199	-0.1510	0.1540	0.4068	1.5668
	3	-0.0007	0.4606	-0.9813	-0.2628	-0.0800	0.2474	1.2557
BM	1	-0.7512	0.7254	-2.6960	-1.2045	-0.7721	-0.3421	1.4199
	2	-0.6957	0.7903	-2.4706	-1.1711	-0.7987	-0.3171	1.4199
	3	-0.7798	0.6896	-2.6960	-1.2350	-0.7673	-0.3495	1.1556
Panel C: Descriptive Statistics for B Shares								
ROE	1	0.0824	0.1749	-2.2952	0.0396	0.0920	0.1387	0.4386
	2	0.1049	0.0831	-0.1658	0.0545	0.1000	0.1456	0.3748
	3	0.0708	0.2062	-2.2952	0.0360	0.0876	0.1360	0.4386
RET	1	0.1007	0.5626	-1.0916	-0.2773	0.0206	0.4520	1.6581
	2	0.3049	0.7302	-1.0573	-0.2875	0.3629	0.8885	1.6581
	3	-0.0043	0.4173	-1.0916	-0.2666	-0.0378	0.2853	0.9428
BM	1	0.8665	1.2530	-2.2846	-0.1800	0.7610	1.8430	3.9995
	2	1.2901	1.3220	-1.3684	0.2765	1.1965	2.5668	3.9995
	3	0.6484	1.1597	-2.2846	-0.2650	0.4420	1.6729	3.3923

Panel A shows the distribution of the price discount (Price Disc) and book value differences between A- and B-shares.

Panel B shows the distribution of the return on book equity (ROE), market return (RET), and book to market (*BM*) for China A-shares.

Panel C shows the distribution of the return on book equity (ROE), market return (RET), and book to market (*BM*) for China B-Shares.

The descriptive statistics are estimated from the entire population of A- and B-shares listed on the SHSE and SZSE national Chinese exchanges between 1995 and 2006. The results are segmented into three periods; with period one representing the entire sample period from 1995 to 2006, period two the years from 1995 to 2000 and period three the years from 2001 to 2006. The sample consists of 56 firms (355 firm-year observations).

Table 2.1b
Descriptive Statistics for A- and H-shares

Variable	Period	Mean	St. Dev	Min	25%-pct	Median	75%-pct	Maximum
Panel A: Descriptive Statistics								
Price Disc	1	-0.8326	0.5305	-2.1016	-1.2059	-0.8559	-0.4272	0.1598
	2	-1.2369	0.4447	-1.9213	-1.6101	-1.2086	-0.9593-	-0.0599
	3	-0.6483	0.4605	-2.1016	-1.0008	-0.6102	-0.2441	0.1598
Book Value	1	0.0009	0.0471	-0.1232	-0.0209	0.0000	0.0195	0.1391
Differences	2	-0.0072	0.0554	-0.1232	-0.0396	0.0000	0.0179	0.1363
	3	0.0046	0.0425	-0.1114	-0.0168	-0.0002	0.0196	0.1391
Panel B: Descriptive Statistics for A Shares								
ROE	1	0.0500	0.1789	-1.2565	0.0170	0.0633	0.1145	0.4726
	2	0.0031	0.1665	-0.7444	0.0073	0.0287	0.0692	0.2203
	3	0.0714	0.1809	-1.2565	0.0355	0.0753	0.1501	0.4726
RET	1	0.1141	0.4834	-0.8967	-0.2348	0.0659	0.4355	1.3871
	2	0.1767	0.3542	-0.5373	-0.0788	0.2043	0.3723	1.0116
	3	0.0855	0.5309	-0.8967	-0.2682	-0.0013	0.4696	1.3871
BM	1	-1.0311	0.5246	-2.6522	-1.3553	-0.9636	-0.7411	0.2437
	2	-1.1069	0.5478	-2.6522	-1.4234	-0.9985	-0.7926	-0.1746
	3	-0.9965	0.5121	-2.2903	-1.3488	-0.9340	-0.7263	0.2437
Panel C: Descriptive Statistics for H Shares								
ROE	1	0.0512	0.1929	-1.2417	0.0159	0.0619	0.1291	0.4905
	2	0.0017	0.1766	-0.7731	0.0066	0.0251	0.0655	0.2929
	3	0.0737	0.1965	-1.2417	0.0331	0.0776	0.1522	0.4905
RET	1	0.1118	0.5249	-1.5026	-0.1925	0.1217	0.4461	1.6243
	2	-0.0848	0.6126	-1.5026	-0.4749	-0.1372	0.3539	1.1946
	3	0.2015	0.4548	-1.0351	-0.1082	0.2033	0.4759	1.6243
BM	1	0.1575	0.7998	-1.8334	-0.4348	0.1683	0.6230	2.6424
	2	0.7651	0.6428	-0.8238	0.3757	0.6828	1.2738	2.2802
	3	-0.1195	0.7072	-1.8334	-0.5712	-0.1872	0.3683	2.6424

Panel A shows the distribution of the price discount (Price Disc) and book value differences between A- and H-shares.
Panel B shows the distribution of the return on book equity (ROE), market return (RET), and book to market (*BM*) for China A-shares.
Panel C shows the distribution of the return on book equity (ROE), market return (RET), and book to market (*BM*) for China H-Shares.

The descriptive statistics are estimated from the entire population of A- and H-shares listed on the SHSE and SZSE national Chinese exchanges between 1995 and 2006. The results are segmented into three periods; with period one representing the entire sample period from 1995 to 2006, period two the years from 1995 to 2000 and period three the years from 2001 to 2006. The sample consists of 30 firms (165 firm-year observations).

Table 2.2a

Short VAR and Long VAR for Returns of A- and B-Shares

Panel A: Short VAR

A Shares	BM_{t-1}	ROE_{t-1}	r_{t-1}
BM_t	0.7963***	0.2660	-0.0617
	(0.0324)	(0.2560)	(0.0558)
ROE_t	0.0101	0.5283***	0.0393***
	(0.0082)	(0.0964)	(0.0127)
r_t	0.1783***	-0.0304	0.0310
	(0.0321)	(0.2558)	(0.0581)
B Shares	BM_{t-1}	ROE_{t-1}	r_{t-1}
BM_t	0.8987***	0.5000***	-0.0972
	(0.0254)	(0.2418)	(0.0553)
ROE_t	-0.0054	0.5000***	0.0936
	(0.0074)	(0.1237)	(0.0082)
r_t	0.0932***	-0.2034	0.0744
	(0.0261)	(0.2464)	(0.0552)

Panel B: Variance Decomposition

	var(N_{total})	var(N_{DN})	var(N_{CN})	cov($N_{CN,DN}$)	diff($N_{DN,CN}$)
Short VAR - A	0.1797***	0.1215***	0.0617**	-0.0018	0.0598*
	(0.0140)	(0.0275)	(0.0310)	(0.0234)	(0.0316)
Short VAR - B	0.3088***	0.0719***	0.1108***	0.0631***	-0.0389
	(0.0217)	(0.0258)	(0.0300)	(0.0111)	(0.0501)
Long VAR - A	0.1679***	0.1133***	0.0646*	-0.0050	0.0487
	(0.0141)	(0.0282)	(0.0363)	(0.0272)	(0.0317)
Long VAR - B	0.2500***	0.0491***	0.0917***	0.0546***	-0.0426
	(0.0196)	(0.0180)	(0.0272)	(0.0111)	(0.0395)

Panel C: Relative Variance Decomposition

	$\frac{Var(N_{DN})}{Var(N_{Total})}$	$\frac{Var(N_{CN})}{Var(N_{Total})}$
Short VAR - A	0.6761	0.3434
Short VAR - B	0.2329	0.3588
Long VAR - A	0.6748	0.3848
Long VAR - B	0.1964	0.3668

Panel A lists the parameters estimates of the short Vector Autoregressive model (VAR) of A- and B-shares. The model variables include the log book-to-market ratio BM_t *(the first element of the state vector z*), the log return on equity ROE_t *(the second element) and* the log market return r_t *(the third element).* The parameters of the table correspond to the VAR system: $z_t^M = C + \Gamma^M z_{t-1}^M + \varepsilon_t$ The first number reported in Panel A is the Weighted least squares point estimate of the parameter, where observations are weighted such that each cross-section receives an equal weight. The second number (in parenthesis) shows the robust jackknife standard error computed using Shao and Rao (1993) jackknife method. The short VAR is based on one lag of each state variable whereas the long VAR is based on two lags of each state variable.

Panel B lists the variance decomposition of the short VAR and the long VAR where the variances are defined as follows:

Var (N_{total})	=	total variance of stock returns of A- or B-shares
	=	Var (N_{DN}) + Var (N_{CN}) – 2 cov(N_{CN},N_{DN})
Var (N_{DN})	=	variance of expected return news
Var (N_{CN})	=	variance of cash flow news
cov(N_{CN},N_{DN})	=	covariance between expected return news and cash flow news
Diff (N_{CN},N_{DN})	=	var (N_{DN}) – var(N_{CN})

Panel C lists the relative size of each variance component to the total variance of stock returns of A- and B-shares.

***, ** and * denote significance at the 1%, 5% and 10% levels (two-tailed), respectively.

Table 2.2b

Short VAR and Long VAR for Returns of A- and H-Shares

Panel A: Short VAR

A Shares	BM_{t-1}	ROE_{t-1}	r_{t-1}
BM_t	0.5182***	0.4399**	-0.1098
	(0.0711)	(0.2245)	(0.0931)
ROE_t	-0.0228	0.3944	0.0435
	(0.0283)	(0.3178)	(0.0410)
r_t	0.4546***	-0.1207	0.1269
	(0.0727)	(0.3074)	(0.0983)
H Shares	BM_{t-1}	ROE_{t-1}	r_{t-1}
BM_t	0.7927***	-0.1961	-0.0200
	(0.0593)	(0.2248)	(0.0747)
ROE_t	-0.0804***	0.2169	0.0205
	(0.0422)	(0.3612)	(0.0310)
r_t	0.1416**	0.4087	0.0490
	(0.0627)	(0.3532)	(0.0773)

Panel B: Variance Decomposition

	var(N_{total})	var(N_{DN})	var(N_{CN})	cov($N_{CN,DN}$)	diff($N_{DN,CN}$)
Short VAR - A	0.1868***	0.1596***	0.0880**	-0.0304	0.0716**
	(0.0204)	(0.2387)	(0.2713)	(0.2556)	(0.0432)
Short VAR - H	0.2781***	0.0566	0.1567**	0.0324	-0.1001
	(0.0331)	(0.0720)	(0.1307)	(0.0857)	(0.1216)
Long VAR – A	0.1592***	0.1196***	0.0732**	-0.0168	0.0464*
	(0.0190)	(0.1822)	(0.2069)	(0.1959)	(0.0378)
Long VAR - H	0.2737***	0.0444	0.1416**	0.0439**	-0.0972
	(0.0324)	(0.0363)	(0.0829)	(0.0424)	(0.0938)

Panel C: Relative Variance Decomposition

	$\frac{Var(N_{DN})}{Var(N_{Total})}$	$\frac{Var(N_{CN})}{Var(N_{Total})}$
Short VAR - A	0.8544	0.4711
Short VAR - H	0.2035	0.5635
Long VAR - A	0.7513	0.4598
Long VAR - H	0.1622	0.5174

Panel A lists the parameters estimates of the short Vector Autoregressive model (VAR) of A- and H-shares. The model variables include the log book-to-market ratio BM_t *(the first element of the state vector z*), the log return on equity ROE_t *(the second element) and* the log market return r_t *(the third element)*. The parameters of the table correspond to the VAR system: $z_t^M = C + \Gamma^M z_{t-1}^M + \varepsilon_t$. The first number reported in Panel A is the Weighted least squares point estimate of the parameter, where observations are weighted such that each cross-section receives an equal weight. The second number (in parenthesis) shows the robust jackknife standard error computed using Shao and Rao (1993) jackknife method. The short VAR is based on one lag of each state variable whereas the long VAR is based on two lags of each state variable.

Panel B lists the variance decomposition of the short VAR and the long VAR where the variances are defined as follows:

Var (N_{total})	=	total variance of stock returns of A- or H-shares
	=	Var (N_{DN}) + Var (N_{CN}) – 2 cov(N_{CN},N_{DN})
Var (N_{DN})	=	variance of expected return news
Var (N_{CN})	=	variance of cash flow news
cov(N_{CN},N_{DN})	=	covariance between expected return news and cash flow news
Diff (N_{CN},N_{DN})	=	var (N_{DN}) – var(N_{CN})

Panel C lists the relative size of each variance component to the total variance of stock returns of A- and H-shares.

***, ** and * denote significance at the 1%, 5% and 10% levels (two-tailed), respectively.

Table 2.3a

Short VAR and Long VAR for Foreign Share Price Discount on A- and B-shares

Panel A: Variance Decomposition

	var(N_{total})	var(N_{DN})	var(N_{CN})	cov($N_{CN,DN}$)	diff($N_{DN,CN}$)
Short VAR	0.2130***	0.1569**	0.0030	0.0266	0.1539**
	(0.0342)	(0.0775)	(0.0027)	(0.0942)	(0.0775)
Long VAR	0.4122***	0.1629**	0.0045	0.1224	0.1585**
	(0.4148)	(0.0804)	(0.0036)	(0.3581)	(0.0805)

Panel B: Relative Variance Decomposition

	$\frac{Var(N_{DN})}{Var(N_{Total})}$	$\frac{Var(N_{CN})}{Var(N_{Total})}$
Short VAR	0.7366	0.0141
Long VAR	0.3952	0.0109

Panel A lists the variance decomposition of the short VAR and long VAR for A- and B-shares.

Var (N_{total})	=	total variance of price discount
	=	Var (N_{DN}) + Var (N_{CN}) – 2 cov(N_{CN},N_{DN})
Var (N_{DN})	=	variance of expected return news
Var (N_{CN})	=	variance of cash flow news
cov(N_{CN},N_{DN})	=	covariance between expected return news and cash flow news
Diff (N_{CN},N_{DN})	=	var (N_{DN}) – var(N_{CN})

Panel B lists the relative size of each variance component to the total variance of A-and B-shares.

***, **and * denotes significance at the 1%, 5% and 10% level, two-tailed.

Table 2.3b

Short VAR and Long VAR for Foreign Share Price Discount on A- and H-shares

Panel A: Variance Decomposition

	var(N_{total})	var(N_{DN})	var(N_{CN})	cov($N_{CN,DN}$)	diff($N_{CN,DN}$)
Short VAR	0.8298	0.6692	0.0153	0.0727	0.6539
	(0.6372)	(0.3584)	(0.0124)	(0.3596)	(0.3542)
Long VAR	0.3363**	0.6524	0.0270	-0.2891	0.6254
	(0.1487)	(0.4060)	(0.0484)	(0.3706)	(0.4001)

Panel B: Relative Variance Decomposition

	$\frac{Var(N_{DN})}{Var(N_{Total})}$	$\frac{Var(N_{CN})}{Var(N_{Total})}$
Short VAR	0.8065	0.0184
Long VAR	1.9400	0.0803

Panel A lists the variance decomposition of the short VAR and long VAR on A- and H-shares.

Var (N_{total})	=	total variance of price discount
	=	Var (N_{DN}) + Var (N_{CN}) – 2 cov(N_{CN},N_{DN})
Var (N_{DN})	=	variance of expected return news
Var (N_{CN})	=	variance of cash flow news
cov(N_{CN},N_{DN})	=	covariance between expected return news and cash flow news
Diff (N_{CN},N_{DN})	=	var (N_{DN}) – var(N_{CN})

Panel B lists the relative size of each variance component to the total variance of A-and H-shares.

***, **and * denotes significance at the 1%, 5% and 10% level (two-tailed), respectively.

Table 2.4a: Earnings Response Coefficient (ERC) Analysis: A and B- Shares

Dependent Variable	N	Intercept	SUE_a	SUE_b	$SUCF_a$	$SUCF_b$	Adj. R^2
$(p_t^B - p_t^A) - (p_{t-1}^B - p_{t-1}^A)$	335	(+/-) 0.031* (2.08)	(-) -0.170 (-0.88)				-0.0007
	335	(+/-) 0.031 (2.07)		(-) -0.018 (-0.98)			-0.0001
	335	(+/-) 0.031* (2.07)	(-) -0.041 (-0.11)	(-) -0.015 (-0.44)			-0.0031
	335	(+/-) 0.090 (0.98)			(-) -0.060 (-0.52)	(-) -0.003 (-0.26)	-0.0042

Predicted sign above coefficient, t-statistics below coefficient
**p<0.05 **p<0.01*

Panel A of this table shows the estimated regression of the unexpected change in the logarithms of the price discount of A- and B-shares on standardized unexpected earnings (SUE) or standardized unexpected cash flows (SUCF) for 1997 – 2006 (N =335).

Table 2.4b: Earnings Response Coefficient (ERC) Analysis: A- and H- Shares

Dependent Variable	n	Intercept	SUE_a	SUE_h	$SUCF_a$	$SUCF_h$	Adj. R^2
$(p_t^H - p_t^A) - (p_{t-1}^H - p_{t-1}^A)$	165	(+/-) 0.074** (3.05)	(-) -0.039 (0.44)				-0.0061
	165	(+/-) 0.074** (3.09)		(-) -0.021 (-1.21)			0.0028
	165	(+/-) 0.074** (3.05)	(-) 0.145 (0.31)	(-) -0.023 (-1.24)			-0.0028
	165	(+/-) 0.057* (2.31)			(-) 0.291 (0.75)	(-) 0.051 (0.56)	0.011

Predicted sign above coefficient, t-statistics below coefficient
**p<0.05 **p<0.01*

Panel B of this table shows the estimated regression of the unexpected change in the logarithms of the price discount of A- and H-shares on standardized unexpected earnings (SUE) or standardized unexpected cash flows (SUCF) for 1997 – 2006 (N =165).

Table 2.5
Robustness Test: Revisit Short VAR and Long VAR for Returns of A- and B-Shares

The table revisits the short and long VAR model for firms that had changes in shares outstanding during the period between 1996 and 2006. The number of samples have dropped from the original 335 firm-year observations to 298 firm-year observations for A- and B-shares.

Panel A: Variance Decomposition

	var(N_{total})	var(N_{DN})	var(N_{CN})	cov($N_{CN,DN}$)	diff($N_{DN,CN}$)
Short VAR - A	0.1782	0.1160	0.0326	-0.0148	0.0834
Short VAR - B	0.2997	0.0820	0.0884	-0.0647	-0.0064
Long VAR - A	0.1577	0.1070	0.0285	-0.0111	0.0785
Long VAR - B	0.2333	0.0534	0.0713	-0.0543	-0.0179

Panel B: Relative Variance Decomposition

	$\frac{Var(N_{DN})}{Var(N_{Total})}$	$\frac{Var(N_{CN})}{Var(N_{Total})}$
Short VAR - A	0.6512	0.1828
Short VAR - B	0.2735	0.2950
Long VAR - A	0.6783	0.1808
Long VAR - B	0.2291	0.3057

Panel A lists the variance decomposition of the short VAR and the long VAR where the variances are defined as follows:

Var (N_{total})	=	total variance of the stock returns of A- and B-shares
	=	Var (N_{DN}) + Var (N_{CN}) – 2 cov(N_{CN},N_{DN})
Var (N_{DN})	=	variance of expected return news
Var (N_{CN})	=	variance of cash flow news
cov(N_{CN},N_{DN})	=	covariance between expected return news and cash flow news
Diff (N_{CN},N_{DN})	=	var (N_{CN}) – var(N_{DN})

Panel B lists the relative size of each variance component to the total variance of stock returns of A- and B-shares.

***, ** and * denote significance at the 1%, 5% and 10% levels (two-tailed), respectively.

Table 2.6

Robustness Test: Revisit Short VAR and Long VAR for Foreign Share Price Discount on A- and B-shares

Panel A: Variance Decomposition

	var(N_{total})	var(N_{DN})	var(N_{CN})	cov($N_{CN,DN}$)	diff($N_{DN,CN}$)
Short VAR	0.2182	0.1690	0.0022	-0.0235	0.1668
Long VAR	0.3476	0.1959	0.0029	-0.0744	0.1930

Panel B: Relative Variance Decomposition

	$\frac{Var(N_{DN})}{Var(N_{Total})}$	$\frac{Var(N_{CN})}{Var(N_{Total})}$
Short VAR	0.7745	0.0101
Long VAR	0.5636	0.0083

Panel A lists the variance decomposition of the short VAR and long VAR for A- and B-shares.

Var (N_{total})	=	total variance of price discount
	=	Var (N_{DN}) + Var (N_{CN}) – 2 cov(N_{CN},N_{DN})
Var (N_{DN})	=	variance of expected return news
Var (N_{CN})	=	variance of cash flow news
cov(N_{CN},N_{DN})	=	covariance between expected return news and cash flow news
Diff (N_{CN},N_{DN})	=	var (N_{CN}) – var(N_{DN})

Panel B lists the relative size of each variance component to the total variance of A-and B-shares.

***, **and * denotes significance at the 1%, 5% and 10% level, two-tailed.

Table 2.7

Impact on Price Discount of Major Policy Announcements

The table reports the price discount drifts of major policy announcements. I identify three major policy announcements between 1996 and 2006. Panel A reports the average monthly price discounts around the announcement date of partial market liberalization in February 2001, panel B reports the price discounts around the announcement for Qualified Foreign Institutional Investor Program in November 2002 and panel C reports the discounts around the announcement for Qualified Domestic Institutional Investor Program. The significance of mean difference between the price discounts of pre-event window and post-event window is marked with "*", where ***, **and * denotes significance at the 1%, 5% and 10% level, two-tailed.

Panel A: Partial Market Liberalization

		Price Discount	
Event Time	(-6, -2)	(-1, +1)	(+2, +6)
Mean (%)	84.26***	72.37	59.37***

Panel B: Qualified Foreign Institutional Investor Program (QFII)

		Price Discount	
Event Time	(-12, -2)	(-1, +1)	(+2,+12)
Mean (%)	62.96	66.33	61.86

Panel C: Qualified Foreign Institutional Investor Program (QFII)

		Price Discount	
Event Time	(-8, -2)	(-1, +1)	(+2, +8)
Mean (%)	5.77***	1.91	18.73***

CHAPTER 3

Dividend Policy in China

An important strand of corporate finance research has focused on the issue of dividends. While there is some consensus on the link between growth opportunities and dividend policies, based on contracting theory in the US and other countries, we are not entirely clear about the nature and extent of this link in China. This is because of the unique governance and the ownership structure in the corporate sector of China which is different from those in developed countries. Many companies that were formerly SOEs before being listed, have varying levels of state ownership. These differences could affect the way contracts are formulated and enforced for Chinese firms thus affecting corporate policy decisions.

The objective of this chapter is to examine the relationship between growth opportunities and dividend policies in China. To shed evidence on this linkage in the Chinese setting, I use observations of pure A-shares companies (listed on Shanghai and Shenzhen stock exchanges) in China between 1996 and 2006. Gul (1999a) analyzes firms listed on the Shanghai Stock Exchange for the years 1991 to 1995. Since the laws relating to financial reporting and securities regulation have

changes substantially, an examination of the contracting theory using an extended and more recent data set could provide further insights on the application of this theory in China.

To date, a number of research papers have provided strong support for a negative relationship (Gaver and Gaver, 1993; Gul 1999a, b) based on the theory that growth opportunities is an important contracting cost explanation for corporate dividend policies (Jensen and Meckling (1976), Rozeff (1982) and Easterbrook (1984)). According to Jensen's FCF theory, firms with low growth opportunities have more FCF to pay out as dividends. In other words, the FCF problem and higher agency costs can be mitigated by increasing dividend payout to shareholders. Since the governance and the ownership structure in the corporate sector of China differs largely from those in developed countries, this study can improve our understanding on whether contracting costs explanations for dividend policies still apply given these differences in institutional arrangements in China.

The chapter is organized as follows. Section 3.2 discusses the institutional background of the share ownership structure and the corporate governance in China. Section 3.3 reviews the literature and provides the explanation to the development of

hypothesis. Section 3.4 presents the data and the methodology employed. Section 3.5 reports the empirical results. Section 3.6 tests the robustness of the results. Section 3.7 concludes.

3.1 Introduction

Unlike developed markets where the ownership of corporations is diverse, the predominant form of ownership in Chinese listed firms is concentrated since most of the listed firms are carves-out of SOEs. The parent SOE holds the state share of the firms and the government or the SOE controls over half of the firms. All the state shareholdings are ruled by the state council as non-tradable shares. These shares can only be bought and sold through private placement with special approval from the government. This practice gives rise to the existence of several types of shares in listed firms; state shares, legal person shares and public shares. Among all these shares, only shares held by public are tradable.[1] Given this low floating proportion, management is unlikely to make decisions that are favourable to all shareholders

[1] On 29th April, 2005, the CSRC announced a major institutional change and kicked off the first round of experimental reforms on share structure on May 9. Despite more and more non-tradable firms become tradable, state ownership percentage did not drop significantly. The sample shows that SOE still owns 33% on average in 2006 as compared to 40% in 2004 before the reform.

especially the minority shareholders. The weak legal system fails to protect the voting rights of minority shareholders. This unique institutional setting shapes the Chinese firms' corporate governance system. In turn, the weak investor protection laws may affect the corporate and dividend policies of firms.

Contrary to agency theory where civil law countries with weak investor protection have lower dividend payout ratios (La Porta et al., 2000), China shows the opposite. The results show that the mean (median) of dividend payout ratio between 1996 and 2006 is 54.9% (47.1%). Mitton (2004) illustrates in a country-level analysis that China is associated with a higher dividend payout than other common law countries like Singapore and South Africa. Consistent with the studies of Wei, Zhang and Xiao (2003), and Lee and Xiao (2004), the preliminary finding shows that state dominant firms pay higher dividend. In particular, Lee and Xiao (2004) offer the tunneling incentive hypothesis to explain this phenomenon. Since state shares are not tradable, firms with high ownership tend to distribute more dividends to meet the cash demand of controlling shareholders. This unique institutional setting thus provides an interesting backdrop to investigate whether all listed firms with high state ownership in China tend to adopt higher dividend policies.

To date, researchers try to use existing theories of dividend policy to shed light on the dividend decisions of firms in China but failed to show consistent results. On one hand, Eun and Huang (2007) follow signaling theory and examine the asset pricing mechanism in China stock markets and find that investors are willing to pay a premium for dividend-paying stocks. They suggest that investors prefer those companies that use dividends to signal management's willingness to return cash flow to outside shareholders over those that do not. On the other hand, Lee and Xiao (2004) argue that cash dividend might be used as a vehicle for tunneling in state dominant firms instead of alleviating agency problem. Based on the sample of listed firms between 1996 and 1999, they find that state dominant firms have high propensity to pay cash dividend but low propensity to subscribe to rights offering. Furthermore, these firms often increase cash dividend after rights offering, using cash dividends to siphon profits out of companies for the benefit of controlling shareholders. Thus, the market reacts negatively to cash dividend announcement of firms with concentrated ownership. The contradictory arguments from these two studies may be explained by two reasons. While Eun and Huang (2007) test on the period between 1995 and 2004, Lee and Xiao (2004) examine the years between 1996 and 1999. Secondly, the former study examines all the listed A-shares whereas the latter focuses on the pure A-shares.

Since extant literature cannot provide consensus evidence, I therefore attempt to test whether contracting costs explanations for dividend policies still apply given the different setting in China. Contrarily to other developed markets, Chinese firms with high growth options have large investment requirements may rely on government policy loans rather than internal financing. In addition, with high concentrated ownership and with most of the listed firms still controlled by the state, firms may not set profit maximization as their primary objectives. These unique factors may offer interesting results to the traditional contracting theory.

Jensen (1986) suggests that for firms with FCF problem, managers can minimize such agency costs by increasing dividend payout to shareholders. Since reducing dividend payments can trigger a drop in stock price, by increasing dividends, managers commit themselves to pay out the higher level of dividends to shareholders in both the current and future periods. That is, managers bond their promises to disgorge FCF in future periods. This reduces the inefficiency of marginal investments and hence the agency costs of FCF. Firms with more growth opportunities have lower FCFs and hence pay lower dividends. Consistent with this theory, Smith and Watts (1992), Gaver and Gaver (1993) and Gul (1999a, b), find that

high-growth firms have lower dividend payout ratios than non- or low-growth firms. Since firms with high-growth opportunities have lower FCF, therefore they have less flexibility in their dividend policy. Contrarily, firms with low-growth opportunities will choose to pay more dividends rather than investing in negative net present value projects (Gul, 1999a).

Closely tied to this FCF theory is the life-cycle explanation for dividend payments proposed by DeAngelo, DeAngelo and Stulz (2006). They find that while young rapidly growing firms have mostly "contributed" equity capital and pay few or no dividends, more mature, highly profitable firms with equity capitalization made up of retained earnings pay the bulk of dividends each year.

In order to study the relationship, I use pooled cross-sectional time series data for the eleven-year period between 1996 and 2006 from the *Taiwan Economic Journal* (*TEJ*). Only pure A-share firms are being analyzed. Those firms with B- or H-shares are traded on two or three exchange markets simultaneously. Shareholders in these different markets may have different incentives and therefore may affect firms' corporate policy choices. This study shows that low-growth firms (i.e. firms that are likely to have more severe FCF problems and higher agency costs) make higher

dividend payouts than high-growth firms in China. The results are consistent with contracting explanations.

However, a closer investigation shows that the relationship between a firm's growth potential and dividend policy is more negative in smaller firms. In other words, smaller firms with low growth opportunities pay higher dividends than similar larger firms. Since there is a strong association between high state ownership and size, this suggests that firms with high state ownership pay lower dividends among low growth firms. It seems that shareholders of firms with lower state ownership are able to force managers of firms with high FCF to pay out higher dividends; small firms which are associated with lower state ownership use dividends to reduce agency costs and align the interest of shareholders and managers. These finding also indirectly suggest that firms with high state ownership have more severe agency problems in the sense that shareholders are less able to force managers to pay out the FCF.

This research indicates that pure A firms with low-growth opportunities mirror those in U.S. when paying dividends in general. However, the negative association between dividend payout and firm size in China, consistent with the findings of Gul (1999a), is different from previous U.S. studies. State ownership is positively

associated with firm size and may be explained in terms of the fact that firms with higher state ownership have more severe agency problem and hence pay lower dividends to shareholders.

3.2 Share Ownership Structure

Unlike former Soviet Union and other socialist countries where they pushed for sudden and comprehensive price reforms combined with wholesale privatization (Green, 2004, p.10), China adopted a more conservative and gradual approach. Since stock market can provide alternative financing and investment resources, the Chinese government established the first exchange in 1990 in an attempt to liberalize the repressed financial sector. Treated as an experimental reform, China withdrew from a planned economy to a regulated one with the state creating rules and institutional arrangements (Green, 2004, p. 16). The state has carved out part of their ownership and retained as the controlling shareholder of the listed SOEs in the form of state and legal person shares.

3.2.1 State Shares

After 1949, nearly all business entities were created and owned by the government under the socialist economic and political system. SOEs are governed by both local

governments and the central government that consists of the national State-owned Assets Supervision and Administration Commission of the State Council. Due to lack of efficiency, a great number of SOEs were suffering losses. The government began to reform the SOEs in the late 1980s. Initially, these firms were allowed to retain profits for further development. The reform solved the productivity issue but not the incentive incompatibility problem between the enterprises and the state. Thus, the central government undertook the shareholding reform by restructuring SOEs into shareholding companies and issuing shares to their state owners and employees (Green, 2004, p.56). The state shares are not tradable in the stock market. While the ultimate owner of these shares is the State Council, they are managed by the Bureau of Ministry of Finance or State Asset Management Bureau. Since the economic reforms first instituted in 1978, the state has attempted to reduce the autonomy to a lesser degree. The stock markets were created in 1990 as an alternative financing option apart from bank lending as the major financing source to alleviate the bad debt problem. To assure stable transfer, the provincial government would select the SOEs to go public and controlled the amount shares released to the market. As a result, it is still the dominant shareholder though the control has declined gradually in the past few years.

After two unsuccessful attempts to sell off the release of states shares, the Chinese government finally announced a more conservative pilot program in April 2005 to encourage listed SOEs to transform the non-tradable state shares to tradable shares. The program aims at eliminating trading right difference between non-tradable state shares and tradable shares, according to Shang Fulin, the chairman of CSRC. The institutional reform does not mean selling out non-tradable shares; rather there are certain relevant restrictions to follow. Firstly, subsequent to the completion of transformation, state-owned shares can be cashed in only upon the approval of the state-owned assets authorities. Secondly, it depends on the intention of controlling shareholders. Although there are no restrictions in the laws and policies, the controlling shareholders will hold a substantial amount of shares in the long run in order to control the companies.

While there is an incremental reduction of state shares ownership after the split share structure reform in 2005, about 34% of the domestically listed companies still off-limits to tradable investors, based on Shanghai Securities Yearbook. Evidently, the state is still the dominant shareholder.

3.2.2 Legal person shares

Legal person shares represent the portion that is owned by other state entities. This type of shares accounts for about a third of every listed firm's equity. It comprises of domestic institutions such as private companies, state-owned enterprises with at least one non-state owner and non-bank financial institutions such as investment funds and security companies (Xu and Wang, 1997; Green 2004, p. 30). As part of China's economic reform plans, the legal person shares were emerged when the central government established its domestic stock markets in 1991. This was one of the remedies for reducing government intervention in state-owned enterprises (SOEs), for encouraging profit-seeking incentives and competition, and for enhancing efficiency and profitability of SOEs (Qian, 1999). Similar to state shares, legal person shares cannot be traded on the stock exchanges unless approved by the government; for fear that the private sector did not have enough capital to acquire large tranches of state shareholdings (Delios and Wu, 2005). As of December 2006, legal person shares covered around 31%[2] of ownership in Shanghai and Shenzhen markets.

[2] Percentage extracted from Shanghai Securities Yearbook

3.2.3 Public shares

Apart from the non-tradable shares, Chinese firms also issue multiple classes of tradable shares. They are mainly categorized as A-shares, B-shares, H-shares and employee shares.

A-shares are domestically listed shares on the Shanghai and Shenzhen stock exchanges and are traded in Renminbi. These shares were confined to domestic investors before 2003. With the launch of the QFII, the country relinquished tight capital controls and allowed limited foreign institutions to invest in the A-share market.

B shares are denominated in USD in Shanghai and Hong Kong Dollars in Shenzhen stock exchanges. These shares were initially reserved for foreign investors. However, due to inactive trading, the Chinese government introduced various measures to vitalize the market but bound to be unsuccessful. Thus, the CSRC and the State Administration of Foreign Exchange Bureau liberalized the B-share market in 2001. Local investors with existing foreign currency deposit accounts with domestic commercial banks are given the right to invest in the market (Sun et al, 2009). Most of the companies with B-share listings are also listed as A-share stocks.

H shares refer to the shares of companies incorporated in mainland China that are traded on the Hong Kong Stock Exchange. Many companies float their shares simultaneously on the Hong Kong market and one of the two mainland Chinese stock exchanges.

Employee shares were established during the 90s as part of the reform of the SOEs. Under the contract responsibility system, it allowed enterprises to run their businesses and thus could retain a portion of profits as staff compensation or for further development (Qi, Wu and Zhang, 2000). Most of the listed firms do not have employees shares and they only account for a small fraction of total shares outstanding. The issuance of this type of shares was abolished in 1999.

3.3 Background: The Corporate Governance in China

Subsequent to the formation of the People of Republic of China in 1949, the country formed the SOEs to upgrade the level of industrialization in response to two factors. Firstly, there were large discrepancies between the level of industrial outputs in China and in other developed countries. Secondly, China was facing political isolationist measures and economic embargo from Western countries led by the U.S., the country

realized the importance of developing the defense industries to protect the new state and sovereignty (Lin, Cai and Li, 2001, p. 32). Given the weak economic foundation and the scarce capital available, the government suppressed the interest rate and the exchange rate; and also kept the price of raw materials and labour to develop heavy industries. Under the traditional SOE system, the state delegated the operations to managers. Based on this hierarchy structure, this gave rise to principal-agent problems.

3.3.1 Governance of Traditional SOEs Pre-Reform Period

The desire to "leap forward" caused severe distortions in the economic structure. In view of the fact that the state owned the SOEs and that they were operated by managers, the ownership and control of the SOEs were separable; this would create incompatible incentives between owners and managers. As mentioned by Lin, Cai and Li (2001, p.31), the Chinese government focused on expanding heavy industries rapidly and attempted to achieve non-economic goals such as preservation of an industry for national security purposes (Clarke, 2003) while enterprise managers and staff favored enlarging enterprises and increasing personal wages.

Secondly, information asymmetry existed between the state and the managers. Since the state did not participate in the operations of the enterprises, it would be difficult to obtain operating information, making it costly for the state to evaluate enterprise performance (Lin, Cai and Li, 2001, p.87). Managers who involved in direct operation of the SOEs could shirk and tunnel through reporting lower profits by overstating total costs or understating revenues. Moreover, since the government suppressed the cost of heavy industry development by keeping interest rate low and distorted the price of series of factors and products; therefore, profit level of each enterprise would not be an appropriate indicator for evaluating enterprise performance. Obviously, the consequences of managers for poor enterprise performance would be even smaller than in the competitive market. Furthermore, as the Chinese government decided what to produce, whom to hire and how much to pay workers, SOEs only engaged in production in accordance with the government orders. This exacerbated the incentive incompatibilities between the state and the enterprise managers, as suggested by Lin, Cai and Li (2001, p.91).

3.3.2 Economic Reforms

Owing to the lack of efficiency endemic to SOEs and the over-emphasis on developing heavy industries led to serious shortage of industrial consumer products

and deprived living conditions of farmers (Lu, 2001). The reform started in 1978, to introduce gradually the market economy. The decentralization of SOEs in order to increase autonomy and improve incentives was the key item in the reform programme.

From the adoption of contract system, followed by asset operation responsibility system and finally corporatization, reforms have devolved powers to restructured enterprises and managers were given the discretion over funding, products, pricing and labor practices (Chen et al., 2006).

Apart from increasing productivity and efficiency of SOEs (Lin and Zhu, 2001), corporatization policy serves to raise equity capital for SOEs to convert into corporate form. The operational units of SOEs were carved out. They became limited liability companies and pursued profit-making objectives (Chen, Firth and Rui, 2006). Many of these companies then gradually sold shares to the public. This is a constructive tool to save state industries out of the despair in that the government was no longer obligated to provide subsidies when many SOEs were loss-making (Li et al., 2004).

Unlike some other ex-communist countries, where the governments privatized 100% of its enterprises, Chinese government privatizes the SOEs gradually by retaining the controlling stake of the listed firms for fear that will devastate the fledgling stock market (Chen, Firth and Gao, 2002). The government does not only own a major portion of firms' assets, but also directly involved in many aspects of the corporate decisions such as financing, production and investing. Therefore, some researchers attempt to study the impact of partial privatization by comparing pre and post-listing financial and ownership information of the listed companies and conclude that privatizations have contrary results with all other countries confirmed by D'Souza and Megginson, (1999). Researchers often claim the poor results attributed by increase in agency costs and inadequate corporate governance (Sun and Tong, 2003; Chen, Firth and Rui, 2006).

3.3.3 Governance of Split Share System

After partial liberalization, firms listed on the Shanghai and Shenzhen Stock Exchanges are characterized by concentrated ownership with dominant or block holders (state bureau and or legal person). The market became distorted as many as two-thirds of the shares were barred from the trading process. This creates the principal-principal problem, as suggested by Claessens et al, (1999). One would

expect the dominant shareholders could therefore control and influence a firm's objectives may diverse from tradable shareholders. Since non-tradable shares are not freely transferable, shareholders may seek for other opportunities to maximize their benefits other than maximizing share price. State shares, which are managed by Bureau of Ministry of Finance or State Asset Management Bureau, may focus more on non-economic goals and place less emphasis on profit maximization. In contrast, legal persons, which comprise of domestic institutions, have close business connections to the partial privatized firms, may have objectives similar to institutional investors in market economies as suggested by Xu and Wang (1997).

A further problem with ownership concentration is the lack of independence among boards of directors in China. While the structures and responsibilities of the board of directors are similar to the capitalist societies, the appointment of top management and directors are different from the U.S.. The appointments are typically selected and removed by the Chinese government; despite the fact that the role of the Communist Party has diminished in recent years (Chen et al, 2006). Furthermore, the requirement for firms to include non-executive directors which are perceived to

enhance the interests of shareholders especially the minority ones (Fama and Jensen, 1983), started only after 2001[3].

Additionally, there are competing arguments as to how largest shareholder of the partially privatized SOEs in China impacts the firms' performance. Previous literature (Grossman and Hart, 1980; Shleifer and Vishny, 1986) document that certain degree of ownership concentration is desirable. An extant of research echo the theory and conclude in their privatization studies that government controlled firms perform well (Bortolotti and Faccio (2007); and Gupta (2005). Empirical evidence so far has presented mixed results using Chinese setting. Earlier studies (Mok and Hui, (1998) argue that by high equity retention by the state can provide signals to investors as a sign of government's confidence in the company. The government can help guard the minority shareholders from expropriation and may help impose discipline to managers. In contrast, other studies like Xu and Wang (1997) and Sun and Tong, (2003) find that since state shareholders are not independent[4], they fail to provide effective monitoring of management. Without incentives and expertise to

[3] CSRC requires firms to have a supervisory board following the German two-tier board structure. Similar to the board of directors, supervisory boards are not independent and have limited authority to monitor manager's behavior.

[4] The state shares of an enterprise are usually managed by a provincial branch of the state asset management bureau which in turn also manages the state shares of other companies.

monitor, managers tend to be opportunistic and seek personal benefit rather than the benefit of the company. They further argue that legal persons, unlike state ownership, can enhance firm's performance since they only hold shares of one or few companies.

3.4 Literature Review and Hypothesis Development

3.4.1 Previous Research on Cash Dividend Policy in China

Drawing references from existing studies, researchers attempt to test for the explanatory power for the dividend decisions of firms in China but they failed to find consistent explanations. Thus, they conclude that since the institutional settings in China differ broadly from those in U.S. and other developed countries, the existing theories have weak explanatory power. The following reviews the prior studies of dividend policies and how they are applied in the Chinese context.

3.4.1a Signaling Theory

The signaling theory argues that the market infers a rise in earnings and cash flows from a dividend increase. The announcement of an increase in dividend is interpreted as good news; hence this positive information can lead to a higher stock price. In an attempt to quantify the dividend effect, a number of researchers look at

the market behavior surrounding dividend announcements. In general, empirical work has supported the theory.

Assuming that outside investors do not have perfect information about firm's profitability and that cash dividends are taxed higher than capital gains, Bhattacharya (1979) develops the first model in which cash dividends function as a signal of expected cash flows of firms and that the tax costs can be fully recovered by ensuing stock prices increase. If investment projects are profitable, then dividends can be paid from earnings. Conversely, if the projects are unprofitable, this would enhance unanticipated "bail out" financing.

Aharony and Swary (1980) use a methodology to ascertain whether quarterly dividend changes provide information beyond that already provided by quarterly earnings numbers. Based on the dividend expectation model, their results show that stockholders of companies that announced dividend increases (decreases) realized positive (negative) abnormal returns over the twenty days surrounding announcement dates. They also support the semi-strong form efficient market hypothesis that stock market adjusts in an efficient manner to new dividend information.

Asquith and Mullins (1983) argue that the impact of initial dividends is probably more profound than subsequent dividend changes. Since the market does not anticipate any dividend payment, hence, the impacts of dividend changes should be most evident at initiation. The results demonstrate a large positive abnormal return subsequent to dividend initiations, supporting the view that dividends convey unique, valuable information to investors.

Miller and Rock (1985) extend the finance model of firm's dividend decisions by incorporating trading of shares along with inside information. In a world with asymmetric information where trading is allowed, managers may inflate the market value of the firm by paying out more dividends at the expense of investment policy of the firm. As a result, shareholders who plan to sell after dividend announcement will "bribe" the firm decision makers to cut back investment whereas those not plan to sell will "counter-bribe" to keep the decision maker impartial. However, the authors demonstrate from the model that selling shareholders do not earn above-abnormal returns at the expense of the staying shareholders. It is not a wealth transfer, but is the loss of opportunities whose consequences are borne by all shareholders, sellers and non-sellers alike. The authors prove that a consistent signaling equilibrium still exists. However, it provides no support for a policy of

sustaining dividends in the face of earnings disasters.

In line with the above arguments, Eun and Huang (2007) examine the asset pricing mechanism in China stock markets and find that investors are willing to pay a premium for dividend-paying stocks based on all the A-share stocks listed on the Shanghai and Shenzhen stock exchanges between 1991 and 2004. They suggest that investors prefer those companies that use dividends to signal management's willingness to return cash flow to outside shareholders over those that do not. Contrary to the above findings, the study by Lee and Xiao (2004) fail to show any positive reaction to increase of dividend.

3.4.1b Expropriation Theory

Another strand of literature examines the relationship between institutional setting and the dividend policy. Johnson et al. (2000) coin the term "tunneling" to characterize the legal or illegal transfer of assets and profits from minority shareholders to controlling shareholders. They discuss the duty of care and the duty of loyal which are the two vital legal principles that courts use to analyze cases involving tunneling. Their results are in line with La Porta et al. (2000) that in civil-law countries with weak investor protection, entrepreneurs often tunnel

resources out of firms, i.e., expropriate funds that rightfully belong to minority shareholders while common-law countries with stronger investor protection, treat minority shareholders fairly, therefore, outright expropriation of corporate assets by insiders is rare. They also conclude that tunneling not only impairs the interests of minority shareholders, it also encumbers the stock market development.

Using Johnson et al. (2000) argument that controlling shareholder could tunnel minority shareholder, Lee and Xiao (2004) find that state dominant firms have high propensity to pay cash dividend but low propensity to subscribe rights offering based on the sample of listed firms between 1996 and 1999. They further claim that firms often increase cash dividend after rights offering, especially those firms with higher non-tradable shareholding concentration. By giving up subscription rights and using receipts from rights offering to pay cash dividend, they conclude that this is equivalent to selling a portion of the non-tradable shares by the majority shareholders to minority shareholders. As a result, market reacts negatively to cash dividend announcement of firms with concentrated ownership.

Chen, Jian and Xu (2009) confirm the tunneling issue by examining the differential pricing for tradable and non-tradable shares during the IPO periods of the listed

companies. They find that distribution of dividend by listed companies in China do not signal future profitability. Their results show that companies with more differential pricing in the IPO, a recent IPO or rights issue, or more concentrated ownership tend to pay more dividends. Based on this, they argue that the distribution exacerbates agency problem. In both studies, researchers believe that due to the unique institutional feature in China, that state shares and legal person shares are not tradable, these shares can only be bought and sold through private placement with special approval by the government; hence, dividends are one of the ways large shareholders can earn a return on their holdings. As suggested by Chen, Jian and Xu (2009), the controlling shareholders are adopting a suboptimal high-dividend policy as a way to "tunnel" their wealth out of the companies. However, if they have other means of extracting cash from the firm, their preference for cash dividend maybe substantially reduced. Deng, Gan and He (2006), documents two channels through which large shareholders expropriate resources at the expense of minority shareholders in China. Apart from dividend policies so that corporate resources are kept in the firm and under their control, firms can also rely on related party transactions, including asset sales, transfer pricing of goods and services and extracting trade credits. The study provides opposite evidence to the arguments claimed by Lee and Xiao (2004) and Chen, Jian and Xu (2009).

Evidently, the discussion on financial research about China has yet to fully explain the dividend payout pattern of this "mysterious" market. Since the evidence using signaling and tunneling theories are far from being conclusive, this chapter attempts to focus on FCF theory to explore the dividend policies of Chinese listed firms.

3.4.2 Free Cash Flows and Dividend Policy

Prior literature suggests two explanations for the association between growth opportunities and dividend policy. The first relies on the signaling perspective, which suggests that high quality firms may commit to larger dividends in order to provide signal to the market (Easterbrook, 1984). When a firm raises new capital in the capital market, investment bankers or some similar intermediary will review the firm and act as monitors for shareholders. As such, managers are more likely to act in investors' interests. In other words, one can assert that investment bankers and other intermediaries send signals to investors by putting their reputations on the line and confirming that the new securities are backed by earnings potential. This goes in line with the signaling theory that expected, continuing dividends compel firms to raise new capital and start up the monitoring mechanism to reduce agency costs of management. Bhattacharya (1979) takes a similar view by arguing that high quality

firms pay higher dividends to reduce information disparities between managers and investors of high growth firms.

The second explanation relies on the contracting costs arguments, they suggest that dividends may serve incentive roles (Jensen, 1986). In the FCF model, firms with more profitable investment opportunities have lower FCF and pay lower dividends. Firms with low management ownership and low growth opportunities have more FCF to pay out as dividends. In other words, managers bond their promises to disgorge FCF in the future periods. Thus, reducing dividend payments can trigger a drop in stock price. The payment of FCF in the form of dividends reduces agency costs and aligns the interest of shareholders and managers. This reasoning of positive association between proportion of assets in place and dividend yield has considerable support and a few contracting arguments strengthen this predicted relation.

Rozeff (1982) recognizes the role of insiders as monitors of managers. He develops the cost minimisation model that combines the transaction costs that may be controlled by limiting the payout ratio with the agency costs that may be controlled by raising the payout ratio. The optimal dividend policy is the outcome of trade-off between equity agency costs and transaction costs. For a sample of 1000 stocks

drawn from 64 different industries, he finds that firms establish lower dividend payout ratios when they are experiencing higher revenue growth, when they possess higher betas. Conversely, firms establish higher dividend payouts when insiders hold a lower fraction of equity and/or a great number of stockholders own the outside equity. By paying dividend, firm can reduce management's ability to squander the firm's resources. Consistent with Rozeff (1982), Easterbrook (1984) document that the new issue market provides effective monitoring and lowers agency costs.

3.4.3 Growth Opportunities and Dividend Policy

Smith and Watts (1992) suggest that contracting theories are better able to explain the cross-sectional variation in corporate policies. They argue that with their ample profitable investment opportunities, high-growth firms have to go to the issue market more frequently than the low-growth firms. Thus, high-growth firms are subject to the monitoring of the new issue market on a frequent basis and suffer less from the agency costs of FCF. They find significant and negative relationship between dividend yield and the ratio of book value of assets to firm value as a proxy for the investment opportunity set which confirms their contracting hypothesis. Gaver and Gaver (1993) extend the Smith and Watts study by conducting the analysis at the firm level rather than industry level. Additionally, they construct an index of investment

opportunities based on six variables (the ratio of the market value of the firm to the book value of assets, the ratio of market value of equity to the book value of equity, the ratio of R&D expenditures to the book value of assets, the earnings/price ratio, the variance of the total return of the firm and the frequency that firm is included in the holdings of growth-oriented mutual funds) and show consistent results with previous study.

DeAngelo, DeAngelo and Stulz (2006) further reinforce this line of argument by testing the life-cycle theory. They find a highly significant relationship between the decision to pay dividends and the ratio of earned to total common equity. The proportion of firms paying high dividend is strongly and positively associated with firms showing high ratio of earned to total common equity indicating that the probability a firm pays dividend increases with the relative amount of earned equity in its capital structure. Further, their simulations show that for well-established firms that do not pay dividends, their cash balances would be huge and thus providing extreme discretion to managers of these mature firms.

Since prior studies examine the association between growth opportunities and dividend policies primarily using data of developed countries, a number of

researchers have consequently tested on other less developed countries. Gul (1999b) and Gul and Kealey (1999) provide additional evidence on the contracting arguments using Japanese and Korean corporate sector respectively. The two economies vary significantly with the structures of U.S. economy. Unlike U.S., which prohibits any equity ownership by banks and financial institutions, Japanese legal and regulatory environment allow them to exert control and to own shares. Moreover, both Japan and Korea corporate sectors are dominated by concentrated ownership[5]. The two studies extend the contracting cost explanations for dividend policies and examine the association between Japanese Keiretsu and Korean Chaebol, investment opportunity set and dividend policies. Consistent with prior studies (Smith and Watts (1992) and Gaver and Gaver (1993), the results show a negative association between investment opportunities set and dividend policies.

By the same token, Gul (1999a) examines the association using companies listed on the Shanghai Stock Exchange from 1990 to 1995 and confirms the results. However, the paper only studies the contracting cost arguments from one stock exchange for the first five years after the establishment of the stock exchange. Since then, there have

[5] Keiretsu firms in Japan are sets of companies with interlocking business relationships and shareholdings while Korean Chaebol firms are characterized by concentrated family ownership, political affiliation may have different monitoring functions.

been significant changes in the laws and regulations relating to financial reporting and securities markets. A re-examination of the role of growth opportunities in dividend policies with more recent data and a thorough analysis with state ownership can hence provide further insights on the application of the theory in China. This leads to the first hypothesis:

H1: There is a negative association between growth opportunities and dividends, *ceteris paribus*.

3.4.4 Ownership Structure and Dividend Policy

An important strand of literature relates ownership structure to expropriation. Shelifer and Vishny (1997, p. 759) argues that large owners prefer to generate private benefits when they gain full control of operations. Similarly, Bebchuk (1999) seeks to find how owner makes a choice between a controlling shareholder structure and a dispersed ownership structure. He argues that choice of structure may affect the future cash flows to shareholders, the private benefits of control to the company's manager and thus the value of a firm. The model shows that publicly traded companies will tend to choose concentrated ownership in countries in which private benefits of control are large. In addition, he also finds that separation of cash flow rights and voting rights will tend to be used in conjunction with a controlling

shareholder structure.

Claessens et al., (1999) examine the relation between ultimate ownership and market valuation, distinguishing between cash flow rights and control rights. Based on 2658 publicly-traded corporations in South-East Asia (Hong Kong, Indonesia, Japan, Korea, Malaysia, The Philippines, Singapore, Taiwan and Thailand), they document negative relationship between control concentration and market valuation in the case of families and widely-held financial institutions. Among these nine countries, the concentration of cash flow rights and control rights vary significantly. This finding is in general in line with the argument that controlling shareholders have the ability and incentives to expropriate from minority shareholders. However, the results show no relation exists between either concentration of state control or control by widely held corporations and market valuation.

Almeida and Wolfenzon (2006) report that when a corporation is affiliated to a group of corporations and all controlled by the same shareholder (usually a family or a state); i.e. a pyramidal ownership; high possibilities of expropriation will arise when investor protection is poor. This structure allows the controlling owner to use the firm it already controls to set up a new firm so as to 1) access the entire stock of

retained earnings of the original firm, and 2) to share the new firm's non-diverted payoff with minority shareholders of the original firm. In less developed countries with poor investor protection, controlling owners will gain private benefits by expropriating minority shareholders through the use of pyramidal structures. Since prevalence of concentrated ownership is particularly high in China, listed firms with high state ownership are more likely to expropriate minority shareholders.

To mitigate the agency problem, researchers have suggested using dividends as an effective monitoring tool since they can remove corporate wealth from insider control (La Porta et al., 2000). Their studies show that better minority shareholder protection is associated with higher dividend pay-outs in a cross-section of firms from around the world.

Following this argument, Chinese companies with more concentrated state ownership are expected to pay lower dividends. Deng, Gan and He (2006) argue that if firms have alternative ways where cash tunneled out of the company goes to controlling shareholders, their preference for cash dividend would be considerably reduced. Unlike dividends which controlling shareholders can only get part of the cash disbursed, controlling shareholders are able to tunnel 100% cash out of the firm

through other means of extracting cash from firms. Thus, they conclude that incomplete restructured firms tend to pay fewer dividends. Conceivably, concentrated state ownership gives rise to the classic free-ride problem. Indeed, CSRC discerned the problem and considered distribution of cash dividend a channel for investor to gain reasonable returns. In a statement, "Orienting Listed Companies to Seek Sustained Returns for Shareholders by Perfecting Dividend Payment System" issued in 2003, the securities regulator promoted and instructed the listed companies' payment of cash dividend to improve the imperfect governance mechanisms.

Since the salient agency problem seem particularly severe when there is high concentration of state ownership in China, these dominating shareholders may abuse the use of FCF and tend to pay lower dividends. Consequently, I conjecture that the dividend payout ratio for firms with low-growth opportunities will be lowered when the state ownership percentage is higher.

H2: The negative relationship between firms' growth opportunities and dividend payout will be moderated by the percentage of state ownership, *ceteris paribus*.

3.5 Data and description

3.5.1 Sample selection and characteristics

The sample consists of the entire population of firms listed on the A-share markets for the period between 1996 and 2006. Firms that issue B shares or H shares are excluded from the sample. All accounting data and stock information (assets, debt, shareholders' equity, cash dividend, state share percentage, annual earnings, sales growth and stock price), are obtained from the Taiwan Economic Journal (*TEJ*).

Following the elimination of firms that do not have pay dividends, sample size is reduced from 13,930 to 5,418 observations. Out of these, 2,198 observations that have missing values on any of the accounting and stock information (assets, debt, shareholders' equity, cash dividend, state share percentage, annual earnings, sales growth and stock price) are removed. These procedures yield 3,320 firms remaining in the study.

[Table 3.1: here]

3.5.2 Dependent Variable Identifications

The empirical analysis concerns differences in dividend policies between growth and non-growth firms and between high and low state ownership concentration.

Dividend policy which is accounting based is chosen as a measurement of dividend policy. The dividend payout ratio is defined as the dividend per share divided by primary earnings per share before extraordinary items.

3.5.3 Descriptive Statistics

Table 3.2 summarizes the descriptive statistics among the measures of the 3,320 observations. The sample illustrates that the average dividend payout for all firms is 54.9%. In comparison, the average dividend payout ratio for listed firms in U.S. between 1993 and 1998 was 39.3% (Fama and French, 2001). This shows that the average payout ratio is relatively higher than in the U.S.. Statistics for size proxied by natural logarithms of assets, profitability proxied by return on assets and leverage are reported. The leverage ratio (Debt/Total Assets) with mean of 19.5% indicates that firms raised funds in the equity market instead of borrowing from the state-owned banks. Due to partial privatization, the ownership structure of the firms is concentrated, with state owning more than 40% of the shares. The figure is comparable to that reported in previous studies such as Chen, Jian and Xu (2009). The paper only focuses on state ownership, rather than legal person shares since they behave differently from the state government. Legal persons, which comprise of domestic institutions, have close business connections to the partial privatized firms.

As suggested by Xu and Wang (1997), they may have objectives similar to institutional investors in market economies. Hence, they can enhance firm's performance after share issue (Sun and Tong (2003)).

[Table 3.2: here]

Table 3.3 presents the Pearson correlation coefficients between the dependent variables and the testing variables. The correlations among all the tested variables prove that most of them are not highly correlated. One exception is that the natural logarithms of assets used to proxy for the size of the firms are significantly and negatively related to the dividend payout. Conversely, state ownership concentration shows a positive relation with the dependent variable. Since firm size and state ownership concentration may be highly correlated, their relationships with dividend payout demands further testing. The significant negative correlation between sales growth and dividend payout provides preliminary evidence that low growth firms tend to pay lower dividends.

[Table 3.3: here]

The hypotheses are tested using OLS regressions with the dividend payout as the dependent variables and sales growth opportunities and earnings price ratio as proxies

for growth opportunities and state ownership concentration as the independent variables. The measure of growth opportunities includes the percentage of sales growth between year *t* and *t-1*. Earnings price ratios (EP) and the ratio of the market value of the firm to the book value of assets (mba) are used to test for the robustness of growth opportunities which are widely used in previous literature (Chung and Charoenwong (1991), Gaver and Gaver (1993) and Gul (1999a, b)). Specifically, the earnings price ratio demonstrates an inverse relationship with growth opportunities and is seen as more robust to price-earnings ratio when a firm has earnings close to zero or negative (Chung and Charoenwong, (1991). Several control variables are included in the regressions.

Firm size is also included as a control variable because Smith and Watts (1992) suggest that it is positively related to various types of corporate governance controls such as dividend policy and management compensation. The natural logarithms of the book value of the total assets (ln_asset) are used to measure the firm size.

Profitability measured in terms of the firm's return on assets (ROA) is included as a control variable. As firm's recent operating performance may be correlated with the growth opportunities, profitability is measured using ROA (operating profit before

depreciation divided by total assets) to control for this problem.

Year is the indicator variable for year between 1996 and 2006 with year indicator variable = 1 if observation is from that year, and 0 otherwise. The industry variable is classified according to the CSRC 20 industry codes. Since specific industries may adopt particular corporate governance practices, thus there would be an association with the industry type and board composition and directors shareholdings. A control variable is included to account for this relationship. The variable has been categorized according to the CSRC 20 industries classification.

The dividend payout model is estimated as follows:

$$\text{Dpayout} = h_0 + h_1\text{Dpayout\_lag} + h_2\text{ln\_asset} + h_3\text{ROA} + h_4\text{D/A} + h_5\text{State} + h_6\text{Sales\_growth} + \sum_k h_k Year_k + \sum_l h_l Ind_l + \varepsilon$$

where

Dpayout = dividend payout of year *t*

Dpayout_lag = dividend payout of year *t-1*

ln_asset = Natural logarithms of total assets

ROA = Return on assets

D/A = Debt/Total Assets

State = % of state shares

Sales_growth = % of sales growth between year *t* and year *t-1*

Year = Indicator variable for year 1996 to year 2006

Industry = a control based on CSRC's 20 industry groups

3.6 Empirical Findings

The OLS results with White-corrected t-statistics are reported in Table 3.4. The first set of regressions test on the main effects on the negative association between growth opportunities and dividends. Eqn (1) and (2) include all the state ownership percentage, the lag term of dividend payout and control variables such as size, profitability and leverage, which are significant factors in cash dividend decisions. Eqn (3) tests on H1 which uses sales growth as a proxy for growth opportunities. The coefficient for sales growth is negative and significant which suggest that firms with less investment opportunities are willing to pay higher dividends in order to remove resources from the firm. This goes in line with Jensen's argument that low-growth firms pay higher level of dividends in order to overcome some of the problems of FCF.

Moreover, in the first regression, the result shows a positive significant relationship

between state ownership and dividend payout in general. However, it is too crude to draw a conclusion that dominant state firms tunnel minority shareholders using cash dividend. Interestingly, unlike the studies in the U.S. where firm size as a control variable is positively related to dividend payout, the results show the opposite. Further, by examining the interactions between state ownership and firm size, the results show that the sign of the coefficient for state ownership changes from positive to negative; and there is a significant and positive relationship between its interaction term with dividend payout as shown in Eqn (3) in Table 3.4. This confirms that the positive association between state ownership concentration and dividend payout cannot be generalized. The effect from firm size would weaken the findings. In other words, not all high state ownership firms are willing to distribute cash dividends to shareholders. These are opposite to the prediction of tunneling theory.

[Table 3.4: here]

To provide a clearer understanding on the dividend policies on low and high growth firms, the observations are split (median) into high growth and low growth firms based on sales growth and further the high- and low-growth firms are split into small and large firms. Table 3.5 illustrates the descriptive statistics for the variables for dividend payout, profitability and the state ownership concentration. Evidently, the

dividend policies are different between growth and non-growth firms. As expected, growth firms pay less amount of dividend to shareholders than non-growth firms. Among the small sized firms, the mean (median) dividend payout for growth firms is 0.4968 (0.4375), compared to a mean (median) of 0.6384 (0.5455) for low-growth firms as shown in Table 3.5a and Table 3.5b. Among the large sized firms, the mean (median) dividend payout for growth firms is 0.4784 (0.4110), compared to a mean (median) of 0.5798 (0.4878) for low-growth firms as shown in the same tables. Moreover, the state ownership percentage is lower (higher) for small (large) firms in both low and high growth firms. In other words, small firms with low state ownership and growth show the highest dividend payout, which further confirms the first hypothesis.

The Wilcoxon two-sample test and the t-test for differences in means show that the dividend payout ratio is significantly ($p < 0.01$) higher for small-sized low-growth firms (mean of 0.6384, median of 0.5455) than for large-sized growth firms (mean of 0.4784, median of 0.4110).

[Table 3.5: here]

The regression results of testing the second hypothesis are reported in Table 3.6. In

particular, the results demonstrate a significant and positive interaction for the state ownership concentration and firm size on low-growth firm's dividend payout. This suggests that the negative association between growth opportunities and dividend policies is weaker for firms with high state ownership. As previously argued, this implies that concentrated state ownership gives rise to agency problem. On the other hand, the positive interaction between state ownership concentration and firm size for high-growth firms fails to show any significance.

[Table 3.6: here]

3.7 Robustness Checks

3.7.1 Other variables as proxy for growth opportunities

Instead of sales growth, I use earnings price ratio (ep), the ratio of market value of the firm to book value of assets (mba) and the ratio of market to book value of equity (mbe) as proxies for growth opportunities as additional tests to confirm my findings. Table 3.7 reports negative and significant relationships between all the proxies for growth opportunities and dividend payout.

[Table 3.7: here]

Table 3.8 and 3.9 illustrate the descriptive statistics for the variables for dividend

payout, profitability and the state ownership concentration after separating the number of observations into low growth and high growth firms based on ep and mba respectively. Each low growth and high growth panel (as shown in Table 3.8a, 3.8b and Table 3.9a, 3.9b) is then further divides into small and large firms. Noticeably, the dividend policies are different between growth and non-growth firms. Consistent with previous results, growth firms pay less amount of dividend to shareholders than non-growth firms. Among the low-growth firms, those with lower state ownership concentration and smaller size show the highest dividend payout. The mean (median) dividend payout for these low growth firms proxied by ep is 0.6108 (0.5263) (Table 3.8a). Conversely, the mean (median) of for high-growth firms with large size and high state ownership 0.4501 (0.4118) as shown in Table 3.8b. Similar but less strong results are found using mba. While the mean (median) dividend payout for the low growth firms, proxied by mba, with small size and low state ownership is 0.5785 (0.5); the mean (median) for high-growth firms with large size and high state ownership is 0.4943 (0.4375) as shown in Table 3.9.

The Wilcoxon two-sample test and the t-test for all the differences in means show that the dividend payout ratio is significantly ($p < 0.01$) higher for small-sized non-growth firms than for large-sized growth firms.

[Table 3.8-3.9: here]

An additional check on the regression analyses are reported in Table 3.10 and 3.11 Similar to the results shown in Table 3.6, the interactive terms for the state ownership concentration and firm size on low-growth firm's dividend payout on the regressions are positive and significant. On the contrary, the positive interaction between state ownership concentration and firm size for high-growth firms fails to show any significance. This confirms my previous findings that the negative relationship between firms' growth opportunities and dividend payout will be moderated by the percentage of state ownership.

[Table 3.10-3.11: here]

3.8 Conclusion

The study provides empirical evidence of the relationship between state ownership concentration, growth opportunities, and dividend policies of pure A listed firms in China. The paper focuses on Jensen's argument that firms with FCF problem and higher agency costs can be mitigated by increasing dividend payout to shareholders. In this chapter, I find evidence consistent with prior studies (Jensen (1986), Smith and Watts (1992), and Gaver and Gaver, (1993)) and the first hypothesis that low growth firms as proxied by sales growth and earnings price have significantly higher

dividend payouts than high growth firms. This suggests that shareholders of firms with lower state ownership are able to force managers of firms with high FCF to pay out higher dividends. Further, state ownership concentration is included to test whether it can mitigate or intensify agency costs seen by firms paying higher dividends to shareholders. The results show that the negative association between low growth firms and dividend payout is stronger for firms with lower state ownership concentration. This also implies that firms with high state ownership have more severe agency problems. Overall, the study provides a new perspective of dividend policy in China. Although the governance and the ownership structure in the corporate sector of China differs largely from those in developed countries, the results suggest that to some extent that contracting costs explanations for dividend policies can apply in China.

Table 3.1: No of Firm Observations

	Total
Firms in Taiwan Economic Journal	13,390
Less:	
Missing values of dividend per share	7,972
Missing measures	2,198
Firms used in the analysis	**3,320**

Table 3.2: Descriptive Statistics of Tested Variables

	Mean	Standard Deviation	Minimum	Q1	Median	Q3	Maximum
Dpayout	0.549	0.492	0.017	0.306	0.471	0.687	10.000
Dpayout_lag	0.541	0.426	0.035	0.303	0.467	0.690	10.000
Ln_asset	14.491	0.969	12.125	13.844	14.348	15.034	20.203
ROA	0.054	0.034	-0.068	0.030	0.046	0.069	0.264
Debt/Asset	0.195	0.138	0	0.081	0.185	0.293	0.694
State (%)	41.796	25.393	0	22.468	48.590	62.943	85.000
Sales_growth	0.266	0.538	-0.893	0.052	0.184	0.359	15.022

Table 3.3: Pearson's Correlation Among Variables

	Dpayout	Dpayout_lag	Ln_asset	ROA	D/A	State	Sales_growth
Dpayout	1.000						
Dpayout_lag	0.238***	1.000					
Ln_asset	-0.049**	-0.0319	1.000				
ROA	-0.210***	-0.113***	0.012	1.000			
Leverage	-0.034*	-0.038*	-0.167***	-0.353***	1.000		
State	0.100***	0.111***	0.186***	0.060***	-0.055**	1.000	
Sales_growth	-0.095***	-0.017	0.059***	0.121***	0.060***	-0.028	1.000

Dpayout_lag = Dividend payout
Ln_asset = Natural log of total assets
ROA = Return on assets
D/A = Debt/Total Assets
State = % of State Ownership
Sales_growth = % of Sales Growth

Table 3.4: Determinants of Payout Ratio

The table shows the coefficients for firm policy variables regressed on the firm size, profitability, leverage, state control and growth opportunities (proxied by sales growth) for 20 industries based on 3320 sample firms that has paid dividend between 1996 and 2006. .

Dependent Variable	n	Intercept	Dpayout_lag	Ln_asset	ROA	D/A	State	StateX ln_asset	Sales_ Growth	Adj. R^2
Dpayout	3,320	(+/-)	(+)	(+)	(-)	(-)	(+/-)			0.122
		0.859***	0.212***	-0.021*	-3.804***	-0.396***	0.002***			
		(5.79)	(10.96)	(-2.21)	(-13.98)	(-5.92)	(4.67)			
	3,320	(+/-)	(+)	(+)	(-)	(-)	(+/-)	(+/-)		0.124
		1.551***	0.210***	-0.068***	-3.909***	-0.399***	-0.013**	0.001**		
		(5.79)	(10.84)	(-3.79)	(-14.27)	(-5.97)	(-2.75)	(3.09)		
	3,320	(+/-)	(+)	(+)	(-)	(-)	(+/-)	(+/-)	(-)	0.126
		1.528***	0.211***	-0.067**	-3.776***	-0.378***	-0.013*	0.001*	-0.047***	
		(5.70)	(10.90)	(-3.69)	(-13.64)	(-5.64)	(-2.71)	(3.05)	(-3.12)	

Predicted sign above coefficient, White-corrected t-statistics below coefficient

**p<0.05 **p<0.01 ***p<0.001*

Note: Regressions reported above are with control variables for industries and years (not reported here).

Dpayout_lag = Dividend payout in year *t-1* Ln_asset = Natural log of total assets ROA = Return on assets

D/A = Debt/Total Assets State = % of State Ownership Sales_growth = % of Sales Growth

Table 3.5a: Descriptive Statistics of Variables for Firms with Low Growth (n=1660)

The table shows the descriptive statistics of variables for pure A dividend paying firms with low growth (proxied by sales growth) between 1996 and 2006. Panel A illustrates the sub-sample of small sized firms (bottom one-third of the sub-sample). Panel B illustrates the sub-sample of large sized firms (upper one-third of the sub-sample).

	Panel A: Small Sized Firms (n = 553)						
	Mean	**Std Dev**	**Minimum**	**1Q**	**Median**	**3Q**	**Maximum**
dvpay	0.6384[#]	0.6244	0.0261	0.375	0.5455	0.7692	10
dypay_lag	0.5594	0.4001	0.0357	0.3226	0.5	0.7143	5
EPS	0.23	0.14	0.01	0.14	0.21	0.3	1.17
State (%)	38.90	24.98	0	17.8	43.43	61	84.98
	Panel B: Large Sized Firms (n = 553)						
	Mean	**Std Dev**	**Minimum**	**1Q**	**Median**	**3Q**	**Maximum**
dvpay	0.5798	0.4582	0.0167	0.3333	0.4878	0.7	5.25
dypay_lag	0.5586	0.4756	0.0417	0.3125	0.4545	0.6957	5
EPS	0.31	0.23	0.01	0.15	0.26	0.42	1.45
State (%)	47.21	24.06	0	34.94	52.5	65.53	85

Table 3.5b: Descriptive Statistics of Variables for Firms with High Growth (n=1660)

The table shows the descriptive statistics of variables for pure A dividend paying firms with high growth (proxied by sales growth) between 1996 and 2006. Panel A illustrates the sub-sample of small sized firms (bottom one-third of the sub-sample). Panel B illustrates the sub-sample of large sized firms (upper one-third of the sub-sample).

	Panel A: Small Sized Firms (n = 553)						
	Mean	**Std Dev**	**Minimum**	**1Q**	**Median**	**3Q**	**Maximum**
dvpay	0.4968	0.4206	0.0246	0.2857	0.4375	0.6522	8.3333
dypay_lag	0.5261	0.3371	0.0347	0.2941	0.4651	0.6897	3.5
EPS	0.30	0.19	0.02	0.18	0.27	0.37	1.44
State (%)	36.92	25.64	0	8.7	41.46	60.09	83.85
	Panel B: Large Sized Firms (n = 553)						
	Mean	**Std Dev**	**Minimum**	**1Q**	**Median**	**3Q**	**Maximum**
dvpay	0.4784[#]	0.3870	0.0239	0.2778	0.4110	0.5912	6
dypay_lag	0.5039	0.3706	0.0424	0.2857	0.4271	0.6333	5.25
EPS	0.49	0.41	0.01	0.24	0.4	0.62	6.25
State (%)	46.12	25.47	0	34.79	53.28	65	85

[#] indicates t-test difference in means and Wilcoxon two-sample test significant at $\alpha = 0.01$

Table 3.6: Determinants of Payout Ratio Dichotomized by Low and High Growth Firms (Proxied by Sales Growth)

The table shows the coefficients for firm policy variables regressed on the lag term on the dividend payout ratio, firm size, profitability, leverage, state ownership % and the interactive term between state ownership % and size for 20 industries based on 3320 sample firms that has paid dividend between 1996 and 2006. Panel A demonstrates the results of the low-growth firms whereas Panel B illustrates the results of high-growth firms.

Panel A – Low Growth									
Dependent Variable	n	Intercept	Dpayout_lag	Ln_asset	ROA	D/A	State	StateXln_asset	Adj. R^2
Dpayout	1,660	(+/-)	(+)	(-)	(-)	(-)	(-)	(+)	0.115
		1.917***	0.201***	-0.092**	-4.981***	-0.532***	-0.021*	0.002**	
		(4.27)	(6.46)	(-3.05)	(-9.77)	(-4.81)	(-2.55)	(2.74)	
Panel B – High Growth									
Dpayout	1,660	(+/-)	(+)	(-)	(-)	(-)	(-)	(+)	0.147
		1.214***	0.211***	-0.049*	-2.705***	-0.202**	-0.008	0.001	
		(4.08)	(9.42)	(-2.44)	(-9.36)	(-2.62)	(-1.56)	(1.85)	

Predicted sign above coefficient, White-corrected t-statistics below coefficient

**p<0.05 **p<0.01 ***p<0.001*

Note: Regressions reported above are with control variables for industries and years (not reported here).

Dpayout_lag	=	Dividend payout	Ln_asset	=	Natural log of total assets	ROA	=	Return on assets
D/A	=	Debt/Total Assets	State	=	% of State Ownership	Sales_growth	=	% of Sales Growth

Table 3.7: Additional Test on the Determinants of Payout Ratio

The table shows the coefficients for firm policy variables regressed on the firm size, profitability, leverage, state control and growth opportunities (proxied by earnings price ratio (ep) and market to book assets (mba) for 20 industries based on 3320 sample firms that has paid dividend between 1996 and 2006.

Dependent Variable	n	Intercept	Dpayout_lag	Ln_asset	ROA	D/A	State	StateX ln_asset	EP	mba	Adj. R^2
Dpayout	3,320	(+/-)	(+)	(+)	(-)	(-)	(+/-)	(+/-)	(-)		0.129
		1.362***	0.207***	-0.056**	-3.341***	-0.374***	-0.012*	0.001*	-0.584***		
		(5.03)	(10.75)	(-3.06)	(-11.06)	(-5.60)	(-2.50)	(2.81)	(-4.40)		
	3,320	(+/-)	(+)	(+)	(-)	(-)	(+/-)	(+/-)		(-)	0.125
		1.443***	0.211***	-0.064***	-4.028***	-0.403***	-0.013**	0.001**		0.028*	
		(5.29)	(10.89)	(-3.51)	(-14.39)	(-6.04)	(-2.71)	(3.05)		(2.04)	

Predicted sign above coefficient, White-corrected t-statistics below coefficient

**p<0.05 **p<0.01 ***p<0.001*

Note: Regressions reported above are with control variables for industries and years (not reported here).

Dpayout_lag	=	Dividend payout in year t-1	Ln_asset	=	Natural log of total assets	ROA	=	Return on assets
D/A	=	Debt/Total Assets	State	=	% of State Ownership	ep	=	earnings price ratio
mba	=	ratio of market to book assets						

Table 3.8a: Additional Descriptive Statistics of Variables for Firms with Low Growth (n=1660) The table shows the descriptive statistics of variables for pure A dividend paying firms with low growth (proxied by earnings price ratio) between 1996 and 2006. Panel A illustrates the sub-sample of small sized firms (bottom one-third of the sub-sample). Panel B illustrates the sub-sample of large sized firms (upper one-third of the sub-sample).

	Panel A: Small Sized Firms (n = 553)						
	Mean	**Std Dev**	**Minimum**	**1Q**	**Median**	**3Q**	**Maximum**
dvpay	0.6108[#]	0.5676	0.0261	0.3529	0.5263	0.75	8.3333
dypay_lag	0.5594	0.4001	0.0357	0.3226	0.5	0.7143	5
EPS	0.23	0.14	0.01	0.14	0.21	0.3	1.17
State (%)	38.90	24.98	0	17.8	43.43	61	84.98
	Panel B: Large Sized Firms (n = 553)						
	Mean	**Std Dev**	**Minimum**	**1Q**	**Median**	**3Q**	**Maximum**
dvpay	0.6504	0.6932	0.0323	0.3449	0.5	0.7670	10
dypay_lag	0.5923	0.49	0.05	0.3131	0.5	0.7273	5
EPS	0.21	0.17	0.01	0.11	0.17	0.26	1.59
State (%)	47.21	24.06	0	34.94	52.5	65.53	85

Table 3.8b: Additional Descriptive Statistics of Variables for Firms with High Growth (n=1660) The table shows the descriptive statistics of variables for pure A dividend paying firms with high growth (proxied by earnings price ratio) between 1996 and 2006. Panel A illustrates the sub-sample of small sized firms (bottom one-third of the sub-sample). Panel B illustrates the sub-sample of large sized firms (upper one-third of the sub-sample).

	Panel A: Small Sized Firms (n = 553)						
	Mean	**Std Dev**	**Minimum**	**1Q**	**Median**	**3Q**	**Maximum**
dvpay	0.4949	0.2716	0.0246	0.2857	0.4615	0.6667	1.7857
dypay_lag	0.5167	0.2941	0.0347	0.3077	0.4762	0.6818	2.6667
EPS	0.38	0.20	0.08	0.27	0.34	0.45	1.93
State (%)	33.60	25.92	0	2.52	35.73	57.45	84.98
	Panel B: Large Sized Firms (n = 553)						
	Mean	**Std Dev**	**Minimum**	**1Q**	**Median**	**3Q**	**Maximum**
dvpay	0.4501[#]	0.2521	0.0167	0.2830	0.4118	0.5769	2
dypay_lag	0.4771	0.3339	0.0424	0.2841	0.4167	0.5882	5.25
EPS	0.54	0.39	0.11	0.32	0.45	0.66	6.25
State (%)	48.71	26.12	0	35.9	55.88	69.76	85

[#] indicates t-test difference in means and Wilcoxon two-sample test significant at $\alpha = 0.01$

Table 3.9a: Additional Descriptive Statistics of Variables for Firms with Low Growth (n=1660) The table shows the descriptive statistics of variables for pure A dividend paying firms with low growth (proxied by market to book assets) between 1996 and 2006. Panel A illustrates the sub-sample of small sized firms (bottom one-third of the sub-sample). Panel B illustrates the sub-sample of large sized firms (upper one-third of the sub-sample).

	Panel A: Small Sized Firms (n = 553)						
	Mean	**Std Dev**	**Minimum**	**1Q**	**Median**	**3Q**	**Maximum**
dvpay	0.5785#	0.5710	0.0246	0.3125	0.5	0.7143	8.3333
dypay_lag	0.5592	0.3937	0.0347	0.3226	0.5	0.7143	5.2222
EPS	0.30	0.17	0.01	0.18	0.28	0.38	1.44
State (%)	34.60	25.56	0	5.14	38.09	57.52	84.98
	Panel B: Large Sized Firms (n = 553)						
	Mean	**Std Dev**	**Minimum**	**1Q**	**Median**	**3Q**	**Maximum**
dvpay	0.5438	0.5144	0.0167	0.2941	0.4348	0.6579	6
dypay_lag	0.5268	0.4688	0.0424	0.2951	0.4333	0.6522	5.25
EPS	0.42	0.38	0.01	0.22	0.34	0.54	6.25
State (%)	46.94	26.04	0	35.31	53.83	67.47	85

Table 3.9b: Additional Descriptive Statistics of Variables for Firms with High Growth (n=1660) The table shows the descriptive statistics of variables for pure A dividend paying firms with high growth (proxied by market to book assets) between 1996 and 2006. Panel A illustrates the sub-sample of small sized firms (bottom one-third of the sub-sample). Panel B illustrates the sub-sample of large sized firms (upper one-third of the sub-sample).

	Panel A: Small Sized Firms (n = 553)						
	Mean	**Std Dev**	**Minimum**	**1Q**	**Median**	**3Q**	**Maximum**
dvpay	0.5634	0.4037	0.0261	0.3333	0.5	0.7241	5
dypay_lag	0.5496	0.4018	0.0357	0.3077	0.4762	0.7143	5
EPS	0.24	0.16	0.01	0.14	0.21	0.3	1.4
State (%)	39.63	24.58	0	19.63	44.19	61.99	75.82
	Panel B: Large Sized Firms (n = 553)						
	Mean	**Std Dev**	**Minimum**	**1Q**	**Median**	**3Q**	**Maximum**
dvpay	0.4943#	0.2718	0.0239	0.3012	0.4375	0.65	2.5
dypay_lag	0.5161	0.3496	0.05	0.2857	0.4286	0.6667	3.5
EPS	0.39	0.30	0.01	0.18	0.3	0.5	2.37
State (%)	46.79	23.09	0	35.72	52.4	63.26	85

# indicates t-test difference in means and Wilcoxon two-sample test significant at $\alpha = 0.01$

Table 3.10: Additional Test on the Determinants of Payout Ratio Dichotomized by Low and High Growth Firms (Proxied by Earnings Price Ratio) The table shows the coefficients for firm policy variables regressed on the lag term on the dividend payout ratio, firm size, profitability, leverage, state ownership % and the interactive term between state ownership % and size for 20 industries based on 3320 sample firms that has paid dividend between 1996 and 2006. Panel A demonstrates the results of the low-growth firms whereas Panel B illustrates the results of high-growth firms.

Panel A – High EP									
Dependent Variable	n	Intercept	Dpayout_lag	Ln_asset	ROA	D/A	State	StateXln_asset	Adj. R^2
Dpayout	1,660	(+/-)	(+)	(-)	(-)	(-)	(-)	(+)	0.114
		2.429***	0.204***	-0.124**	-6.250***	-0.491***	-0.032**	0.002***	
		(4.60)	(6.10)	(-3.43)	(-9.76)	(-4.08)	(-3.16)	(3.31)	
Panel B – Low EP									
Dpayout	1,660	(+/-)	(+)	(-)	(-)	(-)	(-)	(+)	0.154
		1.021***	0.169***	-0.040**	-1.367***	-0.274***	-0.005	0.000*	
		(5.22)	(10.82)	(-3.11)	(-6.83)	(-5.39)	(-1.59)	(1.97)	

Predicted sign above coefficient,White-corrected t-statistics below coefficient

**p<0.05 **p<0.01 ***p<0.001*

Note: Regressions reported above are with control variables for industries and years (not reported here).

Dpayout_lag	=	Dividend payout	Ln_asset	=	Natural log of total assets	ROA	=	Return on assets
D/A	=	Debt/Total Assets	State	=	% of State Ownership	EP	=	Earnings price ratio

Table 3.11: Additional Test on the Determinants of Payout Ratio Dichotomized by Low and High Growth Firms (Proxied by Market to Book Assets Ratio) The table shows the coefficients for firm policy variables regressed on the lag term on the dividend payout ratio, firm size, profitability, leverage, state ownership % and the interactive term between state ownership % and size for 20 industries based on 3320 sample firms that has paid dividend between 1996 and 2006. Panel A demonstrates the results of the low-growth firms whereas Panel B illustrates the results of high-growth firms.

Panel A – Low mba									
Dependent Variable	n	Intercept	Dpayout_lag	Ln_asset	ROA	D/A	State	StateXln_asset	Adj. R^2
Dpayout	1,660	(+/-)	(+)	(-)	(-)	(-)	(-)	(+)	0.12
		1.702***	0.161***	-0.075**	-5.489***	-0.525***	-0.018*	0.001**	
		(4.09)	(5.81)	(-2.73)	(-10.61)	(-4.93)	(-2.34)	(2.66)	
Panel B – High mba									
Dpayout	1,660	(+/-)	(+)	(-)	(-)	(-)	(-)	(+)	0.149
		1.122**	0.280***	-0.043	-2.833***	-0.356**	-0.006	0.001	
		(3.16)	(10.32)	(-1.77)	(-9.37)	(-4.31)	(-1.03)	(1.18)	

Predicted sign above coefficient, White-corrected t-statistics below coefficient

**p<0.05 **p<0.01 ***p<0.001*

Note: Regressions reported above are with control variables for industries and years (not reported here).

Dpayout_lag	=	Dividend payout	Ln_asset	=	Natural log of total assets	ROA	=	Return on assets
D/A	=	Debt/Total Assets	State	=	% of State Ownership	mba	=	market to book assets ratio

Chapter 4

Conclusions

In this dissertation I focus on two related finance issues in the Chinese stock market. First, I examine whether cash flow news and/or expected return news significantly explain the unexpected variability of stock returns of A-shares. The study is motivated by the anomalous differential pricing of "twin" shares to different investor groups and specifically with the foreign designated shares trade largely at a discount relative to domestic A-shares, it extends the literature by examining the drivers of the price discount variation over time. Using the variance decomposition methodology of Campbell (1991), Vuolteenaho (2002), and Callen and Segal (2004), I evaluate the variance contribution of the two pieces of news: cash flow news and expected return news.

Based on the sample that consists of the entire population of firms listed on the A-share, B-share and H-share markets obtained from the Taiwan Economic Journal (*TEJ*) for the period between 1995 and 2006, I find that the empirical results lend support. One of the results shows that expected return news dominates significantly in explaining the unexpected variability of stock returns of A-shares.

This is in line with the argument that stock prices are less synchronous the more developed is the economy (Morck, Yeung and Yu, 2000). Conversely, cash flow news plays a more important role in explaining the unexpected variability of the stock returns of B- or H-shares which is consistent with the findings of Vuolteenaho (2002). A possible explanation for this diversity is that investors in B- or H- share markets would behave like U.S. investors who put heavier reliance on companies' financial reports. Thus, cash flow news governs expected return news in determining the stock return variation. Unlike investors in the U.S. stock market, investors in the A-share market do not rely that much on companies' financial reports. Alternatively, they consider market level news, new policies, regulation changes, governmental interventions, etc. as critical issues when they trade A-shares. Moreover, while prior studies using U.S. data find that the firm-level stock returns are mainly driven by cash-flow news, I find that Chinese stock markets are driven (at least partially) by other factors. The difference in expected return news between domestic and foreign markets has a much greater economic effect on driving the price discount than the cash flow news differences. It turns out that accounting information captured by cash flow news is less relevant in China stock market.

Nonetheless, there are some limitations to this study. Since the Chinese stock markets established in the 90's, the number of firm-observations available are limited especially for the A- and H-shares. Moreover, subject to the substantial changes in the financial and regulatory environments across time, the results of the long VAR are less significant than the short VAR though they are still consistent with the general results.

This study can be extended in the following ways. First, the study can link to the issue on value relevance. As B-shareholders are characterized by foreign institutional investors, news that is more associated with firm specific information could have a more profound impact on the variation of B-share returns via investor reactions, therefore accounting information in the B-share market is more relevant than that in A-share market consistent with the previous study by Sami and Zhou (2004). However, other studies such as Lin and Chen (2005) show that accounting numbers based on domestic accounting standards, in contrast to IAS, are more relevant in the Chinese stock market. Since the value relevance of accounting standards is still very much in contention, future work can be directed towards understanding this issue.

Further, the study can test the relationship between price discount variation and price synchronicity. The results from the second chapter indicate that returns on A-shares show a much higher variance in discount rate news. This means that A-shares have higher systematic volatility, which is consistent with Morck, Yeung and Yu, (2000). B-shares, similar to the shares in the US, show lower R^2 which implies that cash flow news dominates discount rate news. Since firm-specific information captured by cash flow news is less relevant in the domestic China stock market by comparison to the foreign B-share market; thus, the study can further investigate whether the price synchronicity differs between A- and B or H shares.

The third chapter aims at providing some evidence as to whether contracting theory can explain the relationship between growth opportunities and dividend policies in a different legal and regulatory environment. Given the almost non-existence of corporate governance, and weak enforcement power of regulatory authority, controlling shareholders would expropriate minority shareholders' interests. The unique Chinese institutional settings can therefore provide an interesting backdrop to investigate whether contracting cost explanations for dividend policies are applicable in view of these differences. In addition, I examine whether the percentage of state ownership and the size of a firm have any bearing on this

relationship.

Two hypotheses are tested in the third chapter. The first hypothesis is to test whether low growth firms as proxied by sales growth and earnings per price have significantly higher dividend payouts than high growth firms. Using 3,320 firm-year observations from 1996 to 2006, the empirical evidence supports the argument found in prior studies (Jensen (1986), Smith and Watts (1992), Gaver and Gaver, (1993), Gul (1999a, 199b) and Gul and Kealy (1999)). The results suggest that firms with lower growth opportunities are able to force managers of firms with high free cash flow to pay out higher dividends. To test Hypothesis 2, I partition the full sample into low growth and high growth subsamples. The low growth and high growth firms are defined according to their sales growth percentages between year *t* and year *t-1*. The results show that the negative relationship between low growth firms and dividend payout is stronger for firms with lower state ownership concentration. Firm size seems to weaken the positive association between state ownership concentration and dividend payout. In other words, small firms with low growth distribute the highest percentage of dividends from their earnings. Instead of using dividends to expropriate minority shareholders, I argue that large firms that tend to have higher state ownership than small firms can find alternative

ways to tunnel cash out of the company. Hence, their preference for cash dividend would be considerably reduced. This suggests that state ownership intensifies agency costs seen by firms paying lower dividends to shareholders indicating that firms with high state ownership have more severe agency problems.

The study can be further extended by comparing the dividend policy of dual listed shares with the pure A-shares. On one hand, it can substantiate the application of contracting theory in countries with different institutional settings. On the other hand, I conjecture that the firm size and the state ownership effect will be less dominant in the dual-listed shares. In addition, I can also investigate whether the agency problem seen by paying lower dividends from high state ownership firms can be mitigated by better corporate governance. This is left to future research.

APPENDIX A

From Equation (2) of Vuolteenaho (2002), the log book to market ratio (denoted as), can be written as:

$$b_t - p_t = k_t + \sum_{j=0}^{\infty} \rho^j r_{t+1+j} - \sum_{j=0}^{\infty} \rho^j e_{t+1+j} \tag{A1.1}$$

where b_t is the log book value, p_t is the log market value, r_t is the log stock return, e_t is the log return on book-value equity, and k_t is the approximation error.

Let E^A and E^B denote the expectation operator for the A-share market and B-share market, respectively. The expectation operators are different in the two markets because the markets are segmented. Let M denote as A- or B- share market. The expectation of equation (A1.1) can be written as:

$$b_t^M - p_t^M = k_t + \sum_{j=0}^{\infty} \rho_M^j E_t^M (r_{t+1+j}^M) - \sum_{j=0}^{\infty} \rho_M^j E_t^M (e_{t+1+j}^M). \tag{A1.2}$$

where, with some abuse of notation, k_t will continue to denote the approximation error even when the equations are transformed by expectations and differencing.

Subtracting the book-to-market ratio of the B-market from the A-market and assuming that book values are identical in both markets yields:

$$p_t^B - p_t^A = k_t + \left[E_t^B \left(\sum_{j=0}^{\infty} \rho_B^j (e^B_{t+1+j}) \right) - E_t^A \left(\sum_{j=0}^{\infty} \rho_A^j (e^A_{t+1+j}) \right) \right] - \left[E_t^B \left(\sum_{j=0}^{\infty} \rho_B^j (r^B_{t+1+j}) \right) - E_t^A \left(\sum_{j=0}^{\infty} \rho_A^j (r^A_{t+1+j}) \right) \right] \quad . \tag{A1.3}$$

Further taking the expectation of equation (A1.3) at period *t -1*, I obtain:

$$E_{t-1}\left(p_t^B - p_t^A\right) = k_t + \left[E_{t-1}^B \left(\sum_{j=0}^{\infty} \rho_B^j (e^B_{t+1+j}) \right) - E_{t-1}^A \left(\sum_{j=0}^{\infty} \rho_A^j (e^A_{t+1+j}) \right) \right] - \left[E_{t-1}^B \left(\sum_{j=0}^{\infty} \rho_B^j (r^B_{t+1+j}) \right) - E_{t-1}^A \left(\sum_{j=0}^{\infty} \rho_A^j (r^A_{t+1+j}) \right) \right] \tag{A1.4}$$

where $E_{t-1}\left(p_t^B - p_t^A\right) \equiv E_{t-1}^B\left(p_t^B\right) - E_{t-1}^A\left(p_t^A\right)$. Subtracting Equation (A1.4) from Equation (A1.3) gives the revision to the discount:

$$\begin{aligned}
&\left(p_t^B - p_t^A\right) - E_{t-1}\left(p_t^B - p_t^A\right) = k_t \\
&+ \left\{ \left[E_t^B \left(\sum_{j=0}^{\infty} \rho_B^j (e^B_{t+1+j}) \right) - E_{t-1}^B \left(\sum_{j=0}^{\infty} \rho_B^j (e^B_{t+1+j}) \right) \right] - \left[E_t^A \left(\sum_{j=0}^{\infty} \rho_A^j (e^A_{t+1+j}) \right) - E_{t-1}^A \left(\sum_{j=0}^{\infty} \rho_A^j (e^A_{t+1+j}) \right) \right] \right\} \\
&- \left\{ \left[E_t^B \left(\sum_{j=0}^{\infty} \rho_B^j (r^B_{t+1+j}) \right) - E_{t-1}^B \left(\sum_{j=0}^{\infty} \rho_B^j (r^B_{t+1+j}) \right) \right] - \left[E_t^A \left(\sum_{j=0}^{\infty} \rho_A^j (r^A_{t+1+j}) \right) - E_{t-1}^A \left(\sum_{j=0}^{\infty} \rho_A^j (r^A_{t+1+j}) \right) \right] \right\} \\
&= k_t + \left[\Delta E_t^B \left(\sum_{j=0}^{\infty} \rho_B^j (e^B_{t+1+j}) \right) - \Delta E_t^A \left(\sum_{j=0}^{\infty} \rho_A^j (e^A_{t+1+j}) \right) \right] - \left[\Delta E_t^B \left(\sum_{j=0}^{\infty} \rho_B^j (r^B_{t+1+j}) \right) - \Delta E_t^A \left(\sum_{j=0}^{\infty} \rho_A^j (r^A_{t+1+j}) \right) \right]
\end{aligned}$$

where $\Delta E_t^M = E_t^M - E_{t-1}^M$, M=B,H,A. The first and second square brackets of the final equation show the "difference-in-differences" form of the revision to the discount.

APPENDIX B

Based on equation (3), the difference in expected return news can be expressed as:

$$\begin{aligned}
\eta_t^{DN} &= \Delta E_t^B\left(\sum_{j=0}^{\infty}\rho_B^j(r_{t+1+j}^B)\right)-\Delta E_t^A\left(\sum_{j=0}^{\infty}\rho_A^j(r_{t+1+j}^A)\right)\\
&= \Delta E_t^B\left(\sum_{j=0}^{\infty}\rho_B^j(e_3^{/}z_{t+1+j}^B)\right)-\Delta E_t^A\left(\sum_{j=0}^{\infty}\rho_A^j(e_3^{/}z_{t+1+j}^A)\right)\\
&= \sum_{j=0}^{\infty}\rho_B^j e_2^{/}\Delta E_t^B\left(z_{t+1+j}^B\right)-\sum_{j=0}^{\infty}\rho_A^j e_2^{/}\Delta E_t^A\left(z_{t+1+j}^A\right)\\
&= e_2^{/}\sum_{j=0}^{\infty}\rho_B^j(\Gamma^B)^{j+1}\left[z_t^B-E(z_t^B)\right]-e_2^{/}\sum_{j=0}^{\infty}\rho_A^j(\Gamma^A)^{j+1}\left[z_t^A-E(z_t^A)\right]\\
&= e_2^{/}\Gamma^B(I-\rho_B\Gamma^B)^{-1}\left[z_t^B-E(z_t^B)\right]-e_2^{/}\Gamma^A(I-\rho_A\Gamma^A)^{-1}\left[z_t^A-E(z_t^A)\right]\\
&= e_2^{/}\Gamma^B(I-\rho_B\Gamma^B)^{-1}\varepsilon_t^B-e_2^{/}\Gamma^A(I-\rho_A\Gamma^A)^{-1}\varepsilon_t^A
\end{aligned}$$

(A2.1)

where $e_2^{/}=(0,1,0)$. Taking the variance of Equation (B1) yields:

$$\begin{aligned}
Var(\eta_t^{DN}) &= Var\left[e_2^{/}B(I-\rho_B B)^{-1}\varepsilon_t^B-e_2^{/}\Gamma^A(I-\rho_A\Gamma^A)^{-1}\varepsilon_t^A\right]\\
&= e_2^{/}\Gamma^B(I-\rho_B\Gamma^B)^{-1}\Sigma^B\left[e_2^{/}\Gamma^B(I-\rho_B\Gamma^B)^{-1}\right]^{/}\\
&+e_2^{/}\Gamma^A(I-\rho_A\Gamma^A)^{-1}\Sigma^A\left[e_2^{/}\Gamma^A(I-\rho_A\Gamma^A)^{-1}\right]^{/}\\
&+2e_2^{/}\Gamma^B(I-\rho_B\Gamma^B)^{-1}\Sigma^{AB}\left[e_2^{/}\Gamma^A(I-\rho_A\Gamma^A)^{-1}\right]^{/}
\end{aligned}$$

(A2.2)

where $\Sigma^A=\mathrm{cov}(\varepsilon_t^A)$, $\Sigma^B=\mathrm{cov}(\varepsilon_t^B)$ and Σ^{AB} is the covariance matrix between ε_t^A and ε_t^B.

To illustrate how Σ^{AB} is constructed and estimated, suppose that $\varepsilon_t^A = \left(\varepsilon_{1,t}^A \quad \varepsilon_{2,t}^A \quad \varepsilon_{3,t}^A\right)'$ and $\varepsilon_t^B = \left(\varepsilon_{1,t}^B \quad \varepsilon_{2,t}^B \quad \varepsilon_{3,t}^B\right)'$. Then I have

$$\Sigma^{AB} = \begin{bmatrix} \mathrm{cov}(\varepsilon_{1,t}^A, \varepsilon_{1,t}^B) & \mathrm{cov}(\varepsilon_{1,t}^A, \varepsilon_{2,t}^B) & \mathrm{cov}(\varepsilon_{1,t}^A, \varepsilon_{3,t}^B) \\ \mathrm{cov}(\varepsilon_{2,t}^A, \varepsilon_{1,t}^B) & \mathrm{cov}(\varepsilon_{2,t}^A, \varepsilon_{2,t}^B) & \mathrm{cov}(\varepsilon_{2,t}^A, \varepsilon_{3,t}^B) \\ \mathrm{cov}(\varepsilon_{3,t}^A, \varepsilon_{1,t}^B) & \mathrm{cov}(\varepsilon_{3,t}^A, \varepsilon_{2,t}^B) & \mathrm{cov}(\varepsilon_{3,t}^A, \varepsilon_{3,t}^B) \end{bmatrix}. \tag{A2.3}$$

To estimate Σ^{AB}, I retrieve the two estimated errors from the two VAR(1) systems and then calculate the covariance matrix of the two estimated errors.

Similarly, the second term on the right hand of Eq. (3b) can be written as

$$\begin{aligned} \eta_t^{CN} &= \Delta E_t^B \left(\sum_{j=0}^{\infty} \rho_B^j (e_{t+1+j}) \right) - \Delta E_t^A \left(\sum_{j=0}^{\infty} \rho_A^j (e_{t+1+j}) \right) \\ &= \Delta E_t^B \left(\sum_{j=0}^{\infty} \rho_B^j (e_3' z_{t+1+j}^B) \right) - \Delta E_t^A \left(\sum_{j=0}^{\infty} \rho_A^j (e_3' z_{t+1+j}^A) \right) \\ &= \ldots \\ &= e_3' \Gamma^B (I - \rho_B \Gamma^B)^{-1} \varepsilon_t^B - e_3' \Gamma^A (I - \rho_A \Gamma^A)^{-1} \varepsilon_t^A \end{aligned}$$

The variance of this term is:

$$\begin{aligned} Var(\eta_t^{CN}) &= Var\left[e_3' B (I - \rho_B B)^{-1} \varepsilon_t^B - e_3' \Gamma^A (I - \rho_A \Gamma^A)^{-1} \varepsilon_t^A \right] \\ &= e_3' \Gamma^B (I - \rho_B \Gamma^B)^{-1} \Sigma^B \left[e_3' \Gamma^B (I - \rho_B \Gamma^B)^{-1} \right]' \\ &+ e_3' \Gamma^A (I - \rho_A \Gamma^A)^{-1} \Sigma^A \left[e_3' \Gamma^A (I - \rho_A \Gamma^A)^{-1} \right]' \\ &+ 2 e_3' \Gamma^B (I - \rho_B \Gamma^B)^{-1} \Sigma^{AB} \left[e_3' \Gamma^A (I - \rho_A \Gamma^A)^{-1} \right]'. \end{aligned} \tag{A2.4}$$

where I define $e_3 = (0, 0, 1)$.

APPENDIX C

In this Appendix, I consider how the variance decomposition of foreign share price discount is implemented when a richer two-lag VAR specification is taken for the inter-listed firm's log book to market ratio, log return on equity ratio and log return. The long VAR specification with two lags is:

$$\begin{pmatrix} b_t^M - p_t^M \\ e_t^M \\ r_t^M \end{pmatrix} = C^M + \Gamma_1^M \begin{pmatrix} b_{t-1}^M - p_{t-1}^M \\ e_{t-1}^M \\ r_{t-1}^M \end{pmatrix} + \Gamma_2^M \begin{pmatrix} b_{t-2}^M - p_{t-2}^M \\ e_{t-2}^M \\ r_{t-2}^M \end{pmatrix} + \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{pmatrix} \tag{A3.1}$$

where M denotes the market as before and where the polynomials are all of order two. I expand the matrix term into:

$$C^M = \begin{bmatrix} c_1^M \\ c_2^M \\ c_3^M \end{bmatrix}, \quad \Gamma_1^M = \begin{bmatrix} \alpha_1 & \alpha_2 & \alpha_3 \\ \beta_1 & \beta_2 & \beta_3 \\ \delta_1 & \delta_2 & \delta_3 \end{bmatrix}, \quad \Gamma_2^M = \begin{bmatrix} \alpha_1' & \alpha_2' & \alpha_3' \\ \beta_1' & \beta_2' & \beta_3' \\ \delta_1' & \delta_2' & \delta_3' \end{bmatrix}, \text{ and } \varepsilon^M = \begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \varepsilon_3 \end{pmatrix}.$$

I then substitute (A3.1) into (A2.1) and simplify by stacking the first-order system as suggested by Sargent (1979). For clarity of expression, I use the M superscript for the constant term and error term. For simplicity, I ignore the M superscript for the elements of these matrices. Then the two-lag VAR model (A3.1) can be written into a one-lag VAR model:

$$\begin{pmatrix} b_t^M - p_t^M \\ b_{t-1}^M - p_{t-1}^M \\ e_t^M \\ e_{t-1}^M \\ r_t^M \\ r_{t-1}^M \end{pmatrix} = \begin{pmatrix} c_1 \\ 0 \\ c_2 \\ 0 \\ c_3 \\ 0 \end{pmatrix} + \begin{bmatrix} \alpha_1 & \alpha_1^{/} & \alpha_2 & \alpha_2^{/} & \alpha_3 & \alpha_3^{/} \\ 1 & 0 & 0 & 0 & 0 & 0 \\ \beta_1 & \beta_1^{/} & \beta_2 & \beta_2^{/} & \beta_3 & \beta_3^{/} \\ 0 & 0 & 1 & 0 & 0 & 0 \\ \delta_1 & \delta_1^{'} & \delta_2 & \delta_3^{/} & \delta_3 & \delta_3^{/} \\ 0 & 0 & 0 & 0 & 1 & 0 \end{bmatrix} \begin{pmatrix} b_{t-1}^M - p_{t-1}^M \\ b_{t-2}^M - p_{t-2}^M \\ e_{t-1}^M \\ e_{t-2}^M \\ r_{t-1}^M \\ r_{t-2}^M \end{pmatrix} + \begin{pmatrix} \varepsilon_{1t} \\ 0 \\ \varepsilon_{2t} \\ 0 \\ \varepsilon_{3t} \\ 0 \end{pmatrix}.$$

(A3.2)

Model (C2) can be written more succinctly as:

$$z_t^M = C^M + \Gamma^M z_{t-1}^M + \varepsilon_t^M \tag{A3.3}$$

The error term $\varepsilon^M{}_t$ is assumed to have a covariance matrix Σ^M and to be independent of everything known at *t-1*. I make assumptions that errors are not correlated across firms at this stage. Taking the expectations on both sides of equation (A3.2) gives:

$$\begin{aligned} E_t^M\left(z_{t+1+j}^M\right) &= C^M + \Gamma^M E_t^M(z_{t+j}^M) \\ &= C^M + \Gamma^M\left[C + ME_t^M(z_{t+j-1}^M)\right] \\ &= C^M + \Gamma^M C^M + \left(\Gamma^M\right)^2 E_t^M(z_{t+j-1}^M) \\ &= ..... \\ &= \left[I + \Gamma^M + \left(\Gamma^M\right)^2 + ... + \left(\Gamma^M\right)^j\right] C^M + \left(\Gamma^M\right)^{j+1} z_t^M . \end{aligned} \tag{A3.4}$$

Similar to Equation (b1), using (A3.4), I can derive the difference in expected return news as:

$$
\begin{aligned}
\eta_t^{DN} &= \Delta E_t^B\left(\sum_{j=0}^{\infty}\rho_B^j(r_{t+1+j}^B)\right)-\Delta E_t^A\left(\sum_{j=0}^{\infty}\rho_A^j(r_{t+1+j}^A)\right)\\
&= \Delta E_t^B\left(\sum_{j=0}^{\infty}\rho_B^j(e_5^{/}z_{t+1+j}^B)\right)-\Delta E_t^A\left(\sum_{j=0}^{\infty}\rho_A^j(e_5^{/}z_{t+1+j}^A)\right)\\
&= \sum_{j=0}^{\infty}\rho_B^j e_5^{/}\Delta E_t^B\left(z_{t+1+j}^B\right)-\sum_{j=0}^{\infty}\rho_A^j e_5^{/}\Delta E_t^A\left(z_{t+1+j}^A\right)\\
&= e_5^{/}\sum_{j=0}^{\infty}\rho_B^j\left(\Gamma^B\right)^{j+1}\left[z_t^B-E(z_t^B)\right]-e_5^{/}\sum_{j=0}^{\infty}\rho_A^j\left(\Gamma^A\right)^{j+1}\left[z_t^A-E(z_t^A)\right]\\
&= e_5^{/}\Gamma^B(I-\rho_B\Gamma^B)^{-1}\left[z_t^B-E(z_t^B)\right]-e_5^{/}\Gamma^A(I-\rho_A\Gamma^A)^{-1}\left[z_t^A-E(z_t^A)\right]\\
&= e_5^{/}\Gamma^B(I-\rho_B\Gamma^B)^{-1}\varepsilon_t^B-e_5^{/}\Gamma^A(I-\rho_A\Gamma^A)^{-1}\varepsilon_t^A
\end{aligned}
\tag{A3.5}
$$

where $e_5^{'}=(0,0,0,0,1,0)$. Taking the variance of Equation (A3.5) yields:

$$
\begin{aligned}
Var(\eta_t^{DN}) &= Var\left[e_5^{/}\Gamma^B(I-\rho_B\Gamma^B)^{-1}\varepsilon_t^B-e_5^{/}\Gamma^A(I-\rho_A\Gamma^A)^{-1}\varepsilon_t^A\right]\\
&= e_5^{/}\Gamma^B(I-\rho_B\Gamma^B)^{-1}\Sigma^B\left[e_5^{/}\Gamma^B(I-\rho_B\Gamma^B)^{-1}\right]^{/}\\
&+e_5^{/}\Gamma^A(I-\rho_A\Gamma^A)^{-1}\Sigma^A\left[e_5^{/}\Gamma^A(I-\rho_A\Gamma^A)^{-1}\right]^{/}\\
&+2e_5^{/}\Gamma^B(I-\rho_B\Gamma^B)^{-1}\Sigma^{AB}\left[e_5^{/}\Gamma^A(I-\rho_A\Gamma^A)^{-1}\right]^{/}
\end{aligned}
\tag{A3.6}
$$

where $\Sigma^A=\mathrm{cov}(\varepsilon_t^A)$, $\Sigma^B=\mathrm{cov}(\varepsilon_t^B)$ and Σ^{AB} is the covariance matrix between ε_t^A and ε_t^B. In this expression, However, I need to estimate parameter matrix Σ^{AB}.

To illustrate, suppose that

$\varepsilon_t^A=\begin{pmatrix}\varepsilon_{1,t}^A & 0 & \varepsilon_{2,t}^A & 0 & \varepsilon_{3,t}^A & 0\end{pmatrix}$ and $\varepsilon_t^B=\begin{pmatrix}\varepsilon_{1,t}^B & 0 & \varepsilon_{2,t}^B & 0 & \varepsilon_{3,t}^B & 0\end{pmatrix}$. Then, I have

$$
\Sigma^{AB}=\begin{bmatrix}
\mathrm{cov}(\varepsilon_{1,t}^A,\varepsilon_{1,t}^B) & 0 & \mathrm{cov}(\varepsilon_{1,t}^A,\varepsilon_{2,t}^B) & 0 & \mathrm{cov}(\varepsilon_{1,t}^A,\varepsilon_{3,t}^B) & 0\\
0 & 0 & 0 & 0 & 0 & 0\\
\mathrm{cov}(\varepsilon_{2,t}^A,\varepsilon_{1,t}^B) & 0 & \mathrm{cov}(\varepsilon_{2,t}^A,\varepsilon_{2,t}^B) & 0 & \mathrm{cov}(\varepsilon_{2,t}^A,\varepsilon_{3,t}^B) & 0\\
0 & 0 & 0 & 0 & 0 & 0\\
\mathrm{cov}(\varepsilon_{3,t}^A,\varepsilon_{1,t}^B) & 0 & \mathrm{cov}(\varepsilon_{3,t}^A,\varepsilon_{2,t}^B) & 0 & \mathrm{cov}(\varepsilon_{3,t}^A,\varepsilon_{3,t}^B) & 0\\
0 & 0 & 0 & 0 & 0 & 0
\end{bmatrix}.
\tag{A3.7}
$$

The parameter matrix Σ^{AB} is estimated by taking the sample Variance-Covariance matrix of the residuals of the estimated VAR system. This shows how the variance of expected return news, (3a), is estimated through the long VAR model.

Similarly, Eq. (3b) can be written as,

$$\begin{aligned}\eta_t^{CN} &= \Delta E_t^B\left(\sum_{j=0}^{\infty}\rho_B^j(e^B_{t+1+j})\right)-\Delta E_t^A\left(\sum_{j=0}^{\infty}\rho_A^j(e^A_{t+1+j})\right)\\ &= \Delta E_t^B\left(\sum_{j=0}^{\infty}\rho_B^j(e_3^{/}z^B_{t+1+j})\right)-\Delta E_t^A\left(\sum_{j=0}^{\infty}\rho_A^j(e_3^{/}z^A_{t+1+j})\right)\\ &= \ldots\\ &= e_3^{/}\Gamma^B(I-\rho_B\Gamma^B)^{-1}\varepsilon_t^B - e_3^{/}\Gamma^A(I-\rho_A\Gamma^A)^{-1}\varepsilon_t^A\end{aligned}$$

Its variance is:

$$\begin{aligned}Var(\eta_t^{CN}) &= Var\left[e_3^{/}\Gamma^A(I-\rho_A\Gamma^A)^{-1}\varepsilon_t^A - e_3^{/}\Gamma^B(I-\rho_B\Gamma^B)^{-1}\varepsilon_t^B\right]\\ &= e_3^{/}\Gamma^A(I-\rho_A\Gamma^A)^{-1}\Sigma^A\left[e_3^{/}\Gamma^A(I-\rho_A\Gamma^A)^{-1}\right]^{/} +\\ &\quad e_3^{/}\Gamma^B(I-\rho_B\Gamma^B)^{-1}\Sigma^B\left[e_3^{/}\Gamma^B(I-\rho_B\Gamma^B)^{-1}\right]^{/} +\\ &\quad 2e_3^{/}\Gamma^A(I-\rho_A\Gamma^A)^{-1}\Sigma^{AB}\left[e_3^{/}\Gamma^B(I-\rho_B\Gamma^B)^{-1}\right]^{/}\end{aligned} \tag{A3.8}$$

where $e_3^{/}=(0,0,1,0,0,0)$. The variance, (A3.8), of cash flow news can be similarly estimated to the variance, A3.6), of expected return news.

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