Asset Pricing in Chinese Capital Market

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Abstract

This research report includes both a summary and some further analysis based on the Chinese capital market asset pricing research papers published in top journals for the last 5 years. The opinions of 20 fund managers from top 10 mutual funds in China from a recent interview will also be included in this paper. Our discussion will involve a wide range of topics in asset pricing including underperformance puzzle of the Chinese equity market, equity pricing puzzle in segmented market, stock synchronicity and foreign shareholders' influence on the equity pricing. Our analysis will show that the following four factors form the foundation to the answer of those questions. These four factors are information asymmetry, legal system incompleteness, the political System's influence on economic efficiency and asset pricing, and financial market incompleteness such as the constraint of short sales. We will also look into several of the most debatable topics related to asset pricing of Chinese capital market.

I. Introduction

1.1 Background

Chinese capital market's development path is quite different from those of many developed countries in Europe or North America. The first modern stock exchange in China was not established until 1990. Whereas, the financial system was already well developed in countries like the United States after 1929's great depression. We also notice that modern financial theories were introduced by a group of famous US economists like Harry Markowitz and Williams Sharpe starting from 1950s. Therefore, modern financial theories like CAPM were established well after the financial market had been developed in countries like the United States. Since these theories were mostly based on empirical data from the US market or other mature markets, many of those traditional financial theories may not apply in China because Chinese capital market is still far from fully developed now. Chinese capital market is also very different from other financial markets because of the capital inflow control, and the fact that foreign investors cannot directly invest in the Chinese A-share equity market, the main market because of legal issue. This will also lead to one of our main topics concerning the asset pricing: The A-H and A-B stock premium or discount puzzle. Last but not least, China's unique global political and economic position makes the study of Chinese capital market intriguing but complicated. China is now the second largest world economic entity measured by GDP. China is governed by the communist party and its political system is very different from those of western countries. First proposed by Chinese communist party's former leader XiaoPing Deng, China is now defined by its leaders as a socialist country, however, with market economy. There are also some interesting historical facts about Chinese capital market. According to the lastest statistics of the world top ten stock exchanges, China is the only country which is neither a "western" country nor has been colonized before Second World War. Therefore, it is usually very difficult for many financial scholars to truly understand Chinese capital market because of the cultural difference.

Figure.1

Largest Domestic Equity by Market Capitalization

	Exchange	USD bn end-2011
1	NYSE Euronext (US)	11 796
2	NASDAQ OMX (US)	3 845
3	Tokyo Stock Exchange Group	3 325
4	London Stock Exchange Group	3 266
5	NYSE Euronext (Europe)	2 447
6	Shanghai Stock Exchange	2 357
7	Hong Kong Exchanges	2 258
8	TMX Group	1 912
9	BM&FBOVESPA	1 229
10	Australian Securities Exchange	1 198

Largest equity market by share of value traded

	Exchange	USD bn 2011
1	NYSE Euronext US	18 027
2	NASDAQ OMX US	12 724
3	Tokyo Stock Exchange Group	3 972
4	Shanghai Stock Exchange	3 658
5	Shenzhen Stock Exchange	2 838
6	London Stock Exchange Group	2 837
7	NYSE Euronext Europe	2 134
8	Korea Exchange	2 029
9	Deutsche Börse	1 758
10	TMX Group	1 542

Data source: World federation of exchanges, 2012

1.2 Four worthy-noting factors

Information Asymmetry:

We observe information opacity problem both in in mature markets and emerging markets. However, the information asymmetry problem is more severe in emerging market like in the Chinese capital market. Information asymmetry exists at several levels in Chinese equity market: between state-own corporations and private companies, between board of directors, executive officers of the corporation and small shareholders, between institutional investors and retail investors, and between domestic investors and foreign investors. As we will notice, quite a few authors cited information asymmetry as the main reason for some of the asset pricing puzzles.

Legal System Incompleteness:

Financial and law scholars have long been criticizing China for its poor legal system. Legal system incompleteness influences asset pricing in a few ways. Firstly, inside trading and stock pirce manipulations are very rampant in China and those crimes have been continously igored by regulators and the goverment. According to China Securities Regulatory Commission's statistics, the amount of fund that has been involved in inside trading and revealed by investigation had a figure of 5.7 billions RMB in 2011. However, this is only the tip of the iceberg. The huge amount of inside tradings in China have led equity prices to a strong deviation from their underlying values. Secondly, it is a known fact that the illegal manipulations of financial statements in listed sector are also serious and out of control. The ignorance of this phenomenon by CSRC further worsen the problem. Thirdly, the lack of protection for small shareholders and retail investors is also very serious. As this paper will later state, the legal system incompleteness problem has greatly encouraged inside trading and financial statement manuipulation, and is one of the main reasons that the Chinese stock Index(Shanghai Composite and Shenzhen Composite) has

underperformed all major markets in Asia in the first half year of 2012 despite China's economic growth miracle.

Political System's influence on economic efficiency and asset pricing:

A number of scholars have pointed out that China's stale political system has become a great barrier for its economic growth. The state-own corporations in China are also severely criticized for their inefficiency. Nevertheless, some scholars recently start to argue that evidence from asset sales in both listed sectors and non-listed sectors has shown that state-own corporations can be more superior to private corporations in several ways despite their inefficiency (CalomirisFismanWang 2010 JFE). Also, Nobel Prize laureate Michael Spence and a few Stanford scholars in recent speeches argued that the a general democracy system might be inferior to such a political system(for example: the Chinese political system) in economic growth term in emerging markets. Therefore, it is very difficult to calibrate what Chinese political system's influence on its economic efficiency indeed is. However, there are still some facts about Chinese's political system that we can be more sure about. Quite a few mutual fund managers and Chinese newspapers have defined Chinese equity market as the Communist party's market, indicating that the Chinese government may has a much more interfering power in the equity market and asset pricing than those governments in mature markets.

Financial Market Incompleteness:

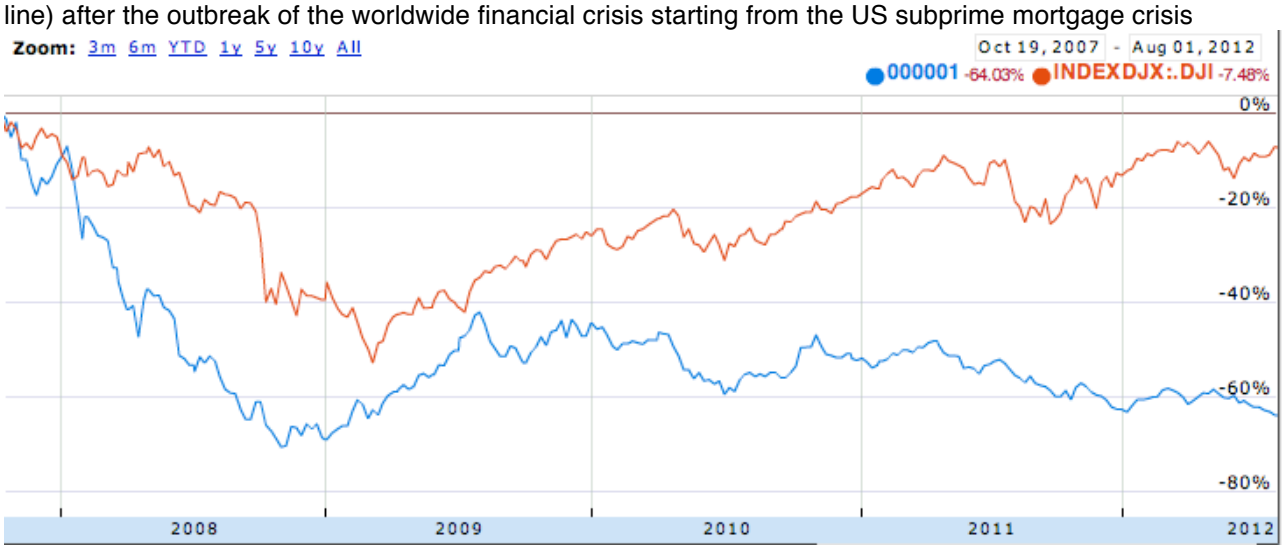
Previous research shows that financial market incompleteness, especially the lack of short sales will tend to boost overall equity prices in the financial market. Short sales for a few blue-chip stocks and the equity market index(HuShen 300 Index, a mixture index comprises of stocks both from Shanghai Stock exchange and Shenzhen Stock exchange) were first allowed under regulation in China in 2010 April. Since then, Chinese equity market had entered a long bear market. Therefore, the permission of short sales was widely considered by many Chinese mutual fund managers as one of the most important reason for Chinese equity market's underperformance. Besides that, we also need to notice that even after the permission of the short sales, Chinese equity market is still more underdeveloped and incomplete compare to mature markets in many aspects.

II. Underperformance puzzle of the Equity Market

Despite China's well-known miraculous GDP growth, Chinese equity market's performance can be described as very disappointing to most domestic investors. In year 2011, the Shenzhen Composite's performance had ranked the last but one among all major equity markets around the globe, only better than Greece's ATHEX index(Figure 2 in Appendix). Ironically, the Shenzhen Composite index still had outperformed a few trivial markets like Cyprus(neighbour of Greece) and Egyptian index (where civil wars had devastated the economy). In the first half year of 2012, Shanghai and Shenzhen Composite had again underperformed all major markets in Asia. This unusual phenomenon have caught a lot of attentions and may have been caused by the following reasons:

- The overcorrection of asset price due to the permission of short sales of stock market index(a reason derived from financial market incompleteness and its development)
- The depression of the asset price by the central government
- The poor asset and dividends claim rights held by small shareholders due to the legal system incompleteness

Figure 3. Comparison between Dow Jones Industrial Average(Red line) and Shanghai Composite index(blue line) after the outbreak of the worldwide financial crisis starting from the US subprime mortgage crisis



Data source: Google finance

2.1 The overcorrection of asset price due to the permission of short sales of stock market index

The permission of short sales and the stock index future was always considered as a double edge sword for financial markets. As we have stated before, the permission of short sales was widely considered as one of the most important reasons for Chinese equity market's underperformance by many Chinese mutual fund managers and market analysts. Other scholars argued that stock index futures and the permission of short sales was actually the stepping stone to a more complete and better functioning financial market. Bekaert and Harvey (2000) has indicated that the short sales have evidently decreased the cost of capital in emerging markets, which greatly promoted the market efficiency. Bris Goetzmann and Zhu (2007) has also pointed out that short sales increases market efficiency from 46 major stock markets around the world's evidence. Bris Goetzmann and Zhu uses downside-minus upside R square as a measurement of market efficiency and argue that shorts sales will decrease the value of this measurement, thus increase the market efficiency. They have also used cross-autocorrelation and other measurements which come to the same conclusion that equity market gets more efficient, and price discovery mechanism for the stock market is functioning better with short sales. However, they also states that with short sales, the market's negative skewness significantly increases. Prior to them, Asquith and Meulbroek (1995) had also declared in their paper that short sales might bring strong negative stock returns. When short sales are not permitted and stock prices are overevaluated, traders who previously did not hold the stock could not enter the market and sell the stocks to correct the equity prices. After

short sales are permitted, investors will enter the market and the process of price correction will happen much faster. However, this may also cause panic when the market is weak and the panic will be widespread if the stock index future drops too fast. Since the short sales and and the stock index future came out when the Chinese equity market was relatively weak, many investors believe that the short sales and stock index future was permitted at a wrong time in China and finally lead to the long bear market in the Chinese equity market.

Figure 4. Shanghai Composite Index after the pass of the partial short sales permission

Data source: Google finance

2.2 The depression of the asset price by the central government

The depression of the asset pricing by the central government also greatly contributed to the underperformance of the equity market. Before the start of the bear market, two impending problems were the center of a hot debate in public and also on newspaper. They were the unstoppable rising house price(we will discuss this in detail later in Chapter V) and the also unstoppable high inflation rate. These two problems had become so serious that they were already looming to greatly threat both the stability of the political system and society. As central government had figured out that equity market both had high positive correlation with CPI and housing asset price, government mandated the central bank to fulfill a “dual mandate” to address both problems by strongly suppressing the equity market. As several managers indicated, the equity market crashed under the fear of waves of negative policies and heavy regulations toward the equity market.

2.3 The poor asset and dividends claim rights held by small shareholders due to the legal system incompleteness

The legal system incompleteness has long been a problem and discussed in detail by Allen, Qian, Qian (2005 JFE). Because of the prevalence of insider trading and price manipulation, added with under-payment or non-payment of dividends to small shareholders despite corporate profit increases, Chinese equity market has always been regarded as a "casino" rather than a place to make a value investment. Due to the problems stated above, rational investors can't expect discount cash flow method to work to evaluate a company's fundamental value. Therefore, they might tend to speculate and overvalue the equities during a boom to reflect value added from rampant speculation, and to severely undervalue the equities and further overdiscount the cash flow during a recession because of the lack of confidence in having the right to claim the dividends they deserve from a corporation. Together, the three factors stated above may have led to the continuously underperformance of the Chinese equity market.

III. Equity pricing puzzle in segmented market

3.1 Background

Following the paradigm of many other successful emerging markets, Chinese equity market was also divided into segments when first established. For domestic investors, they were allowed only to invest in the A share market. For foreign investors, they were allowed to invest in B share or H share market. In terms of the trading volume and market cap, A share market significantly dominates B share and H share market. A qualified Chinese company can choose to go public only in one of those markets, or all those markets either simultaneously or one market after another. However, most companies take A share market as their first choice, and we usually observe companies go public either in A share market only, or A-H share market together, or A-B share market together. The difference between B share and H share is that H share characterizes the Chinese companies that have gone public in HongKong stock exchange and needs to follow the regulations in Hongkong, whereas B share market is traded on Shenzhen and Shanghai Stock exchange and the market is still under the regulation of China Securities Regulatory Commission. Those companies in the H share market are usually gigantic SOEs that have significant need to raise fund, and the trading of H-share is HongKong dollar denominated. On the contrary, B share market contains more small-cap companies and middle size SOEs, and the trading of B-share is USD-denominated on Shanghai stock exchange and HongKong dollar denominated in Shenzhen stock exchange. After February 19, 2001, Chinese domestic investors were allowed to invest in B share market too but with certain limitation. What caught researchers' attention was the unusual relative pricing of A shares to B shares and H shares. The A shares were traded at a much higher premium than B shares and H shares, quite different from all other emerging markets' experiences. The following analysis will show that the equity premium of A shares is caused by different reasons during different periods. The equity discount of B shares and H shares also have different rationale behind it.

Figure 10. Graph explanation of the segmented market in China between 1992 and 2001

	Regulator	Investors	Trading Currency	Company Traded	Overall Market-Cap
A share	CSRC	Mainland	RMB	All kinds of firms	Huge
B share	CSRC	Foreigners	USD(SZ),HKD(SH)	Middle-cap	Trivial compare to A
H share	HKSI	Foreigners	HKD	Selected Blue-chip	Trivial compare to A

3.2 Hypothesis discussing A-B, A-H equity price premium

Chan and Kwok(2005 JEMF) had proposed three hypothesis for the A-B share discount puzzle. The **differential demand Hypothesis(1)**, first proposed by Fernald and Roger (1998), stated that Chinese domestic investors had limited alternative investment choices from 1990 to 1998 therefore pushed up the equity price due to the high trading volume. On the other hand, because of the Asia 1997 financial crisis, foreign investors were generally cautious of the Asia markets at that time. Also during that period, China's economy was not regarded as promising and attractive, which led to the discount of B shares. The **liquidity preference hypothesis(2)**, stated that A shares market was much more liquid than B shares. For this reason, foreign investors included the liquidity risk into the discounting factor of DCF leading to a low B share asset price. The **Differential risk hypothesis** and **Information asymmetry hypothesis(3)**, claimed that due to the lack of information for foreign investors, they tends to choose a higher discounting factor to compensate for the fact that they had less information than domestic investors. Also, Karolyi Li Liao (2009) had pointed out that foreign investors might feel inferior and more uncertain than domestic investors because of the large portion of non-tradable shares in those companies. As we will discuss in detail in Chapter VI, state-own enterprises(SOEs) in Listed sector featured large amount of non-tradable shares had created great uncertainties for foreign investors as well as domestic investors. ChanMenkveldYang (2008) used the PIN(Probability of Informed Trading Measurement) and other measures also found out the presence of information asymmetry between A shares and B,H shares markets. Domestic investors were more confident in investing in the market because they might have more information regarding the future unlock date for those untradable shares, or since most Chinese domestic investors had much less knowledge of asset prcing theory and knowledge of finance than foreign professonal investors, they tend to igore those underlying risks.

For the H-share market, YangChan(2009 WP) and MeiScheinkwanXing(2009) had both indicated the short-sales mechanism have led to the lower asset prices in the H-share market. Several previous research already implies that high trading volume with short-sales constraint may lead to consistent overprice of the A-share asset price relative to H-share. Moreover, the Listed corporations in Hongkong stock exchange are mainly SOEs. The large amount of non-tradable shares may have become a barrier to foreign investors in correctly pricing H-shares.

Figure 5.

3.3 Recent developments

Recently(July 30th 2012), the B share markets again caught investors' eyes as B shares market crashed and had a single trading day drop of 4.71%. This leads to further discussion of A-B shares and A-H shares problem. The A-B shares premium problem may just become a history soon according to GUOXIN Securities' analysts. The rationale we analyzed in the above paragraph well characterized the A-B share premium in 1992-2005, however, may no longer apply for now. First, in 2001, domestic investors were allowed to invest in B-shares under certain limitation. This has led to a discount drop from 80% to 40% on average. Secondly, alternative channels to directly invest in Chinese A share market has weaken and replace B share as the best way to invest in China's equity market. QFII and RQFII(Qualified Foreign Institutional Investors) has become a much more popular way to invest in China's growth than B share market. Example of QFII investors in China are Bill&Melinda Gates' endowment fund, Morgan Stanley's wealth management fund, UBS's wealth management fund, Harvard and Yale's endowment fund and etc. The CSRC has also recently passed a few lessen regulation bills to support the growth of QFII and RQFII, suggesting that foreign direct investment in A share market is being greatly supported by the central government. Thirdly, the relatively size of B-share market has become trivial compare to A-share market. News have been spread that B-share market may be forever delisted after mature direct investment mechanism has been built.

IV. Stock Synchronicity

Chinese equity market can be characterized by its high internal synchronicity(all A share market traded companies' prices are highly correlated) and low external correlation with world equity markets. Chinese equity market was shown as having lower correlation with Dow Jones, S&P500 and other major financial markets than other emerging markets like Taiwan and Hongkong index. GulKimQiu (2010 JFE) has stated that in China's case, the

stock synchronicity is positively related to high government ownership in the corporations, and inversely associated with foreign ownership and auditing quality. A company with high governement ownership signify that its financial information is more opaque. Previously, Morck Yeung and Yu (2000) indicated that stock price movements were more synchronous in emerging markets because less information was available in the public. Both papers have taken an information asymmetry approach as the explanation for this phenomena. In developed countries and mature markets where corporations' information is more readily available, a single corporation's bad news or good news' influence can be very limited because other corporations within the same industry's financial information can be easily accessed and evaluated at the same time too. **For developing countries, a single corporation's bad news or good news can turn out to be widely influential and will arise general fear or optimism because of other corporations' information opacity**. For example, when a company's quarterly reported earning is below expectation, those companies within the same industry or correlated industry will usually severely suffer as well.

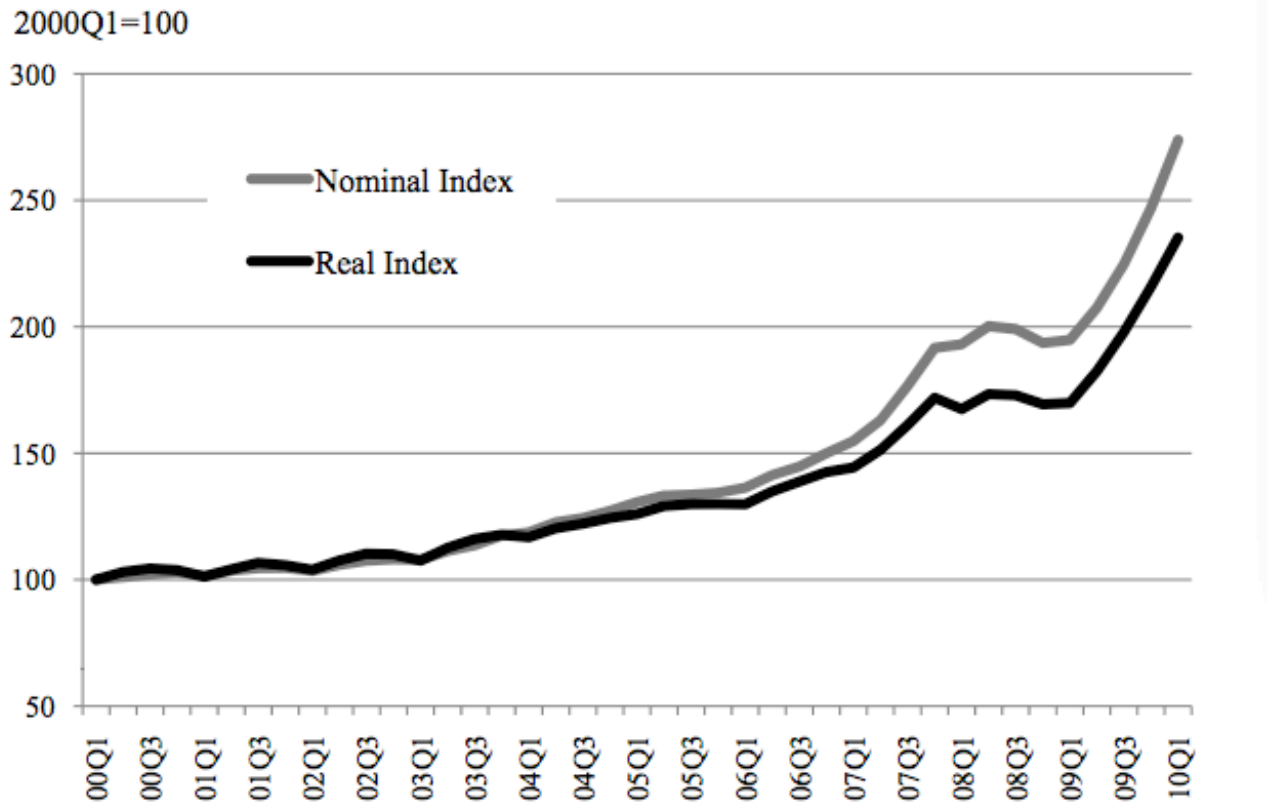
We notice that Chinese government serves as both the regulator and blockholder of a wide number of stocks which are heavily weighted in ShangHai and Shenzhen Composite. Therefore, government may frequently interfere in the market to benefit its own investment funds and the SOEs. This has caused retail investors to trade all their portfolios according to government's intent for the market which causes comovement among a wide range of stock prices in the market. Another reason for high stock synchronicity might be that most emerging markets' economies are heavily depending on exports. Then, many of the public trading companies depending on exports are vulnerable to general macro-level news like changes of exchange rate and interest rate. Therefore, general macro-level news usually causes equity prices in China to move together. If we now shift our attention to Chinese equity market's correlation with world equity market, LinMenkveidYang(2009 CER) has discovered that A shares indices have never really been correlated with world market despite its more and more reliance on global trade and global economy. Their research also suggested that Chinese central government has played an important but implicit role for changes in volatility and correlation of the equity market.

Housing asset bubbles

From year 2003 to 2007, chinese housing price to rents ratio increases from 30% to 70% when real price had an increase of 225%. As we have discussed in first chapter, the skyrocketing housing price had become so serious a problem that it was already looming to greatly threat both the stability of the political system and society. However, the housing price crisis is definitely not as simple as it seems. The analogy of US subprime mortgage crisis and the anticipation of a similar crash in housing market in China was always made among scholars and columnists from finance newspaper. Nonetheless, there is a fundamental difference between US and China's housing problem. The highly securitization of US housing market was not seen at all in China. WuGyourkoDeng (2010 WP) proposed several reasons as the pushing hand for the skyrocketing China housing price. The first and the most important reason is again the government's interference in the housing market. Central government serves as both the regulator and the market maker.

Local governments' main revenue comes from the sales of raw lands, so the central government push policies that encourage the sale of high raw lands prices. SOEs are the main entities that bid up the high price raw lands and then sold them at a even higher premium after the constructions of the buildings. Central governement will make sure that SOEs get the bids because most part of those profit from local governments and SOEs will eventually flow back to central government. Secondly, besides export demand, China's main internal demand comes from housing market or industries related to construction of housing. Therefore, if the housing market crash, China's GDP growth miracle will probably be no more as well and it will very much hit political leaders' images. Therefore, central government is very reluctant to directly suppress the housing market despite the strong protest from the public. Thirdly, WuGyourkoDeng(2010 WP) also pointed out that the lack of alternative investment has made housing investment the second best investment channel besides the A-share equity market. Last but not least, some interesting factors were pointed by Wei Zhang(2009). Owning a big house is always regarded as a sign of success and decent social status in China. WeiZhang (2009) also pointed out a seemingly funny but true factor. Men in China are more likely to succeed in Marriage "market" if they own a house and a decent car. The fear and anticipation of a even higher housing price in the future has created a rigid demand in housing market. All these factors have together led to the skyrocking housing price in China. The recent long bear market in equity market has brought the discussion of the housing asset overpricing problem to a halt because housing prices drop accordingly as well. However, as the Chinese economy gradually recover from recession and the equity and housing prices will eventually go up, housing price will again become a hotly debatable topic soon.

Figure 6, Constant quality price index for newly-built private housing in 35 major Chinese Cities, 2000-2010



Data Source: Institute of real estate studies, Tsinghua university

V. Ownership and agency problem in asset sales, non-tradable shares unlock and more

Since April 2005, CSRC had announced a series of regulations regarding the split-share structure reform. Before the reform, two-third of all shares in the equity market were non-tradable shares held by government managerial boards. Non-tradable share has the same voting right as tradable share however was generally lockup at first to serve as a commitment to alleviate the so-called agency problem. It is very similar to an IPO lock-up in mature market but has an infinite lockup period before the reform(The ownership was belong to government rather than private compared to IPO lock-up as well). After the reform, the non-tradable shares would become tradable following similar steps of an IPO non-tradable shares unlock. LiWangCheungJiang(2011 RFS) regarded this unlock as a risk sharing process, and the boards of management would compensate previous tradable holders to prevent them from dumping the stock to cash out before the unlock. LiaoLiuWang (2011 FM)'s research has found that an abnormal strong average negative stock returns (-14%) was observed during [-120, +20] trading day(The author use the 0 day as the unlock day). For most Chinese firms, non-tradable shareholders include insiders who are endowed with much more private information than tradable shareholders who are considered as outsiders(YuXiaPan 2007). Therefore, tradable shareholders would usually dump shares in advance to discount and adjust the evaluation of the equity in anticipation of the unlock of non-tradable shares. LiaoLiuWang(2011 FM) believes that the agency problem between majority shareholders and minority shareholders equate the agency problems between non-tradable shareholders and tradable shareholders. Moreover, Megginson and Netter(2001) and most researchers believe that in the long run, the efficiency gains from privatization as a consequence of the reform will eventually benefit those corporations after the unlock. CalomirisFismanWang (2010 JFE), on the other hand, argues that the underperformance could last if those previous government-own non-tradable shares mostly shift their ownership to private sector in China's case, because the benefits of political ties could outweigh the efficiency cost of government shareholdings. At the end of 2007, 1254 firms representing over 97% of Chinese A-share market has been fully capitalized, and the non-tradable government-own shares has become a part of history. However, experiences learned from this special case will continue to shed light on future cases of IPO unlock in the equity market.

Figure 7, Cumulative abnormal returns around lockup expirations. The sample contains 482 share lockup expirations between June 2006 and April 2007.

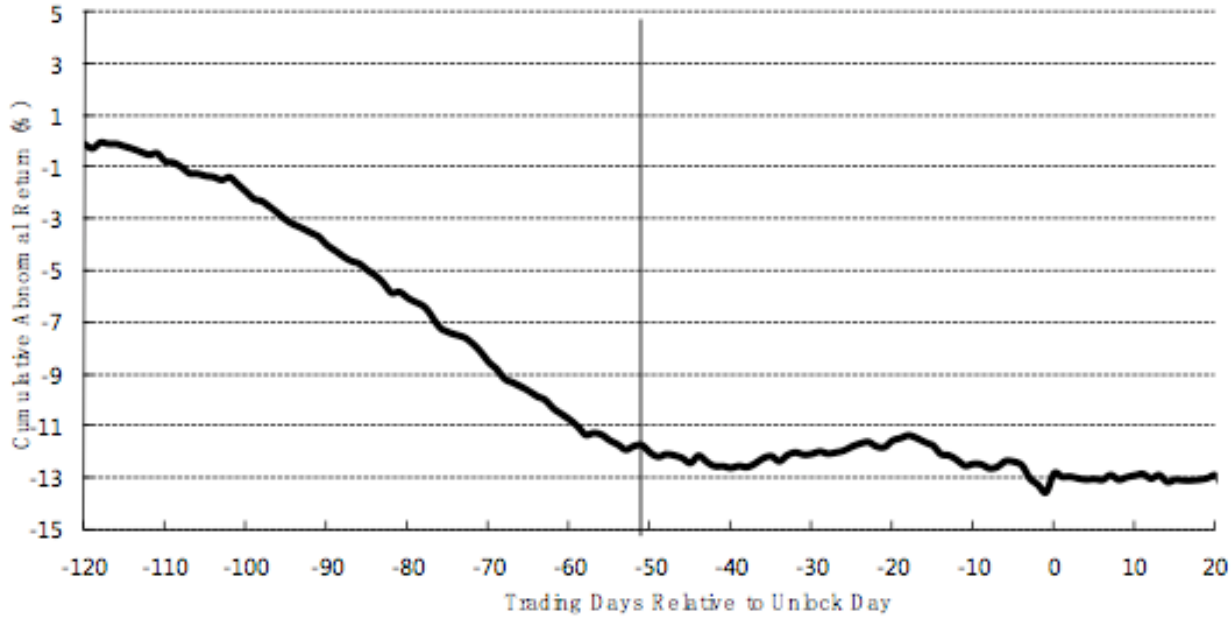
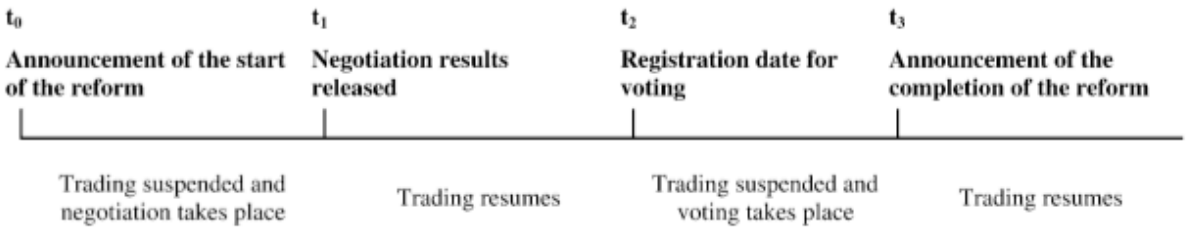
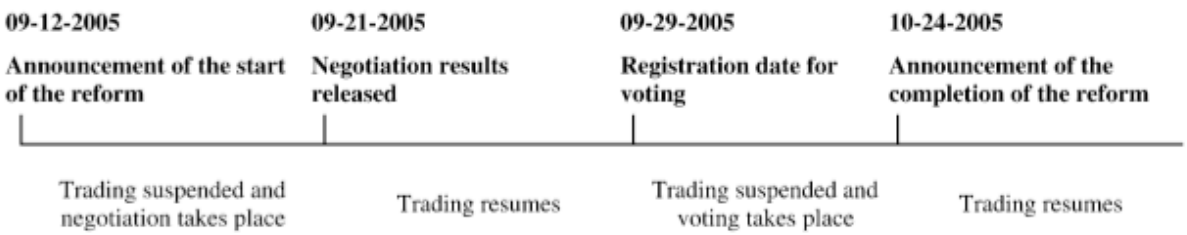


Figure 8, Split share reform process

Panel A: A General Case (single firm)



Panel B: A Case Study – Shanghai Auto's Split Share Structure Reform



VI. Conclusion

We have discussed in details some of the most intriguing topics regarding Chinese capital market. We have also summarized the four important factors as the foundation to the answer of many equity pricing puzzles in China. Nonetheless, we need to notice that the following problems have not been well researched for the Chinese capital market: The corporate bond market(1), the derivative pricing in an incomplete market framework(2) and the problem of how has the equity market pricing changed after the introduce of short sales(3). The importance of development of a complete corporate bond market has always been stressed by governor of China Central bank Zhou Xiaochuan. A well developed corporate bond market will create great efficiency gains for corporations as they would have multiple financing channels, and the cost for borrowing would significantly drop for high-quality and competitive corporations(Figure 8 in Appendix). This market construction does face a lot of problems so far. First, the lack of sound rating agencies makes the evaluation of risk of corporate bonds very difficult. This problem is also caused by the incompleteness of the legal system when CSRC(China Securities and Regulatory Commission) continues to ignore the low auditing quality for corporations and opacity of financial statement information in both listed sector and private sector. Secondly, such companies with personal ties to giant national banks managers could borrow money at extremely low interest rate and take no default risk which contribute to the fact that China's banks have the highest non-performing loans ratio in the world. Therefore, those companies have no incentive to issue corporate bonds. At the same time, high-quality companies with no ties to those banks will have hard time get themselves funded. As those banks can't satisfy the growing need for the huge amount of fund from the large number of rising companies in China, the only solution will be the construction of a more complete bond market. Moreover, even those banks themselves now are issuing many new "financial products" to public which has its essence as mortgage-back securities in order to pass the risk to general investors. This is also signifying the need for a much more complete and trustable corporate bond market. Besides the bond market, the derivative pricing in China capital market is even more rarely touched by scholars. Following Nobel Prize laureate Robert Mundell's experience, a good theory may instruct the development of a new financial system. New research and study are awaiting to be done to build a better and more complete Chinese capital market in the future.

VII. Acknowledge

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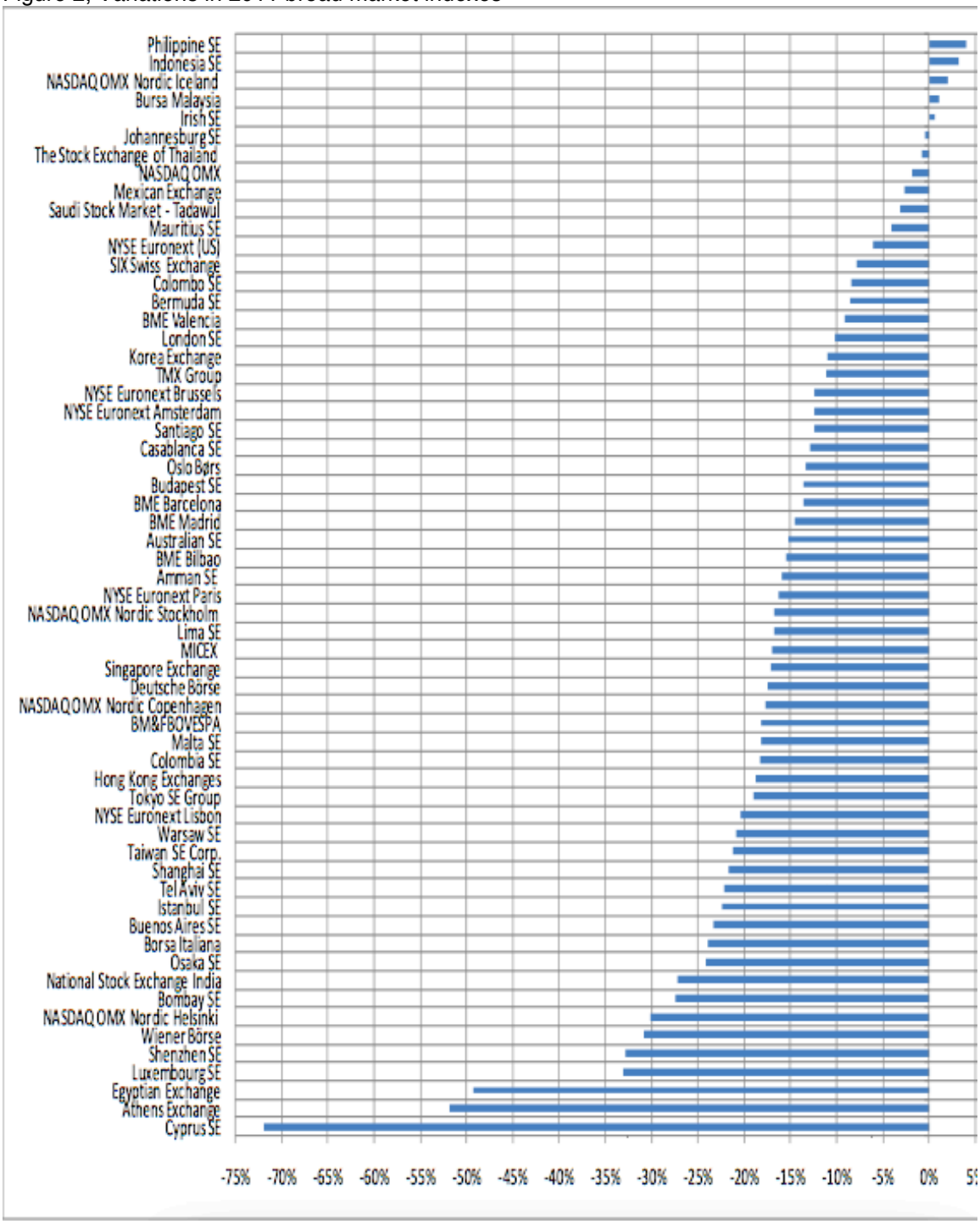
VIII. Appendix

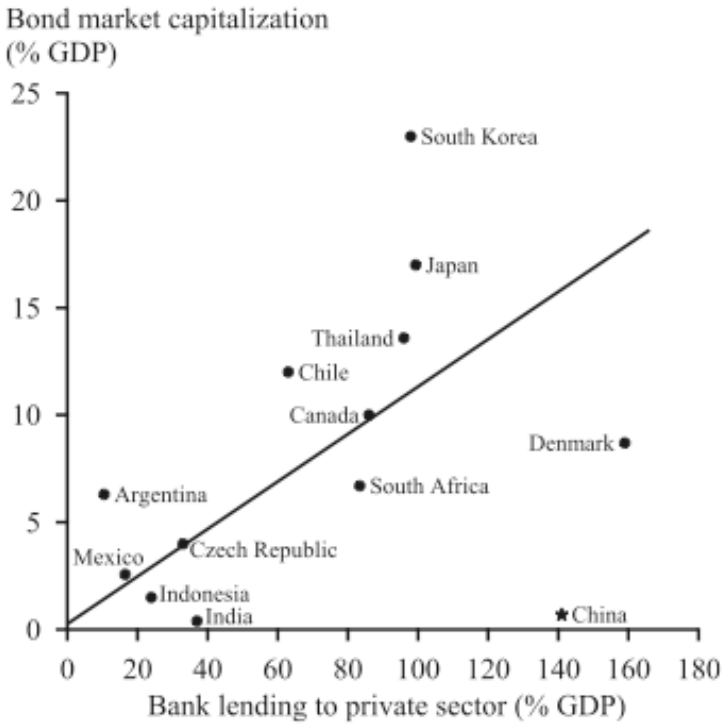
Figure 2, Variations in 2011 broad market indexes



Data source: World Federation of Exchanges, 2012

Figure 8,

Bank lending and the size of bond market



Data source: World Development Indicators, as of the end of 2004.

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