The Best Performing Economy with the Worst Performing Market:
Explaining the Poor Performance of the Chinese Stock Market*

Franklin Allen
Wharton School
University of Pennsylvania
allenf@wharton.upenn.edu

Jun "QJ" Qian
Shanghai Advanced Institute of Finance
Shanghai Jiaotong University
jqian@saif.sjtu.edu.cn

Susan Chenyu Shan
Shanghai Advanced Institute of Finance
Shanghai Jiaotong University
cyshan@saif.sjtu.edu.cn

Julie Lei Zhu
Shanghai Advanced Institute of Finance
Shanghai Jiaotong University
lzhu@saif.sjtu.edu.cn

Last Revised: June 28, 2014
Preliminary and incomplete, comments welcome

Abstract

The size of the Chinese stock market, including stocks listed and traded in Shanghai, Shenzhen and Hong Kong exchanges, is the second largest in the world. The poor performance of this market, especially since the recent global financial crisis, relative to developed (US) and large emerging economies (Brazil, Russia, India and South Africa) as well as unlisted firms in China, has been striking. This is despite the fact that the Chinese economy, also the second largest in the world, has been the fastest growing globally for the past three decades. With firm-level data from over 80 countries for the period 2000-2012, we find that the poor performance cannot be explained by risk or undervaluation of listed firms in China. Instead, factors such as the problematic IPO and delisting processes, and corporate governance related to self-dealing are main contributors.

JEL Classifications: G12, G15, G3.

Keywords: Stock market, return, valuation, IPO, delisting, governance.

* We appreciate helpful comments from Jia Chen, Ruying Hu (of the Shanghai Stock Exchange), Jane Liu, Wei Xiong, Longkai Zhao, and seminar/session participants at Peking University and the Hong Ru Law and Finance Forum. We gratefully acknowledge research assistance from Liangliang Lu, Haofei Wang, Zhen Xu, and financial support from China Academy of Financial Research and University of Pennsylvania. The authors are responsible for all the remaining errors.

I. INTRODUCTION

The Chinese economy has performed extraordinarily well in the past thirty years. In 2014, according to IMF (*World Economic Outlook*, April 2014) figures, China stands ready to overtake the U.S. and become the largest economy in the world in Purchasing Power Parity terms (PPP). This is quite remarkable given that in 1980 its GDP was less than 10% of that of the US. In PPP terms, it will have *double* the US GDP around 2035 as long as it maintains an average growth rate that is at least twice as high as that of the US.

The Chinese stock market started in 1990 with the establishment of two domestic stock exchanges: the Shanghai Stock Exchange (SSE hereafter) and Shenzhen Stock Exchange (SZSE). The market has been growing fast since its inception with a large number of firms being added over the years. Each IPO firm at SHSE and SZSE (the "A share" market) must be approved by the Chinese Securities Regulation Commission (CSRC, equivalent to the SEC in the US). In addition, now over 80% of the total market capitalization of the Hong Kong Stock Exchange (HKSE), which follows rules and regulations similar to those in the UK and US and is open to global investors, consists of companies from (mainland) China ("H share" market). Combining the firms listed and traded in all three exchanges, the Chinese stock market is the second largest in the world, only trailing the US equity markets.

However, the performance of the Chines equity market has been disappointing, especially compared to the growth of GDP. We start from December 31, 1991 as on December 31, 1990 hardly any stocks were listed. Figure 1, Panel A shows that the real GDP performance of China eclipses that of a number of other large developed and emerging economies. By contrast, the Shanghai composite has been one of the worst performing indexes in the world. In fact, as shown in Figure 2, the real value of the index at the end of 2013 is the same as then; only

the Nikkei in Japan and the RTS in Russia have performed nearly as badly.

How can the world's fastest growing economy, where real GDP has grown by a factor of eight (from Figure 1, Panel A) since 1991, have such a poor-performing stock market? There is very little rigorous academic research that addresses this question, which is the main purpose of this paper. We compare the performance of the Chinese market and listed firms with those of the other large developing economies—Brazil, Russia, India and South Africa, and use the US as the benchmark of developed markets. We examine country-, industry and firm-level determinants with a large panel data set that includes over 75,000 firms across 138 exchanges in 89 countries.

The answers to our key question would help policy makers and regulators (e.g., the CSRC) to come up with viable solutions to improve the efficiency and performance of the Chinese stock market. The stock market has not played a role as prominent as the banking sector in financing firms and economic growth (e.g., Allen, Qian and Qian, 2005; AQQ hereafter) since its inception two decades ago. However, the importance of the equity market is growing, and without a stock market that is a viable investment alternative too many resources go into other saving vehicles such as real estate and this leads to many costly distortions in the economy. Further development of the stock market represents one of the main tasks for China's financial system.

We draw on three lines of work in developing our tests. First, there is an extensive strand of literature examine cross-country determinants of financial system development including the stock market. These include a country's macroeconomic conditions, strength of laws and institutions, disclosure and accounting standards, IPO and bankruptcy mechanisms. The variables identified in prior studies are included in our tests as country-level controls. Second, we use the US as a benchmark and we draw on the well-established theories and results on

measuring the risk and returns of stocks and governance and performance of listed firms. Third, we also utilize research on the Chinese economy and related institutional background to help us identify factors that may be unique to the Chinese equity market and corporate sectors.

Although the Shanghai Composite rose initially after the exchange's establishment in 1990 it subsequently fell dramatically in real terms. This was to a large extent due to the fact that inflation in China was very high in the early 1990s as shown in Figure 3. Moreover, many of the securities laws and regulations were introduced during the late 1990s, and the pace of adding new firms to the exchanges slowed down after 2000. For all of these reasons we focus on the period from December 31, 2000 in the rest of the paper. Figure 1, Panel B shows the GDP growth of the same set of countries as Panel A. The Chinese economy grew by a factor of 3.2 (in real terms) over this period, much faster than all the other countries.

Figure 4, Panel A presents the 'buy and hold' returns based on our calculations aggregated from firm-level returns, from 2000 until March 31, 2014, excluding dividends. Moreover, dividends and share repurchases make little difference; as shown in Figure 4, Panel B, returns including payouts show very similar patterns with the performance of the Chinese market the worst of the group. So, overall investors in the stock market have had no return in real terms in the long run. In fact, as shown in Figure 5, the cumulative return of the stock market is less than that of standard bank demand deposits (in real terms) with very low nominal interest rates over the same period, and much lower than that of 5-year deposits.

In evaluating the performance of the Chinese stock market, we first draw on the methodologies of asset pricing, including factors such as interest rates, risk as measured by standard deviation of returns and valuation in terms of P/E (prince-to-earnings) multiple and M/B (market value to book value of assets) ratio. Using both P/E and M/B metrics, we find that

listed firms in all the large countries (BRICS and US) all had a substantial run up in valuation leading up to the 2007-2009 global financial crisis and valuation levels peaked in 2007. But Chinese listed firms had much higher valuation levels than firms from other countries, which is perhaps not surprising given the high growth rate in the economy. Following the crisis, valuation in all countries fell sharply and then rebounded. They did not rebound by as much in China but the valuation levels of Chinese firms are still higher than those of other emerging economies and much higher for US firms.

Our focus is to explore the determinants of the poor performance related to "firm fundamentals," including operating performance as measured by ROA (return on assets) and ROE (return on equity). Interestingly, despite China's phenomenal GDP growth rates, the average operating performance of Chinese listed firms is unimpressive relative to firms from other large emerging economies. AQQ (2005) argued that the 'gap' between the Chinese stock market and its overall economic performance is due to the fact that most of the listed firms are not the best performing firms in the economy.

The key to this hypothesis is the *listing and delisting processes*: as mentioned each IPO firm must be approved by the CSRC and in earlier years this took on the form of explicit quota in a given year allocated to a specific region. Firms must also show profits in consecutive years to satisfy explicit listing standards set by the CSRC. Moreover, one of the stated purposes of establishing the stock market in the first place was to assist the privatization of SOEs through fundraising—i.e., selling shares to the market. Hence, state-owned enterprises (SOEs) and firms with connections to the regulators and related government branches are more likely to be listed, whereas privately-owned firms without high current profitability but with growth potential face a much higher hurdle. Once listed, firms are rarely delisted in China and the 'shell' of a listed firm

is valuable given the difficult listing process.

We find strong evidence supporting the hypothesis that the problematic IPO and delisting regulations and procedures contribute to the poor performance of the market. It is well-documented that firms 'time' the IPO in the US, in that insiders choose the year to sell their stock to the public for the first time in the year during which their operating performance is strong. Moreover, there is also evidence of manipulation of earnings for IPO firms. These prior studies indicate that the operating performance would drop following the IPO year. This phenomenon not only occurs in the US but also in emerging economies (Figure 8) as both ROA and ROE of IPO firms drop from the high levels in the IPO year or the year before the IPO (depending on the IPO process). But listed firms in China have by far the largest post-IPO drop: the average ROA dropped from a high of 12% pre-IPO to just above 6% post IPO, an astonishing fall of one half. By contrast, unlisted firms matched by industries and firm characteristics show no drop in ROA or ROE during the same period surrounding listed firms' IPO. Among the listed firms, SOEs owned and controlled by the central government show a sharper fall in operating performance after IPO. When we sort listed firms by the year of listing, we also find that listed firms in the 2004-2006 cohorts, many of which are large cap stocks, show the worst drop in performance after IPO, which can partially explain the collapse of the market after the 2007-2009 global crisis.

These results suggest that IPO firms in China manipulate their earnings (given the IPO process it is difficult to say how much market timing ability they have); in fact, anecdotal evidence suggests outright frauds of making up revenue and profit figures in order to gain approval of CSRC. Further, the results are consistent with the hypothesis that the listing process also distorts firms' operations in that some firms exhaust their resources and capital and sacrifice

their future operations and growth in order to meet the listing standards.

Consistent with the fact that very few firms are delisted in China, we find that firms with similar levels of poor performance are more likely to disappear from the database (due to delisting) in the US and in other emerging economies. After five consecutive years of losses, listed firms in China are labeled “ST” (special treatment) but remain listed and traded in the exchange

We argue that the listing and delisting criteria need to be substantially reformed. The CSRC has made proposals in this direction and these should be implemented as soon as possible.

II. THE PERFORMANCE OF THE CHINESE STOCK MARKET FROM 2000 TO 2013

Panel A of Figure 2 shows the performance of the Shanghai Composite and the stock indices of other major countries. The SSE Index for China peaked in 2007. The stock price dropped off in 2008 and recovered in 2009 in a similar trend of other markets in the world. The SSE index buy-and-hold return is around 1, significantly lower than Russia, Brazil, and India, slightly lower than the US and about the same as Japan. Figure 3 shows that inflation is high in the 1990s in China. The CPI peaked at around 27% in the mid-1994. The high inflation drives down the real index return as we can see from Figure 2. Anecdotal evidence suggests that many speculations were going on in China's stock market in 1990s. The number of listed firms increased from 13 in 1991 to 1176 in 2000. Moreover, the majority of the existing securities laws and regulations were introduced during the late 1990s, and the intensity of adding new firms to the exchanges slowed down significantly after 2000. For all these reasons, we focus on the period after 2000.[1]

Figure 4 shows that China has underperformed compared to the BRIC countries and even to relatively slow growing developed countries such as the US and Japan in terms of buy-and-hold returns. Table 1 shows distribution of our sample firms by year. Table I presents the sample distribution by year. Panel A and B describe stock returns and firm characteristics of sample firms for all countries and China, respectively. As can been seen from Table I, the number of

[1] Carpenter, Lu and Whitelaw (2014) examine the period of 1992-2012 and find that the Chinese market is efficient in the sense that prices impound information about the firm fundamentals and pricing related information quickly. They also find that the Chinese market has positive 'alpha,' derived from an international factor model (e.g., Fama and French, 2012).

listed firms covered in our sample increased from 23,258 in 2000 to 44,014 in 2012. The number of listed firms in China grew steadily from 1,389 to 2,779. The variable of our primary interest is the value-weighted buy-and-hold return (BHR). The buy-and-hold returns are calculated as cumulative annual stock returns, which are averaged across firms by year with the market capitalization in the previous year as the weight. The BHR is adjusted for inflation to be in 2000 local currency. $1 dollar investment in a worldwide diversified, value-weighted stock portfolio in 2000 generates $1.19 by 2012. It generates $1.67 if cash dividends are included. However, 1 unit of investment in a value-weighted Chinese stock portfolio in 2000 shrinks to 0.61 units by 2012. It is merely 0.62 even if dividends are included.

Figure 4 plots the value-weighted buy-and-hold returns of China and other major countries from 2000 to 2012. Panel A plots the BHR without dividends. China underperformed other countries in most of the years, except for year 2007 and 2009. Other emerging countries, including India, Brazil and Russia, see 1 unit of investment in 2000 increased to over 2 units by the end of 2012. Japan is the second-worst performing with a BHR of around 0.8 by the end of 2012.

Given the extraordinary growth of China's economy, the poor performance of its stock market is striking. One explanation is that the profits accumulated by the listed firms are distributed in the form of dividends. However, based on Bloomberg data, the average dividend yield for members of the Shanghai Composite index was 2.2 percent relative to the 2011 earnings. As a result, the securities regulator China Securities Regulatory Commission (CSRC), have been urging listed companies to pay out cash dividends to their shareholders.[2] Panel B of Figure 4 shows the buy-and-hold returns with cash dividends. The BHR by the end of 2012 for China increased from 0.61 to 0.62, but still underperformed other reference countries.

[2] "Shanghai exchange urges dividend reform", *Financial Times*, January 8, 2013.

Table II shows the nominal returns compared to deposit rates in China. Since the banks are majority owned by the government China, the deposit rates are effectively risk free rates. The table shows that the stock market underperformed the five-year risk free rate. Although the nominal five-year deposit rates increased from 2.88 in 2000 to 4.75 in 2012, the real deposit rates didn't increase. The similar patterns are found for the one-year deposit rates. The nominal demand deposit rates consistently declined, resulting in negative demand deposit rates in most of the years. We accumulate the real deposit rates and stock returns from 2000 and plot the cumulative returns in Figure 5. Apart from the year 2007 when the cumulative stock return exceeds the cumulative deposit rates, in the rest of the years the cumulative stock return underperformed the cumulative one-year and five-year deposit rates. It even underperformed the cumulative demand deposit rates by the end of year 2012.

To quantify the poor performance of Chinese stock market and compare with the rest of the world, we estimate a prediction model to identify factors that may affect average stock returns in a country. We include variables that are found to determine country-level stock market development as explanatory variables in the prediction model. The set of variables include: (1) investor protection measures (La Porta, Lopez-De-Silanes, Shleifer and Vishny, 2002, Djankov, Porta, Lopez-de-Silanes and Shleifer, 2008); (2) financial depth; (3) stock market characteristics, especially liquidity and risk; (4) country-level macro-economic conditions; (5) firm financial performance. In even columns we also include earnings management score (Leuz, Nanda and Wysocki, 2003, Doidge, Karolyi and Stulz, 2007).

Table III presents the ordinary least squares (OLS) estimates of the prediction model of buy-and-hold returns and Sharpe Ratio. We exclude China from the sample. All explanatory variables are winsorized at 1% level and lagged by one year. Larger firms, firms with higher

earnings growth and sales growth, and firms with larger stock return volatilities see larger buy-and-hold returns. Country-level variables don't have significant impact on BHR and Sharpe Ratio in most of the times. In the Sharpe Ratio regressions, larger stock market turnover ratio is related to higher Sharpe Ratio. Earnings management has a negative impact on stock performance. Higher earnings management score represents stronger incentive of firm managements to conceal firm earnings to get private benefit. The negative coefficient on the earnings management measure suggests countries experience poorer stock market performance when corporate governance of firms listed in the country is worse.

We include Chinese listed firms in the regressions in Table IV. The regression results in Table IV show that firms listed in China see substantial under-performance in stock returns as indicated by the negative coefficients on the China dummy, controlling for the same explanatory variables as reported in Table III. On average, firms listed in China underperformed firms listed in other countries by 2.042 in BHR and by 0.36 estimated by prediction model 1.

The next question is which market, Shanghai, Shenzhen and Hong Kong, contributed most to the underperformance. Figure 6 plots the performance of the three stock exchanges. Panel A plots the value-weighted buy-and-hold returns of firms listed in Shanghai, Shenzhen and Hong Kong exchanges. Sample firms listed in Shanghai and Shenzhen exchanges are restricted to those on the main board. Hong Kong performed better than Shanghai and Shenzhen. Before 2007, Shanghai and Shenzhen indices track each other closely, while Shanghai started to drop after that 1 unit investment in Shenzhen stock market returns 0.9 units by year 2012.

Panel B plots the major stock indices in China. We start the plot from 2005 because the CSI 300 Index was introduced then. CSI covers the largest 300 stocks by market capitalization from Shanghai and Shenzhen exchange. The SSE SME Composite covers A-shares listed in the

small-and-medium sized enterprise (SME) board of the Shenzhen exchange, excluding ST stocks. It can be seen clearly from the figure that the Shanghai Composite performed worst. The SSE SME Composite performed best, indicating the better growth of SMEs in China.

Panel C plots the growth enterprise market index in China. It was introduced on June 1, 2010. Together with Shenzhen Composite and the SSE SME Composite, the growth enterprise market index describes the performance of stocks listed in the Shenzhen exchange. For comparison we put the CSI 300 index and the Shanghai Composite Index as well. The growth enterprise market index did not do well until 2013.

III. POSSIBLE REASONS FOR CHINA'S STOCK MARKETS TO PERFORM POORLY

Relative to other stocks and to other assets within China the stock market has performed poorly. Since there are little dividends or share repurchases we would expect that the value of the firms should grow as they accumulate funds. So even if their production is not growing, as long as they are making positive returns their value should be growing. Offsetting this could be a number of factors.

A. The IPO Process in China

We start by investigating whether the poor performance of Chinese stock market is due to the flawed IPO process. Two possible explanations may explain the poor performance of the listed firms. First, the IPO selection process is not an effective one, in the sense that firms that performed relatively worse are selected to be listed while some really good firms are rejected. An alternative hypothesis is that listed firms' performance deteriorates after IPO. In this case, even if good firms are selected to be listed, the stock performance can become poor if their operating performance declines.

We examine the hypothesis by comparing the performance of listed firms and private firms around the IPO year. We select from the listed firms the one with non-missing financial information from three years before to three years after the IPO. We then pair each listed firm with one matching firm. The matching firm is selected from the same level-2 industry private firms with the nearest book assets in the year prior to IPO. The private firm financial information is from the National Bureau Statistics (NBS) ASIF database. Among the 1,693 Chinese listed firms, 594 are matched with one private firm. We also require that the matching firms have non-missing financial data from three years before to three years after the IPO. 184 matching firms meet the criteria. Figure 7 shows the performance of listed firms and their matching firms around the IPO. The two groups of firms have similar operating performance in terms of ROA in year -3 before IPO. The listed firms see significant drop in their ROA in the IPO (from 0.12 to 0.07), while private firms don't see their ROA change much over the years.

The sudden drop in performance of listed firms could be because these firms conduct earnings management in the years before IPO, because firms have to meet some earnings requirement prior to the listing.[3] An even more severe concern is that these firms may have to distort their operation to generate short-term profits at the cost of sacrificing long-term growth. Under the pressure from the regulators, the firms may have exhausted their resources in order to meet the earnings requirement prior to IPO.

The plot of ROE shows a similar pattern. The listed firms have substantially higher ROE than private firms prior to the IPO, but the ROE decreased nearly half in the IPO year. It remains lower than private firms after IPO. These findings suggest that the current IPO mechanisms in

[3] According to the regulations on IPO issued by the CSRC on May 17, 2006, to be listed in the stock exchanges in China, the firms are required to have positive earnings in the three consecutive years prior to the IPO or have accumulated at least 30 million net income. In addition, the firms are required to have accumulated net cash flows over 50 billion or revenue over 300 million in the three years prior to IPO. http://www.gov.cn/flfg/2006-05/18/content_283660.htm; http://www.csrc.gov.cn/pub/zjhpublic/cyb/200911/t20091117_170416.htm

China may have selected good firms to be listed, but have distorted firms' incentive in the short-run, which could be detrimental to these firms in the longer horizon.

Regression results in Table V show consistent results. Listed firms see their ROA drop by 0.039 more than their matching firm in the listing year compared with one year before, controlling for the operating performance prior to listing. Table VI shows international comparison of changes in operating performance in the listing year of the listed firms in China and in other countries. The drop in ROA, ROE and ROS in the listing year is larger for China than for other countries' average. The bigger drop is robust when we measure the change over [-2, +3] window around the listing year.

To detail the analysis, we separate the firms into different cohorts by their listing year. For instance, cohort 2004 represents firms that are listed in 2004. We particularly focus on cohort 2004, 2005 and 2006 because anecdotal evidence suggests some SOE got listed in the mid-2000, whose stock prices collapse after IPO. We examine the performance of each cohort of firms around IPO year relative to the whole sample. As Figure 8 shows, cohort 2004 to 2006 performed worse than other cohorts after the IPO year. One conjecture is some firms that were not performing well got listed in the mid-2000 which dragged down the performance of the whole market. This finding is less significant when we measure the operating performance by ROE.

We also investigate which type of firms contributed most to the poor performance after IPO. Based on the ultimate controller and ownership information provided by CSMAR, the listed firms can be classified into the following categories: (1) firms controlled by the central State-owned Assets Supervision and Administration Commission (SASAC); (2) firms controlled by the local SASAC; (3) firms controlled by the Ministry of Finance; (4) firms controlled by other

government agent; (5) non-state-owned firms. We find that the first group, firms controlled by the central SASAC, performed worse than other listed firms after IPO in terms ROA. The ROE is similar for firms controlled by central SASAC and for other listed firms.

The results of regressions of BHR presented in Table VII suggest that state-owned enterprises (SOE) underperformed non-SOE on average. The underperformance in BHR is most severe for firms ultimately controlled by the Ministry of Finance. Both firms controlled by the central SASAC and local SASAC underperformed non-SOEs.

B. The Delisting Process in China

Another possible explanation for the poor performance of Chinese stock market is that firms whose performance is deteriorating are not timely delisted from the market. To see this we compare the operating performance of firms before delisting. There are very few delisting cases in China, therefore, we compare delisted stocks in other countries with those that received special treatment ("ST") in China. We define the year when the firm is delisted, or received "ST" for the first time as year 0. Some firms received ST only once, while others received ST for multiple times. To make a sensible comparison, we compare only those which become ST and never emerged from it (the permanent ST) with the delisted stocks in other countries. We require the firms have financial information available from five years before the delisting (ST) until the delisting (ST) year. Figure 10 shows that ST stocks in China dropped significantly from two years before the ST year, while the delisted stocks in other countries do not see their ROA become significantly worse before delisting. Compared with other major emerging countries (including India, Brazil, Russia and South Africa), the decline in ROA for Chinese ST stocks is even striking because the delisted stocks in these reference countries don't have negative ROA even when they are delisted. The contrast is similar when we use ROE to measure firms'

performance in Panel B of Figure 10.

These findings suggest that some of the Chinese listed firms perform even worse than the delisted firms in other countries. Some firms that are performing really badly have existed in Chinese stock market and are rarely delisted. Indeed, only around 20 stocks are delisted from the stock market in China every year, and fewer than 10 of them are delisted due to negative earnings. The inefficient delisting mechanism may have contributed to the poor performance of the Chinese stock market.

In addition, we examine the long-run stock performance of firms after IPO and present the results in Table VIII. Listed firms in China have significantly lower long-run returns measured by the 1-year, 5-year and the average annual returns compared with other countries, as indicated by the significantly negative coefficients of the China dummy. The underperformance is robust when firms' growth opportunities are accounted for.

C. Alternative Explanation

C.1. Tunneling and Investment

Although Chinese stocks perform worse than other countries, the listed firms in China are still making positive earnings as shown by Table I. A natural question is why the positive earnings are not accumulated to generate higher valuations for firms. A line of literature including Li, Lu, Qian and Zhu (2014) documents that controlling shareholders of listed firms divert assets by providing loan guarantees to subsidiaries or related parties, or by paying for the debt and expenses. While the tunneling by large shareholders may have been reduced after the CSRC announced new rules curbing the tunneling activities. If tunneling is one explanation for the poor performance of Chinese stock market, then we should expect a decline in cash holdings after IPO.

Figure 11 shows this is indeed the case. The average cash holding, measured by the total cash to the contemporaneous book assets ratio, is 0.27 for Chinese listed firms in the listing year, significantly higher than that of US listed firms at listing. The ratio consistently declined to 0.14 by the end of the fifth year after IPO, while the cash holding of US listed firms reduced only 0.05 in the same period after listing. This may suggest that firms either divert the money to private parties or make more investment.

We therefore compare the investment by listed firms in China and in the US around the listing year. We measure investment by capital expenditure, scaled by the book assets in the previous year. As demonstrated by Figure 13, Chinese firms invest much more than US firms, both before and after IPO. The average investment by Chinese listed firms is 0.68, while the measure is merely 0.07 by US listed firms. The contrast is sharp in the -3 to +3 year window around listing.

Panel B plots the performance of listed firms around IPO. The figure clearly shows an opposite patterns of profits made by Chinese listed firms and US listed firms after IPO. Listed firms in China see stable ROA and ROE before listing, while their profits drop substantially in the year of IPO and remain low afterwards. In contrast, listed firms in the US start with negative ROA before the listing and keep improving until IPO. ROA dropped slightly after one year but remain higher than the pre-IPO level. ROE shows a similar trend.

Panel C presents a more interesting finding of listed firms' performance around significant investment. We define significant investment as the ratio of capital expenditure scaled by lagged assets exceeding 10%. We rank the investment by its magnitude and keep the largest one for each firm. If we zoom in and observe the performance change within a short window around the investment date, we would find similar change in performance for both Chinese and

US listed firms. Profits drop in the two years after investment. It is common that making investment increases the asset base while earnings change with a lag. However, if we examine the patterns of profitability over a longer horizon, we find that there is a run-up of profits for US firms before they make the investment, but the profits for Chinese listed firms keep declining before the investment. It suggests listed firms in China and US are different in choosing the timing for their investment.

These findings imply that the investment made by the Chinese listed firms may not be efficient. Chinese listed firms may attempt to improve their performance by making more investment, so they tend to choose to make investment when they see deteriorating profits. In contrast, US listed firms are more likely to investment when they see their profits are improving. Although there is an immediate drop in profits after the investment but then it recovers soon and surpasses the previous level.

C.2. Alternative Explanations

C.2.1 Risk

An alternative explanation for the poor performance of the Chinese stock market is that the risk is changing. We control for the cumulative stock return volatilities in the BHR regressions, and find that the underperformance of the listed stocks in China still remains. To further account for risk, we construct annual Sharpe Ratio of stocks using the monthly stock returns extracted from Bloomberg. Figure 14 shows the plots of the average of annual Sharpe Ratio of stocks listed in China and the reference countries. The Sharpe Ratio for China is lower than other countries before 2006. It is the highest in the 2007 bubble period and the 2008-09 crisis period. When controlling for firm and countries characteristics in Table III, the Sharpe Ratio for Chinese listed stocks is still lower. Panel B of figure 14 shows there is no big change in

stock return volatilities over the years, indicating that risks do not explain the poor performance of Chinese stock market.

C.2.2 Interest Rates and Valuation

If interest rates rise, then market values will drop for given assets and cash flows. So one explanation of the failure of market values to remain constant despite the inflow of cash is that interest rates have risen. However, the figures in Table II show that this is not the case. In fact if anything interest rates have fallen. The real demand deposit rates decline from -0.51% in 2000 to -2.15% 2012. The 1-year deposit rate in 2012 is 0.5%, slightly lower than that in 2000. The 5-year deposit rates also didn't increase significantly over the years. Therefore, we don't find any evidence that the lower stock returns are due to increasing interest rates.

Figure 15 plots the valuations of listed firms over the sample period. We construct the price-to-earnings ratio and the market-to-book ratio at country-level. We aggregate the market capitalization across stocks within a country and divide it by the aggregated net income of their issuing firms. Since the market capitalization is at the security-level, we multiplied the net income by the ratio of market capitalization of a security to the market capitalization of its issuing firm to obtain the security-level net income. In this way we ensure the consistency of the measurement of the denominator and the numeration. Market-to-book ratio is calculated in the same way. As can be seen from Figure 15, the P/E ratio is high in early 2000, but it declines over the years, except for year 2007 and 2009. The spike in 2007 is perceived to be a bubble of Chinese stock market, because the split-share reform is almost completed then and the anticipation of stock investors is high, which may explain the higher valuation in 2007. To survive in the crisis, firms may fire sell their assets to obtain liquidity, leading to high valuation in 2009. The decreasing valuation of firms may suggest that Chinese listed firms lack growth

opportunities in the past decade.

IV. CONCLUSION

The size of the Chinese stock market, including stocks listed and traded in Shanghai, Shenzhen and Hong Kong exchanges, is the second largest in the world. The underperformance of this market, especially since the recent global financial crisis, relative to both developed (US) and large emerging economies (Brazil, Russia, India and South Africa) has been striking. This is despite the fact that the Chinese economy, also the second largest in the world, has been the fastest growing globally for the past three decades. With firm-level data from over 80 countries for the period 2000-2012, we examine the determinants of the underperformance of the overall Chinese market as well as stocks in each major industry. The poor performance is not due to undervaluation of Chinese companies; instead, factors such as the IPO and delisting processes, corporate governance related to self-dealing and information disclosure are main contributors.

The answers to our key question would help policy makers and regulators (e.g., the CSRC) to come up with viable solutions to improve the efficiency and performance of the Chinese stock market. The stock market has not played a role as prominent as the banking sector in financing firms and economic growth for most of the past two decades. However, the importance of the equity market is growing, and its further development represents one of the main tasks for China's financial system.

References

Allen, Franklin, Jun Qian, and Meijun Qian, 2005, Law, finance, and economic growth in China, *Journal of Financial Economics* 77, 57-116.

Allen, Franklin, Elena Carletti, Robert Cull, Jun Qian, Lemma Senbet, and Patricio Valenzuela, 2013, The African financial development gap, working paper, Wharton, European University Institute, World Bank, Boston College, University of Maryland.

Ayyagari, Meghana, Asli Demirguc-Kunt, and Vojislav Maskmovic, 2010, Formal versus informal finance: Evidence from China, *Review of Financial Studies* 23, 3048-3097.

Beck, Thorsten, Erik Feyen, and Alain Ize, 2008, Benchmarking financial development, Working paper, The World Bank.

Batson, Andrew, 2014, Fixing China's state sector, Paulson Policy Memorandum.

Bortolotti, Bernardo and Andrea Beltratti, 2006, The Nontradable Share Reform in the Chinese Stock Market, Working Paper, Fondazione Eni Enrico Mattei.

Carpenter, Jennifer, Fangzhou Lu, and Robert Whitelaw, 2014. The Real Value of China's Stock Market, Working Paper, New York University.

Cohn, Jonathan B., Lillian F. Mills, Erin M. Towery, 2014, The evolution of capital structure and operating performance after leveraged buyouts: Evidence from U.S. corporate, *Journal of Financial Economics* 111, 469-494.

Djankov, Simeon, Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer, 2008, The law and economics of self-dealing, *Journal of Financial Economics* 88, 430-465.

Doidge, Craig, G. Andrew Karolyi, and Rene M. Stulz, 2004, Why are foreign firms listed in the U.S. worth more? *Journal of Financial Economics* 71, 205-238.

Doidge, Craig, G. Andrew Karolyi, and Rene M. Stulz,2007, Why do countries matter so much for corporate governance? *Journal of Financial Economics* 86, 1-39.

Doidge, Craig, G., Andrew Karolyi, Karl V. Lins, Darius P. Miller, and Rene M. Stulz, Private benefit of control, ownership, and the cross-listing decision, *Journal of Finance* 64, 425-466.

Fama, Eugene, and Kenneth French, 2012. Size, Value and Momentum in International Stock Returns, *Journal of Financial Economics* 105.

Fan, Joseph P.H., T.J. Wong, and Tianyu Zhang, 2007, Politically connected CEOs, corporate governance, and post-IPO performance of China's newly partially privatized firms, *Journal of Financial Economics* 84, 330-357.

Leuz, Chrsitian, 2010, Different approaches to corporate reporting regulation: How jurisdictions differ and why, working paper, University of Chicago.

Leuz, Christian, Dhananjay Nanda, and Peter D. Wysocki, 2003, Earnings management and investor protection: An international comparison, *Journal of Financial Economics* 69, 505-527.

Levine, Ross, Norman Loayza, and Thorsten Beck, 2000, Financial intermediation and growth: Causality and causes, *Journal of Monetary Economics* 46, 31-77.

Levine, Ross, and David Renelt, 1992, A sensitivity analysis of cross-country growth regressions, *American Economic Review* 82, 942-963.

Li, Wang, Cheung, and Jiang, Privatization and risk sharing: Evidence from split share structure reform in China, *Review of Financial Studies* 24, 2549-2525.

Li, Ke, Lei Lu, Jun Qian, and Lei Zhu, 2014, Enforceability and the effectiveness of laws and regulations, Working Paper, China Academy of Financial Research.

Loughran, Tim, and Jay R. Ritter, The operating performance of firms conducting seasoned equity offerings, *Journal of Finance* 1997, 1823-1850.

Mei, Jianping, Jose Scheinkman, and Wei Xiong, 2003, Speculative trading and stock prices: An analysis of Chinese A-B share premia, working paper, Princeton University.

Michie, R., 1987. The London and New York Stock Exchanges 1850-1914, London: Allen & Unwin.

Morck, R., B. Yeung, and W. Yu, 2000, The information content of stock markets: Why do emerging markets have synchronous stock price movement?" *Journal of Financial Economics* 58, 215-260.

Appendix: Variable Definitions

Datastream

Security-level Variables

Firm-level Variables

Country-level Variables

Bloomberg

Compustat

WIND

National Bureau Statistics (NBS) ASIF

CSMAR

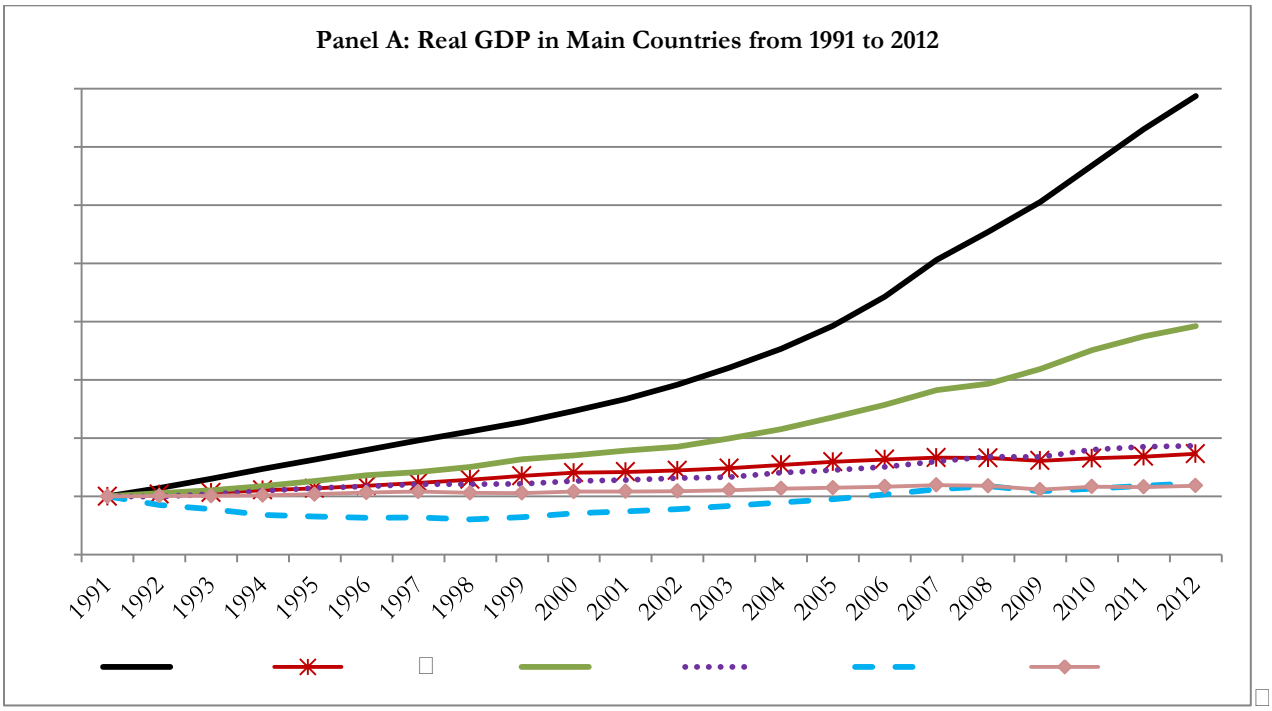
World Bank

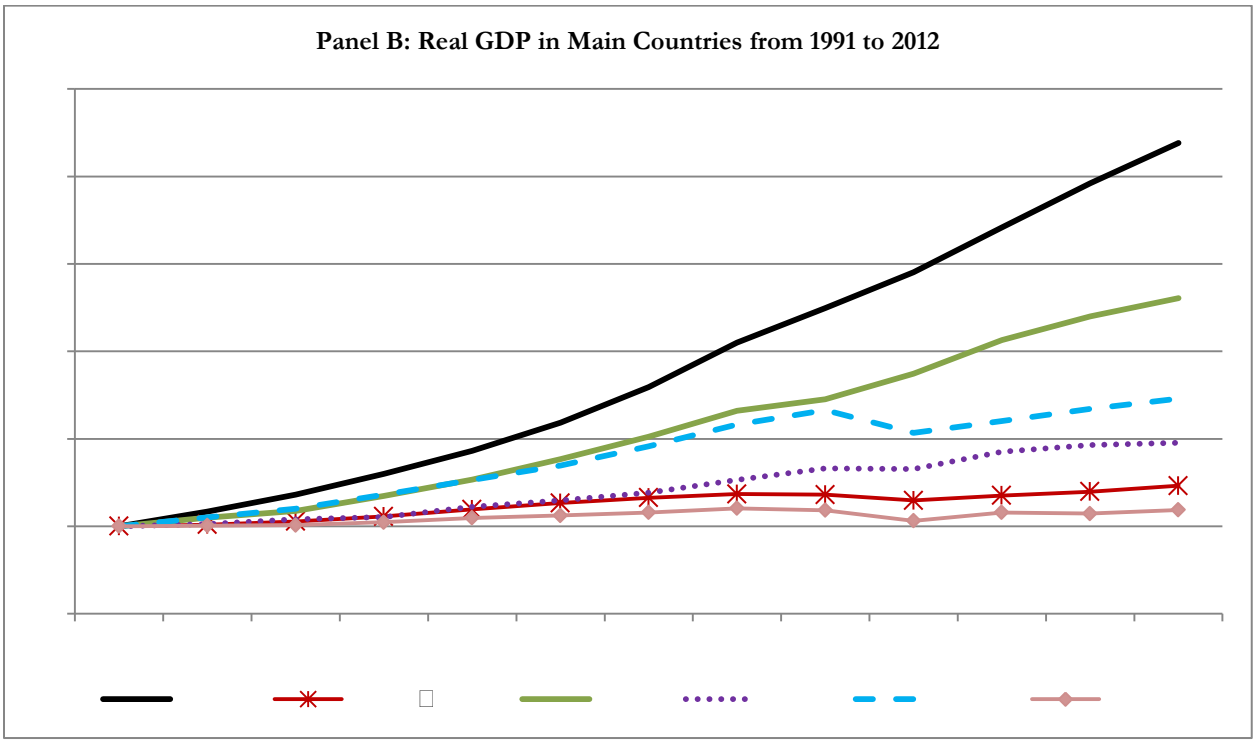
World Federation of Exchanges

Djankov et al. (2008)

Leuz et al. (2003)

Figure 1. Real GDP in Main Countries from 1991 to 2012



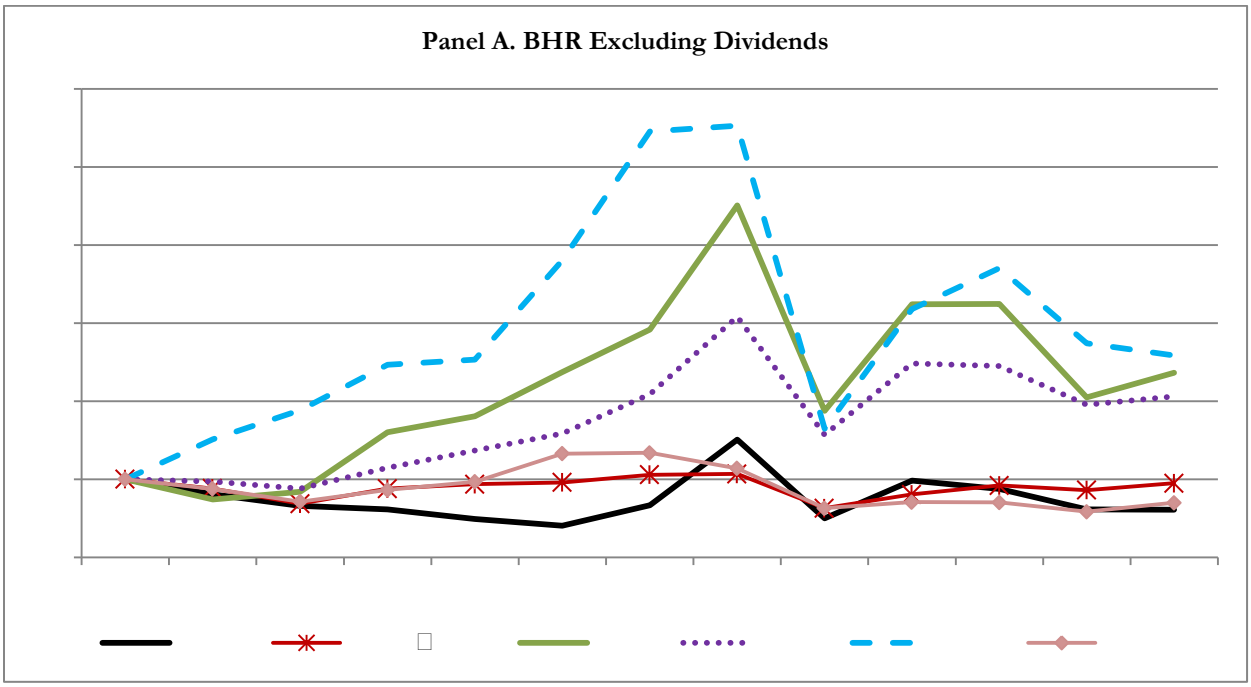


1 5
3 0

2 0

1 0

Figure 4. Buy-and-Hold Returns of Firms Listed in Main Countries



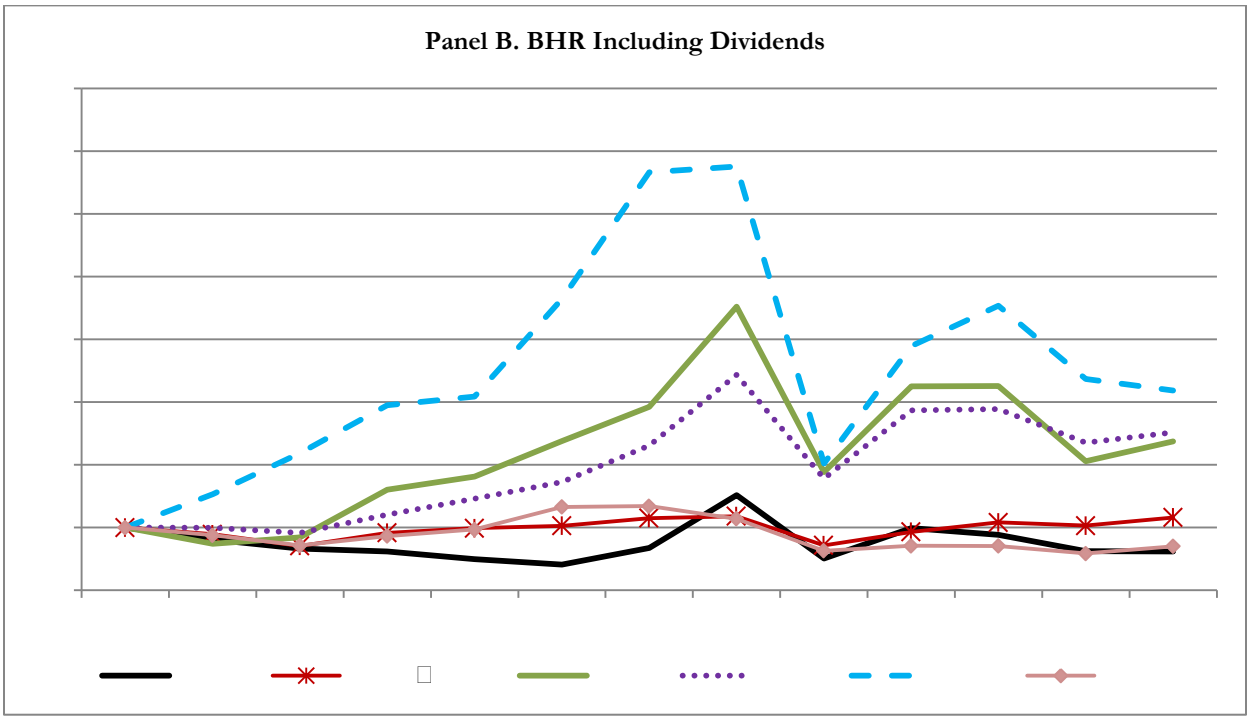


Figure 5. Cumulative Real Returns on Deposits and Stocks

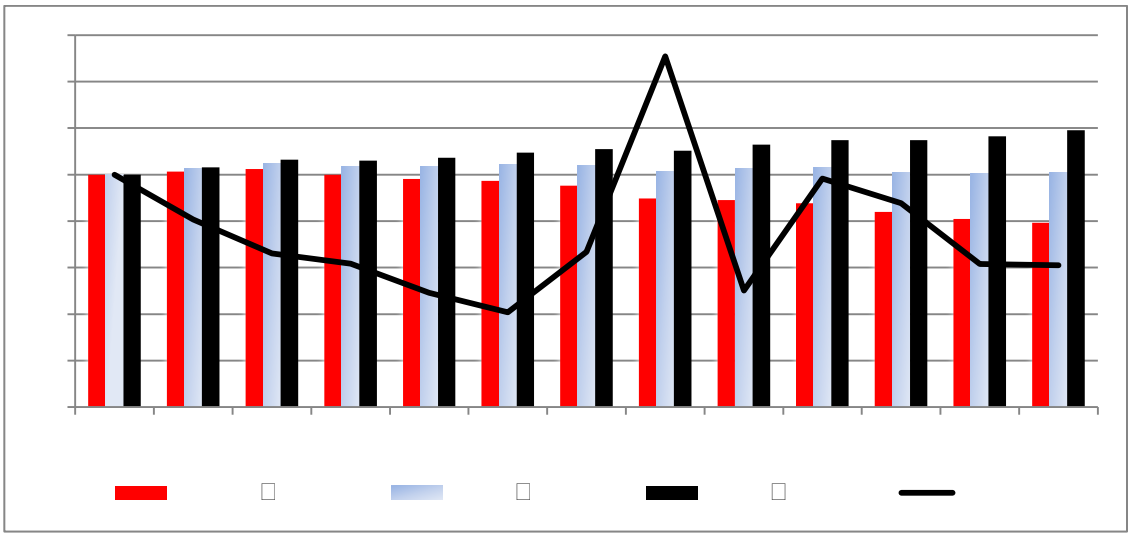
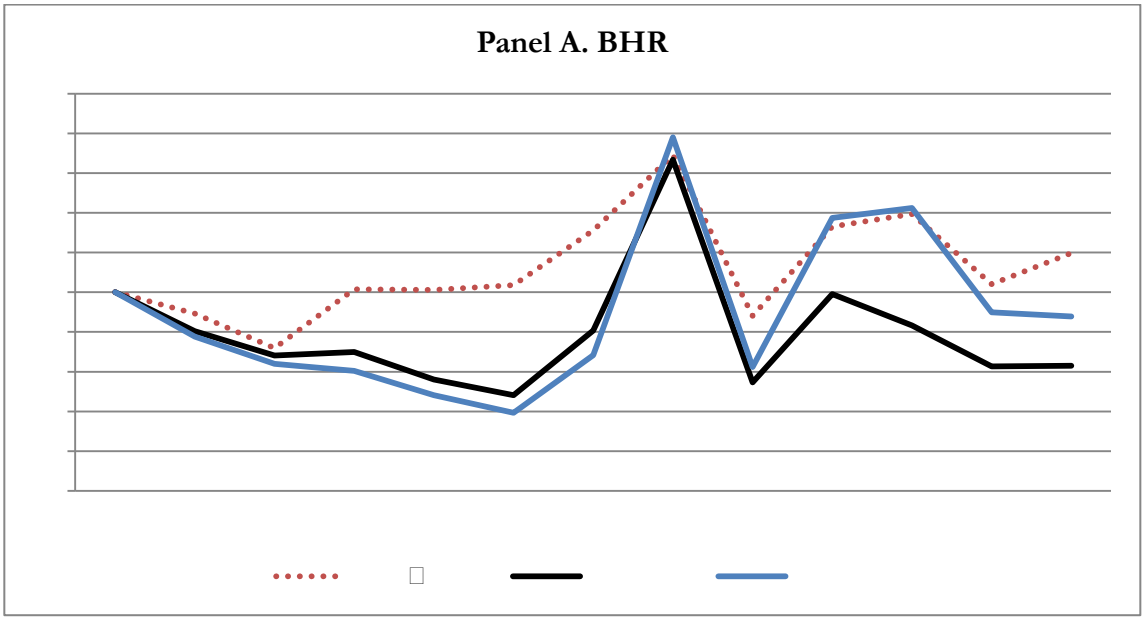
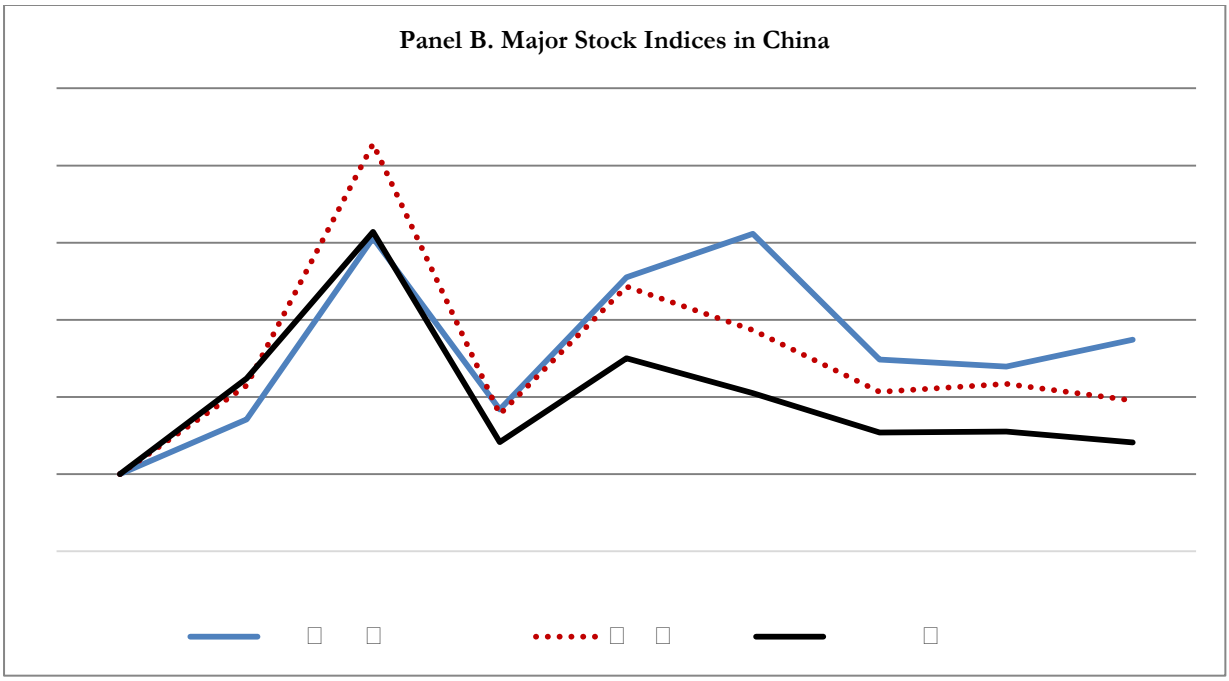


Figure 6. Performance of Chinese Stocks: Shanghai, Shenzhen and Hong Kong




Panel B. Major Stock Indices in China

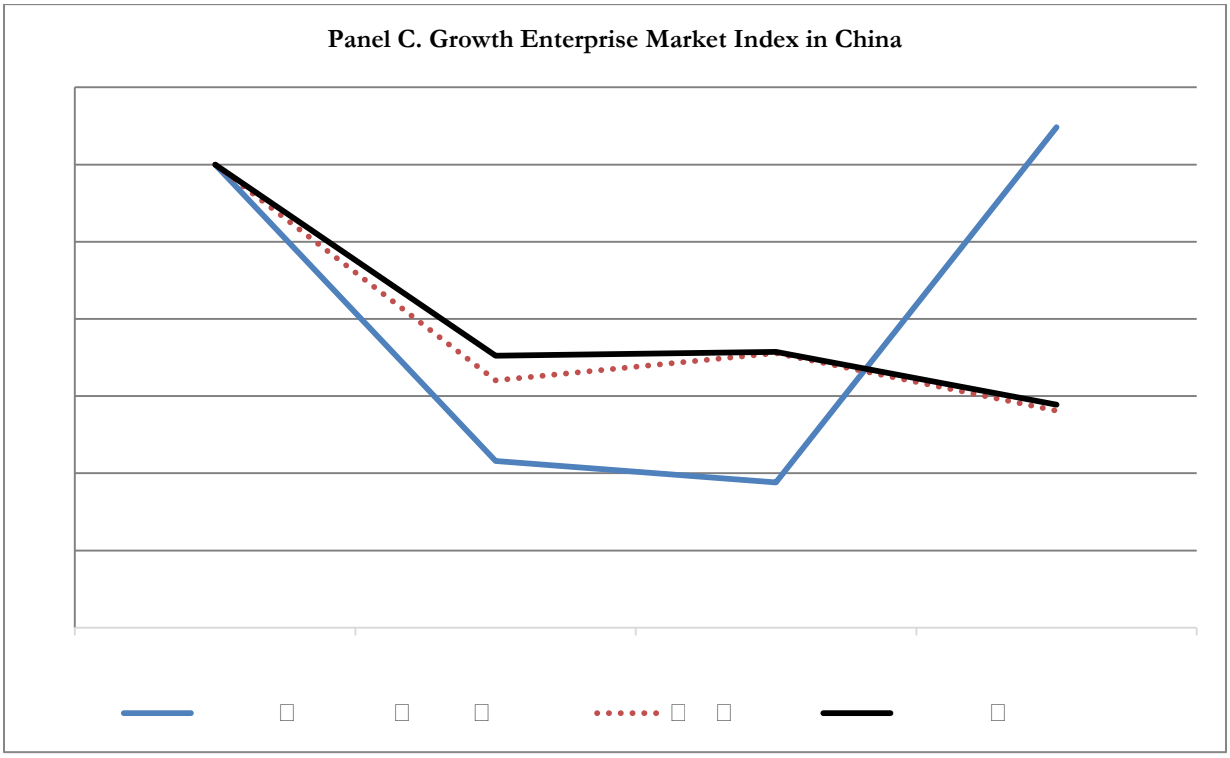
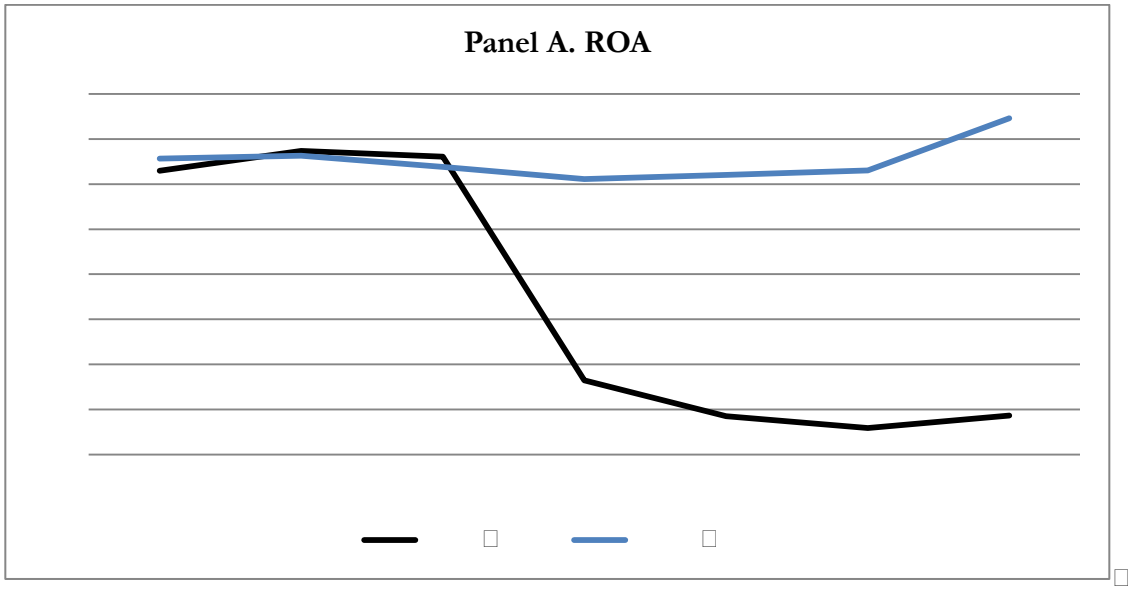

Panel C. Growth Enterprise Market Index in China

Figure 7. Performance around IPO: Listed Firms vs. Private Firms



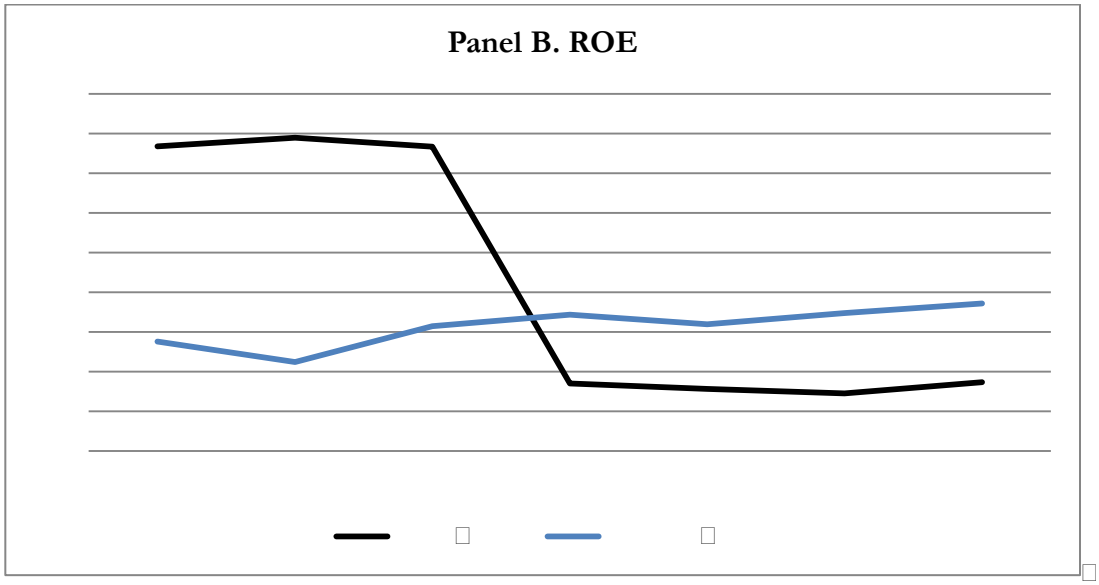
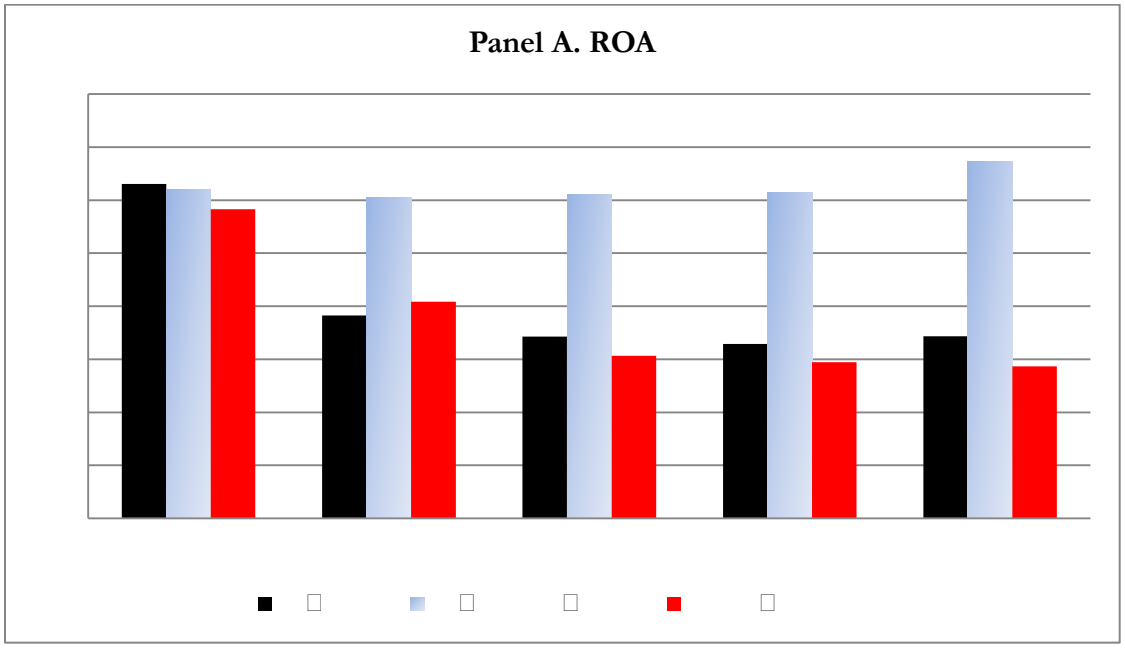


Figure 8. Performance around IPO: Cohort Analysis



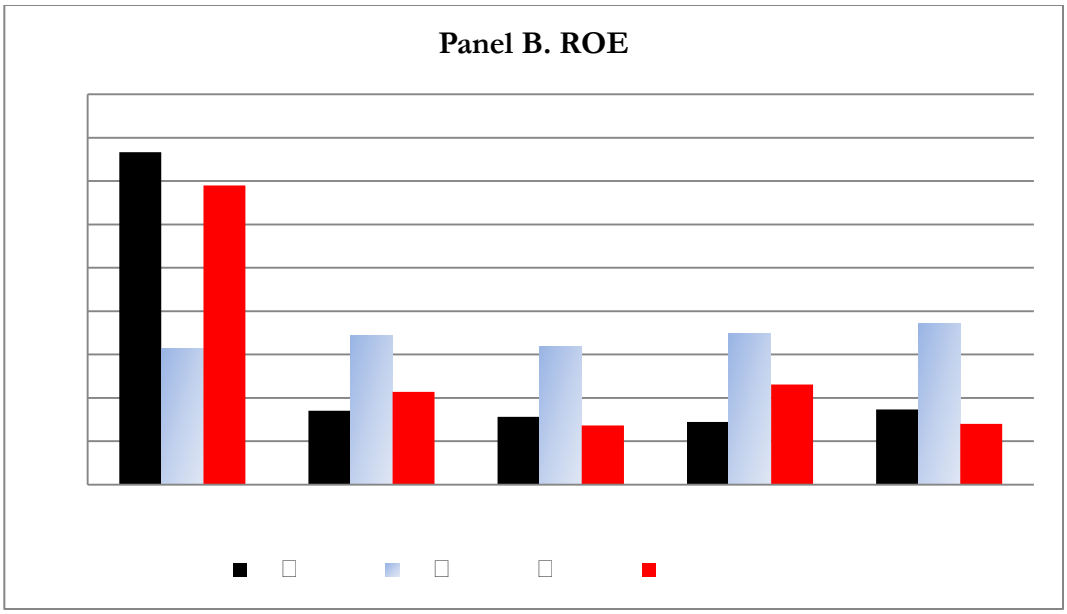
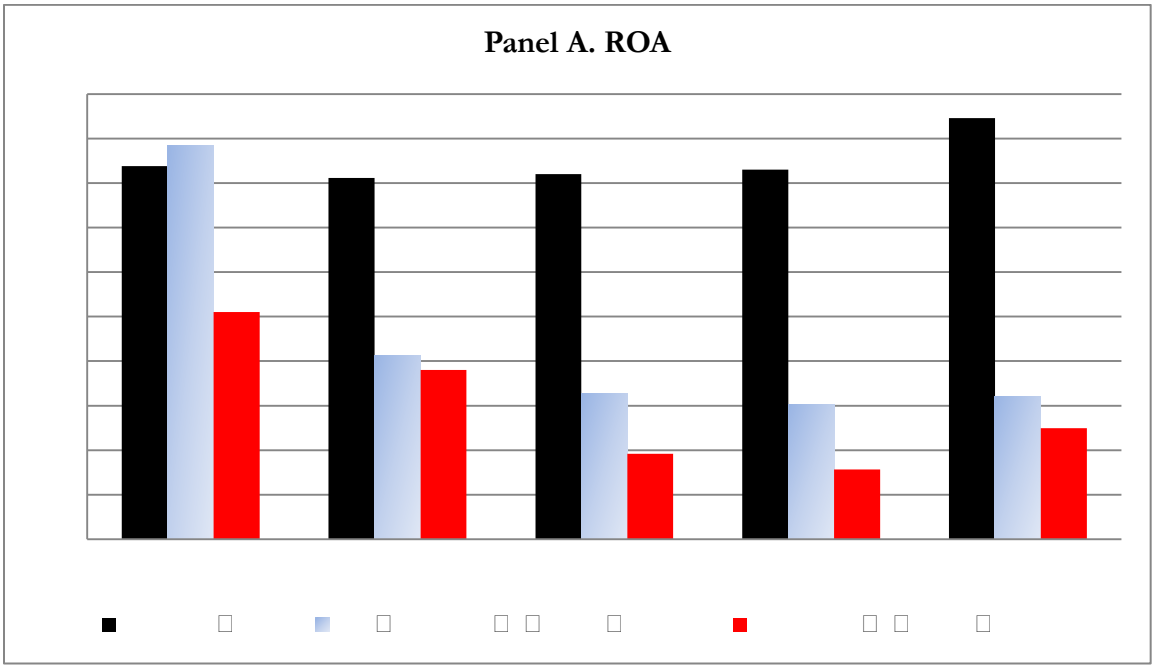

Panel B. ROE

Figure 9. Performance around IPO: Distinguish State-Owned Enterprises (SOE)



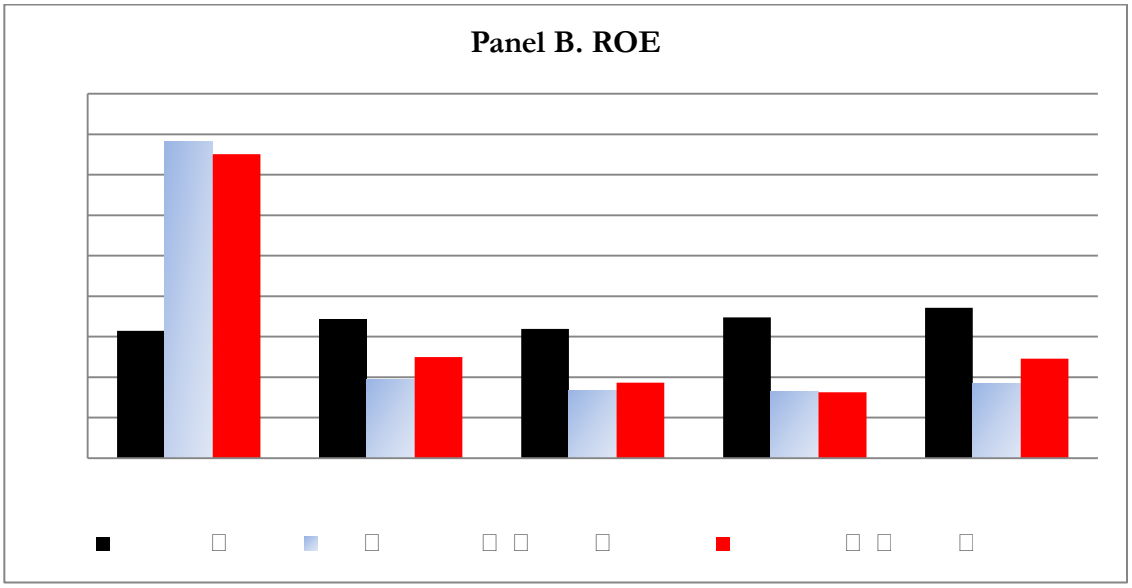
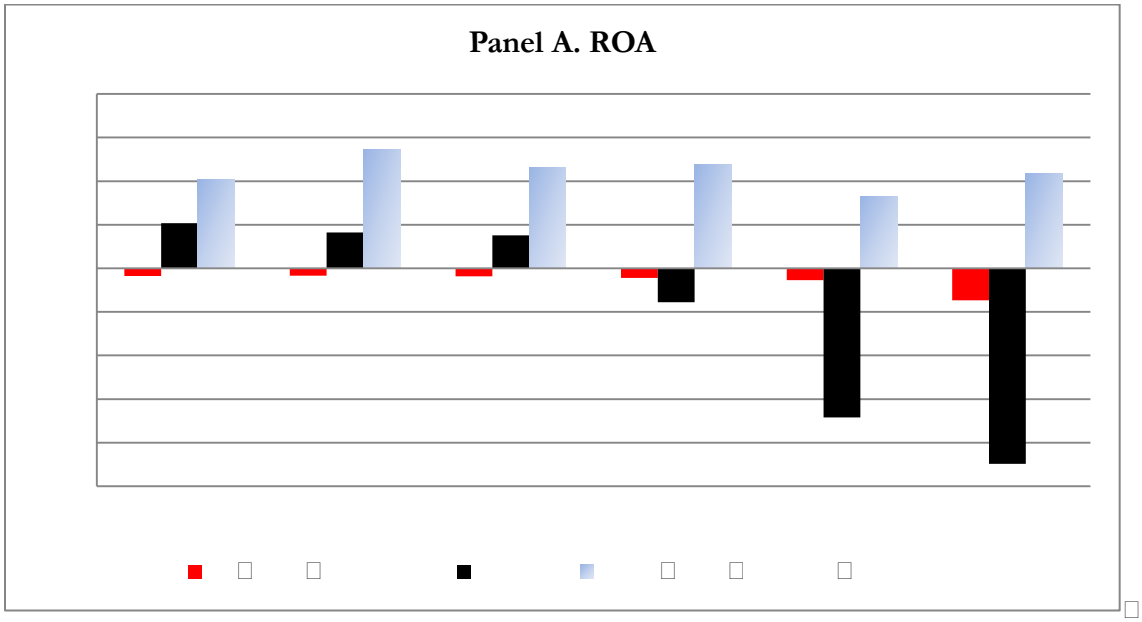


Figure 10. Firm Performance before Delisting



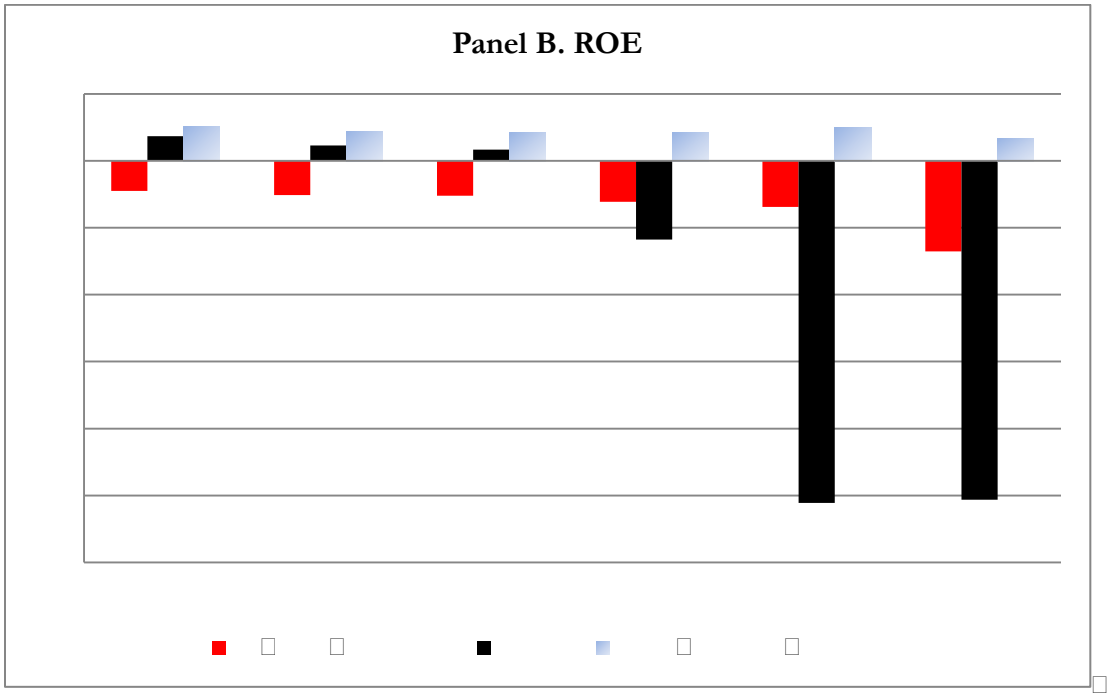


Figure 11. Tests of the Tunneling hypothesis: Cash holding after IPO

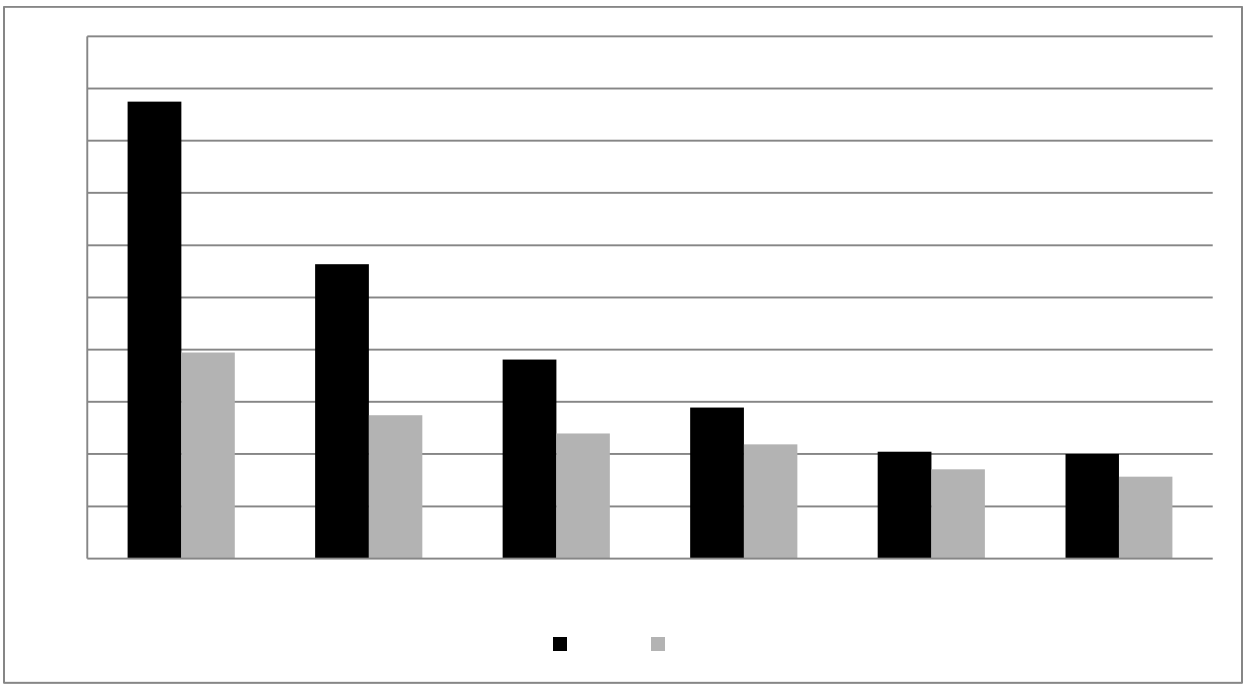
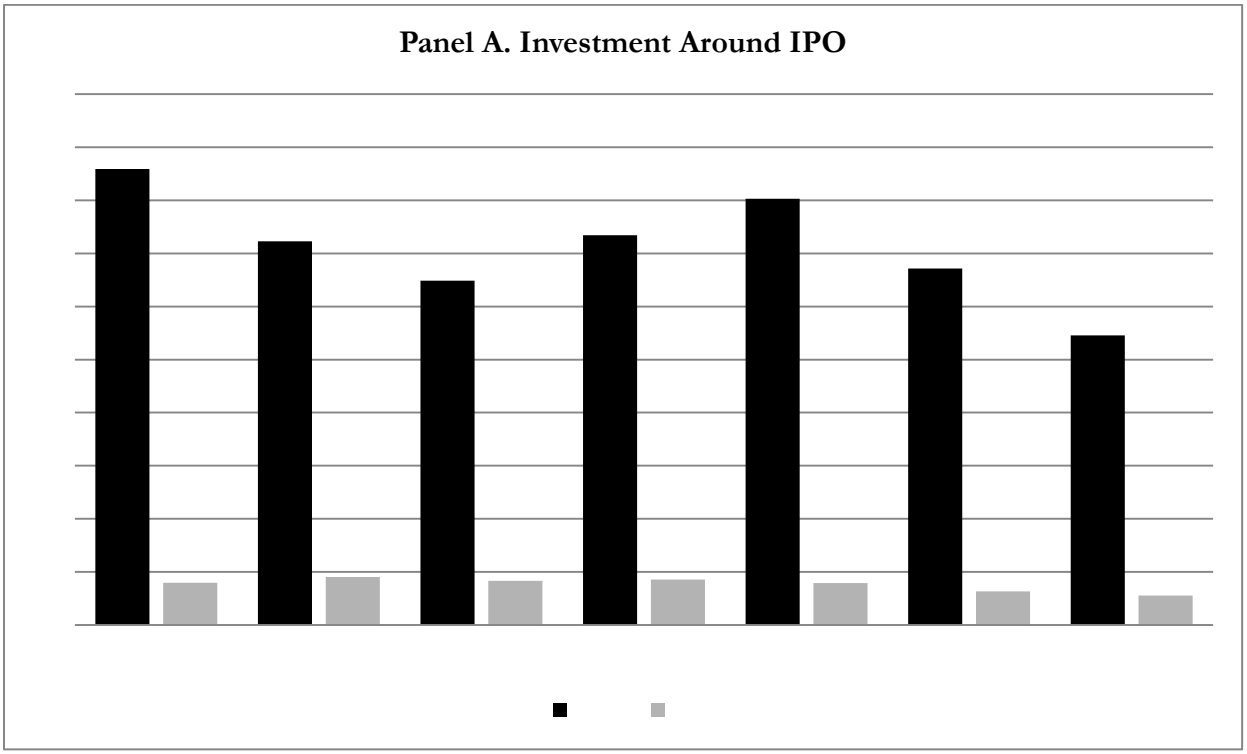
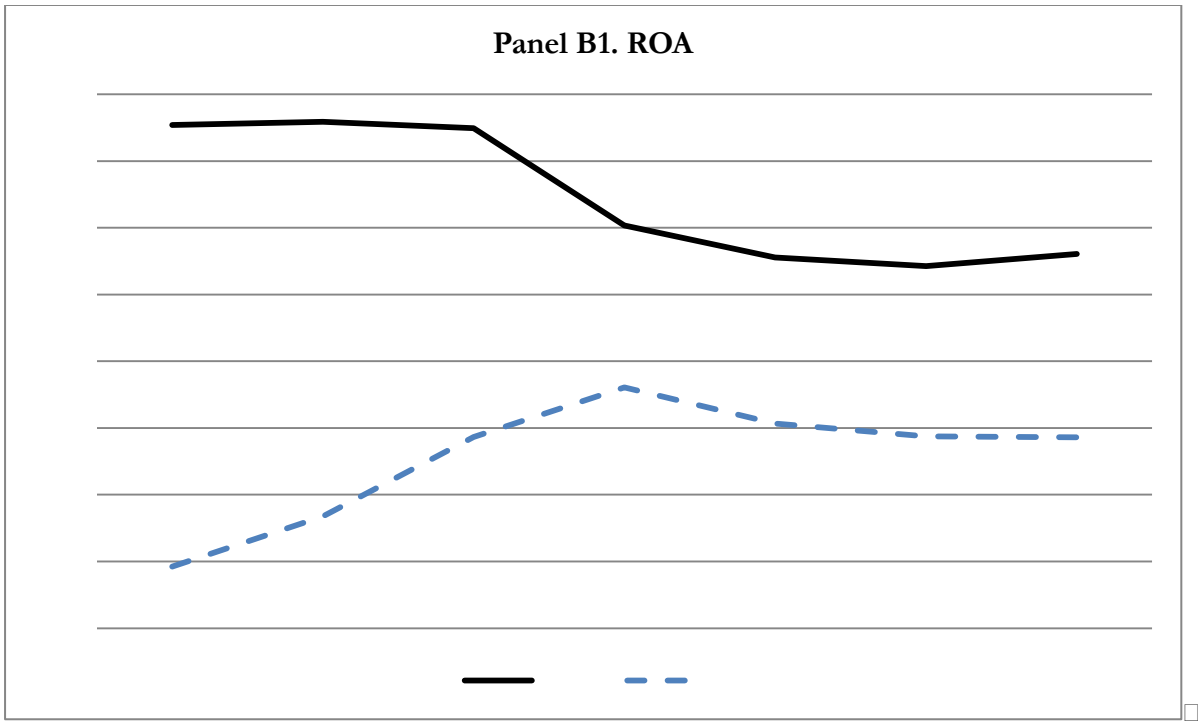
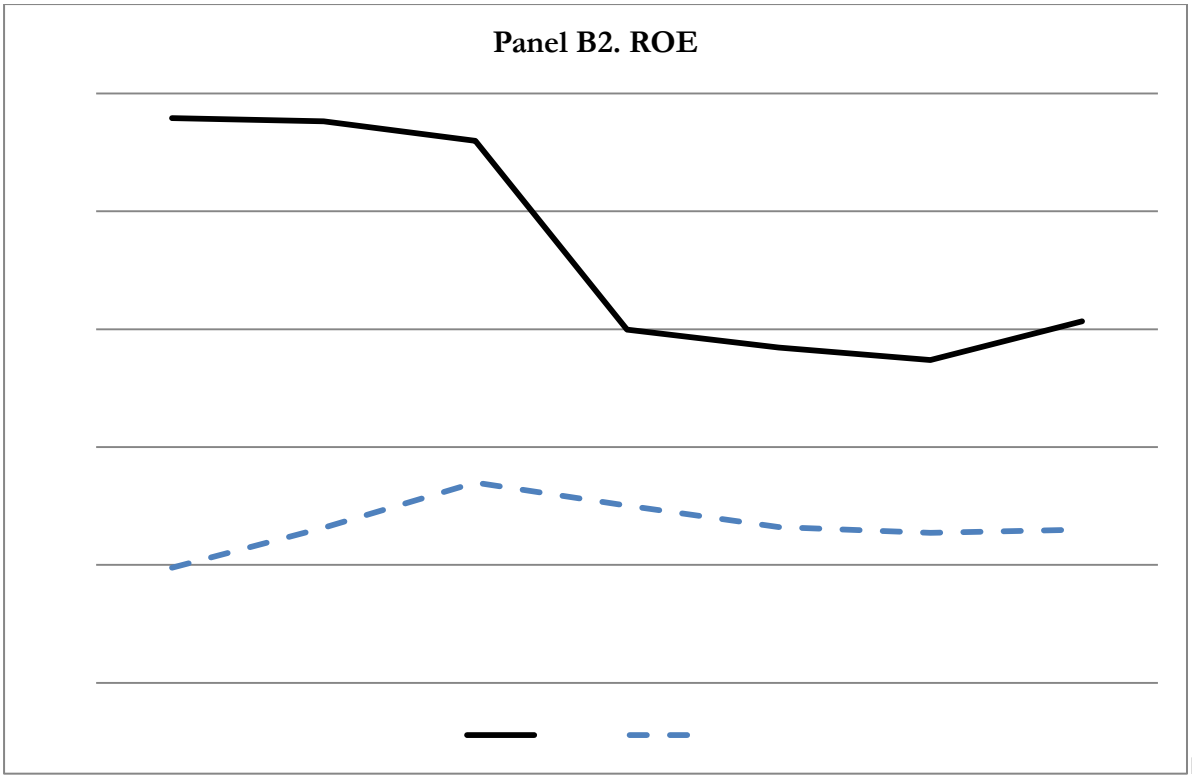
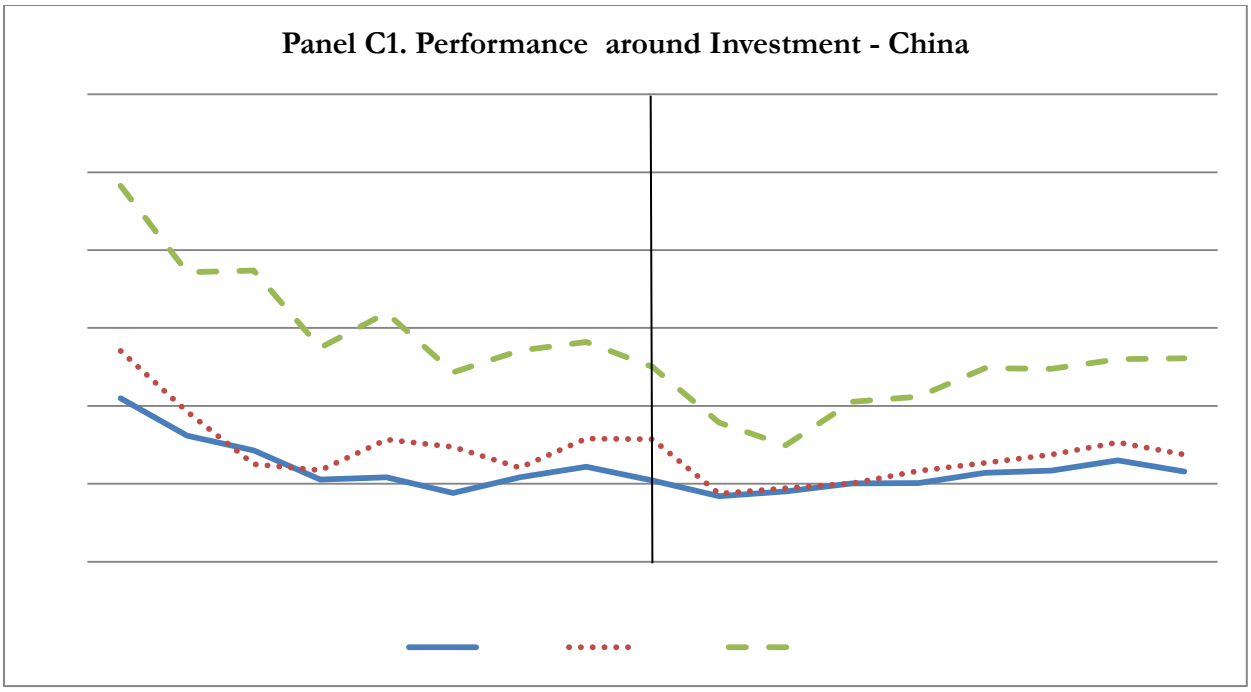


Figure 12. Investment Efficiency of Firms Listed in China and US




Panel B1. ROA


Panel B2. ROE


Panel C1. Performance around Investment - China

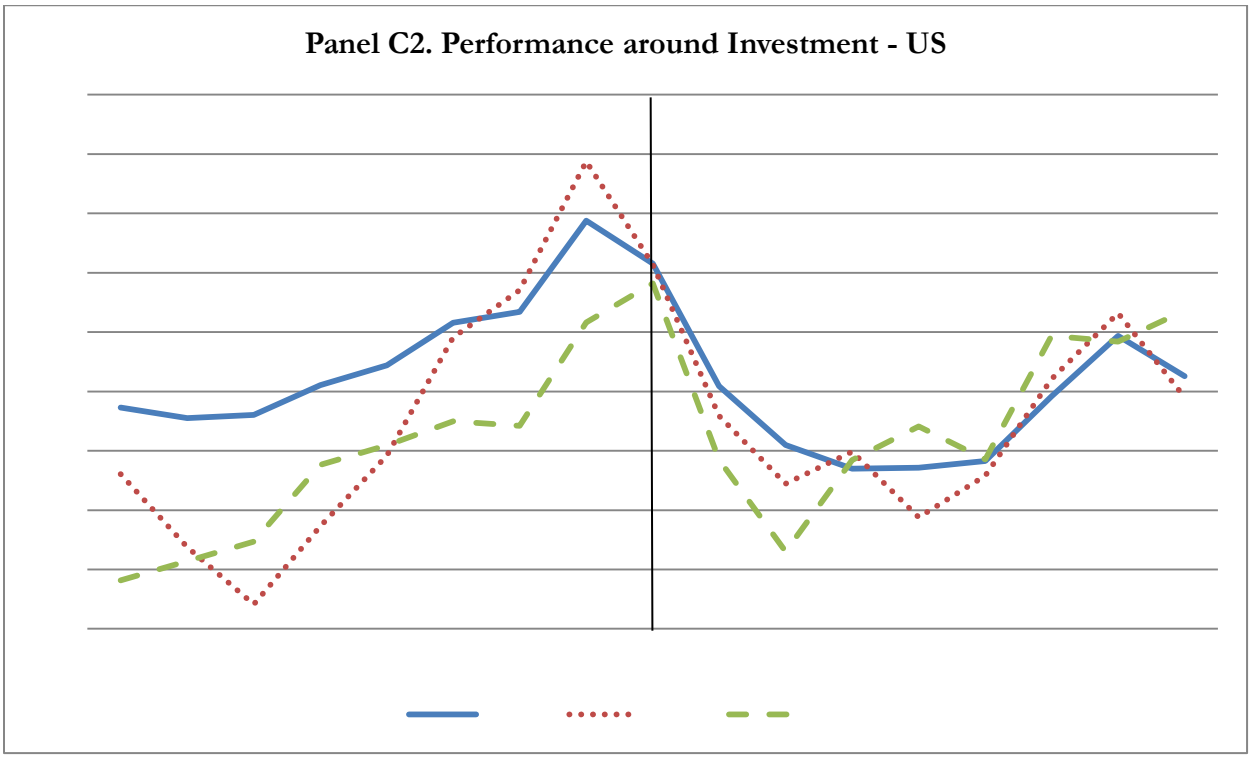
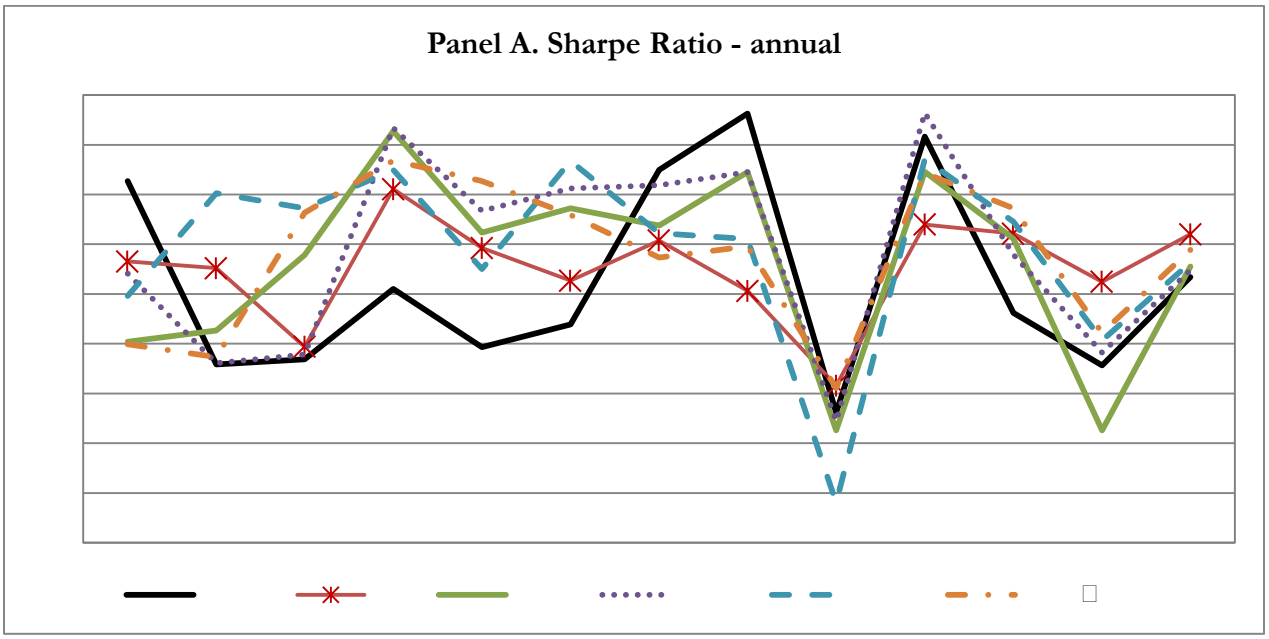

Panel C2. Performance around Investment - US

Figure 13. Sharpe Ratio and Risk: Cross-Country Comparison



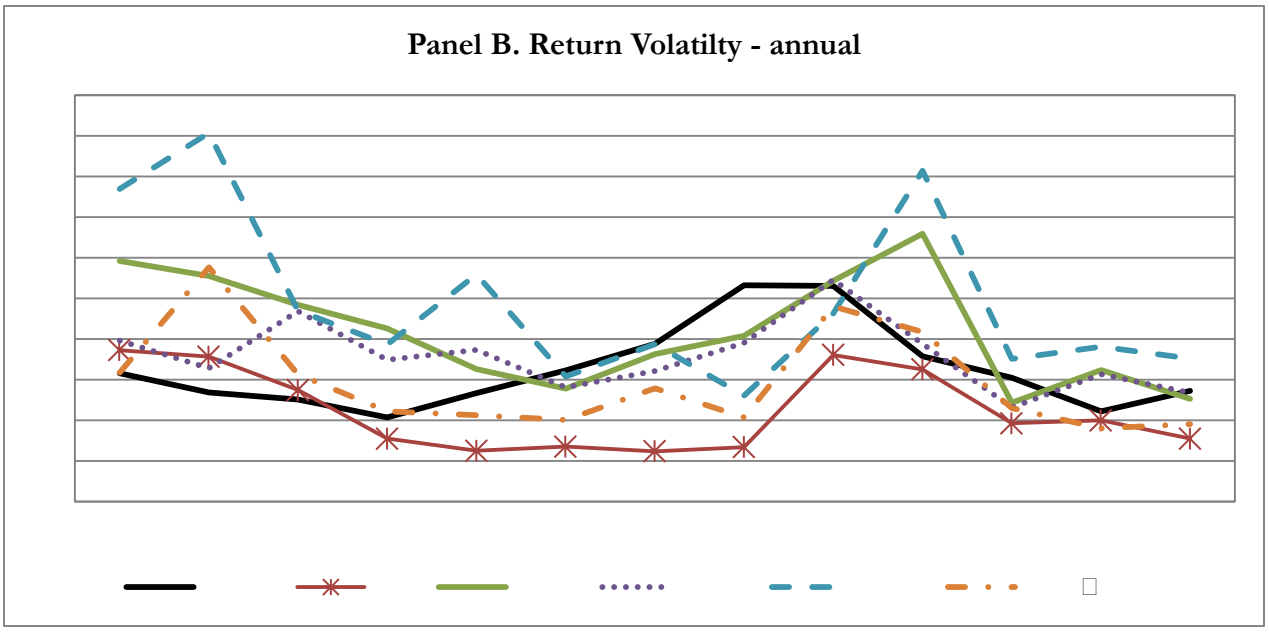
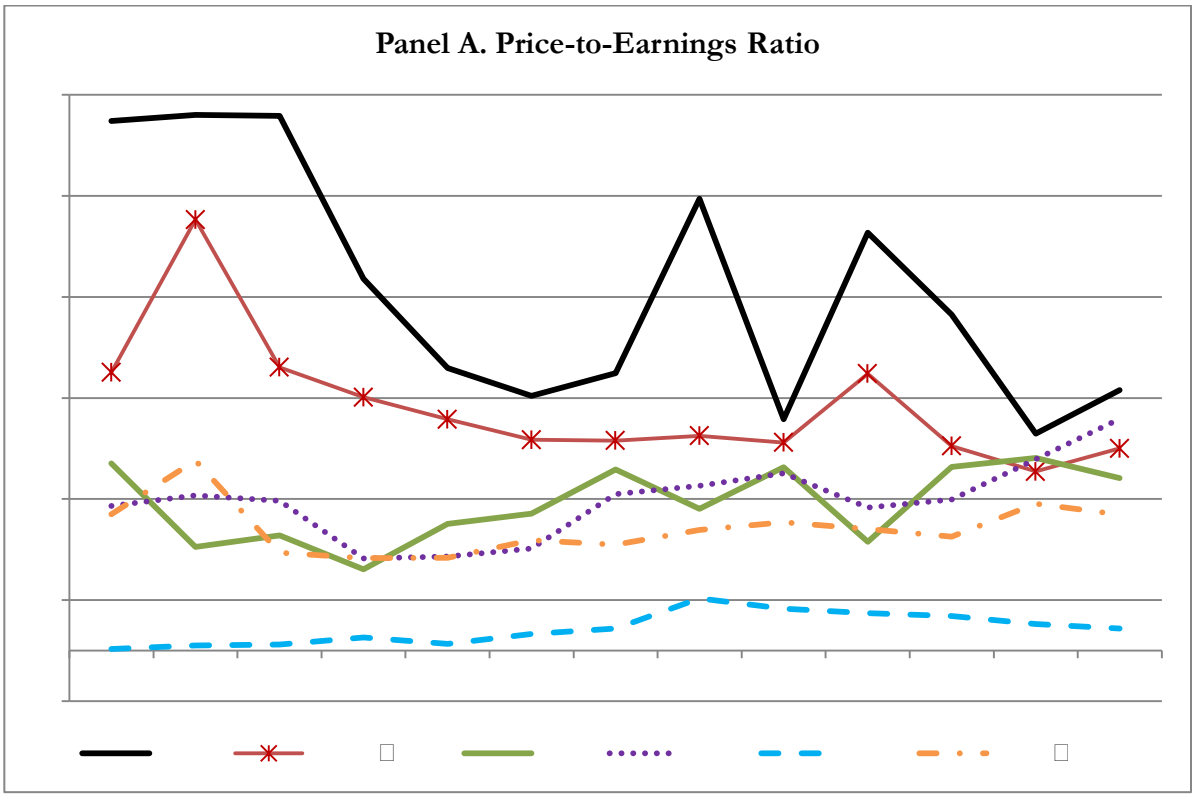


Figure 14. Valuation of Listed Firms

$$\frac{\text{Market Cap of Security}_j}{\text{Market Cap of Firm}_i}$$



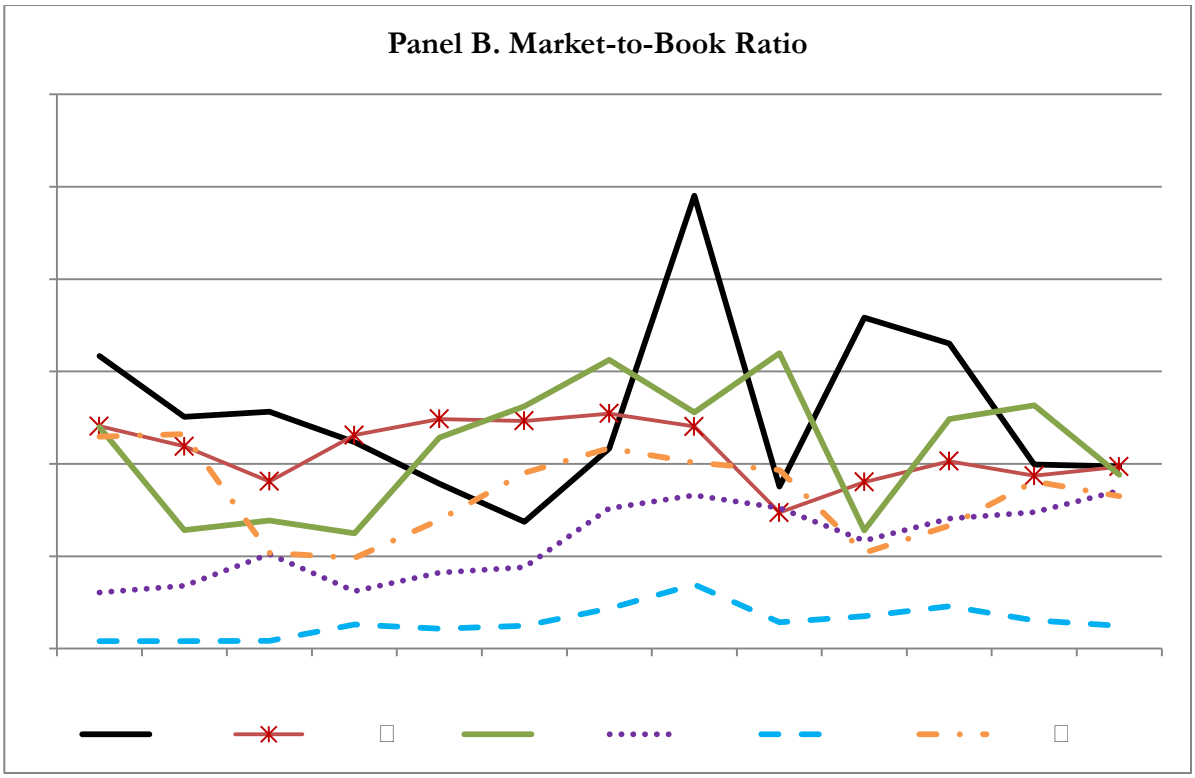
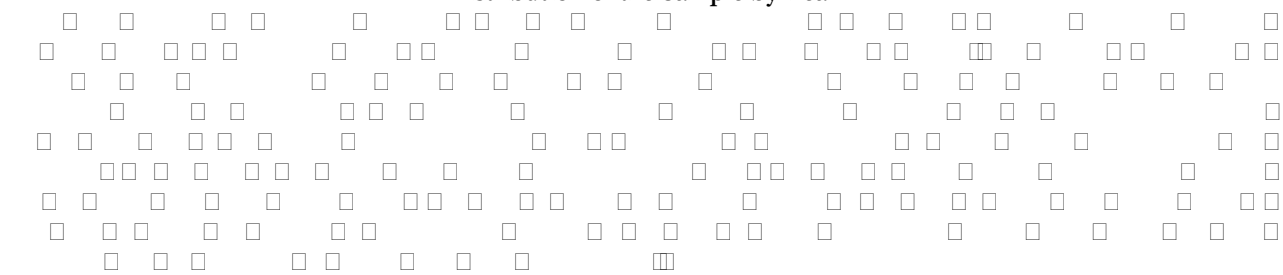
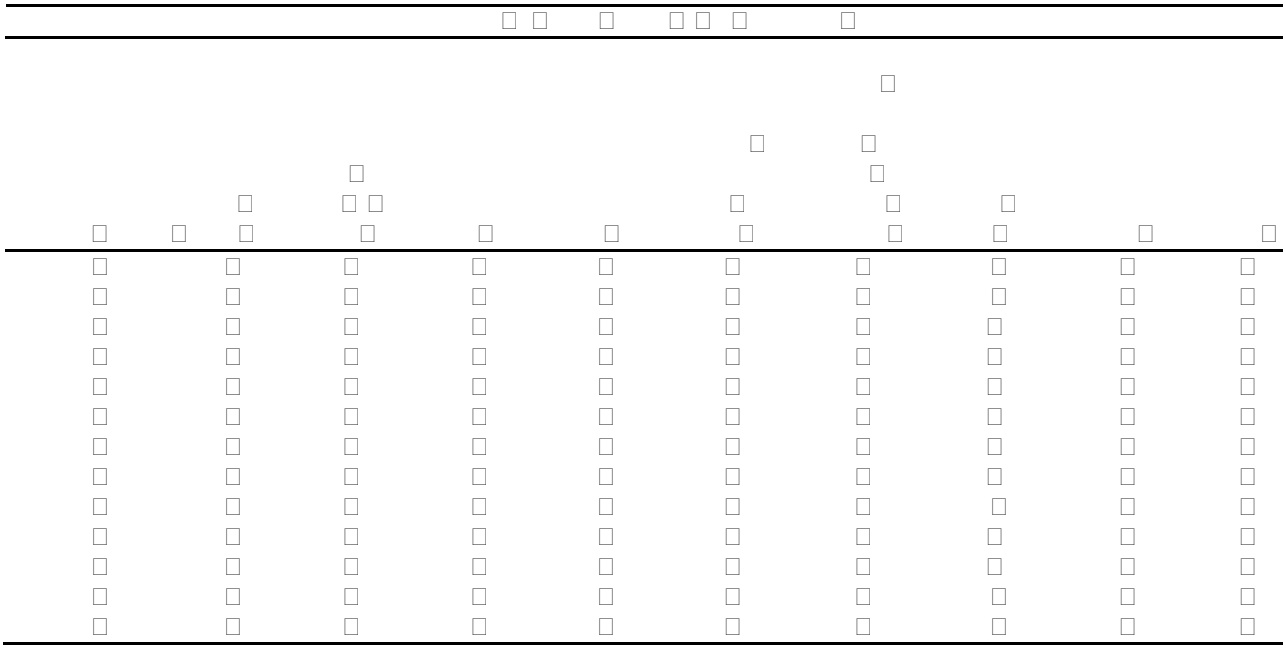

Panel B. Market-to-Book Ratio

Table I
Distribution of the Sample by Year





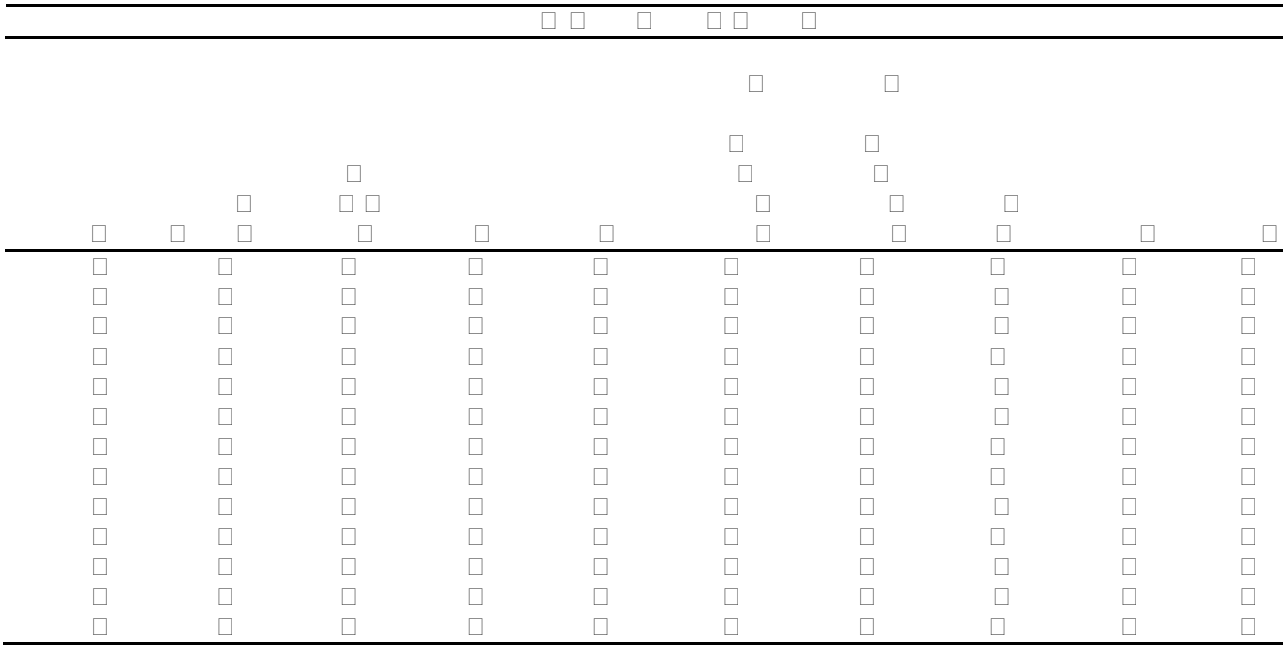


Table II
Deposit Interest Rates and Stock Returns

Table III
The Prediction Model of Buy-and-Hold Returns

[illegible]

Firm Characteristics

[illegible]

Country Characteristics

[illegible]

Table IV

Stock Performance of Listed Firms in China

Firm Characteristics

Country Characteristics

Table V

Performance of Chinese Listed Firms after IPO: Matching Firm Approach

□ □ □								
□	□	□	□	□	□	□	□	□
□ □	□	□	□	□	□	□	□	□
	□	□	□	□	□	□	□	□
□	□	□	□	□	□	□	□	□
	□	□	□	□	□	□	□	□
□ □ □	□	□	□	□	□	□	□	□
	□	□	□	□	□	□	□	□
□	□	□	□	□	□	□	□	□
	□	□	□	□	□	□	□	□
□ □	□	□	□	□	□	□	□	□
	□	□	□	□	□	□	□	□
□ □	□	□	□	□	□	□	□	□
	□	□	□	□	□	□	□	□
□	□	□	□	□	□	□	□	□
	□	□	□	□	□	□	□	□
□ □ □	□	□	□	□	□	□	□	□
□ □ □	□	□	□	□	□	□	□	□
□ □	□	□	□	□	□	□	□	□
□	□	□	□	□	□	□	□	□

Table VI
Performance of Chinese Listed Firms around IPO: Cross-Country Comparison

□

□ □ □ □ □

□	□□	□	□	□	□□	□	□	□	□
□		□	□	□	□	□	□	□	□
		□	□	□	□	□	□	□	□
□	□ □	□	□	□	□	□	□	□	□
		□	□	□	□	□	□	□	□
□		□	□	□	□	□	□	□	□
		□	□	□	□	□	□	□	□
	□	□	□	□	□	□	□	□	□
		□	□	□	□	□	□	□	□
□	□	□	□	□	□	□	□	□	□
		□	□	□	□	□	□	□	□
	□	□	□	□	□	□	□	□	□
		□	□	□	□	□	□	□	□
□	□ □	□	□	□	□	□	□	□	□
		□	□	□	□	□	□	□	□
□	□	□	□	□	□	□	□	□	□
		□	□	□	□	□	□	□	□
	□	□	□	□	□	□	□	□	□
		□	□	□	□	□	□	□	□
□	□	□	□	□	□	□	□	□	□
	□	□	□	□	□	□	□	□	□
	□ □	□	□	□	□	□	□	□	□
	□	□	□	□	□	□	□	□	□

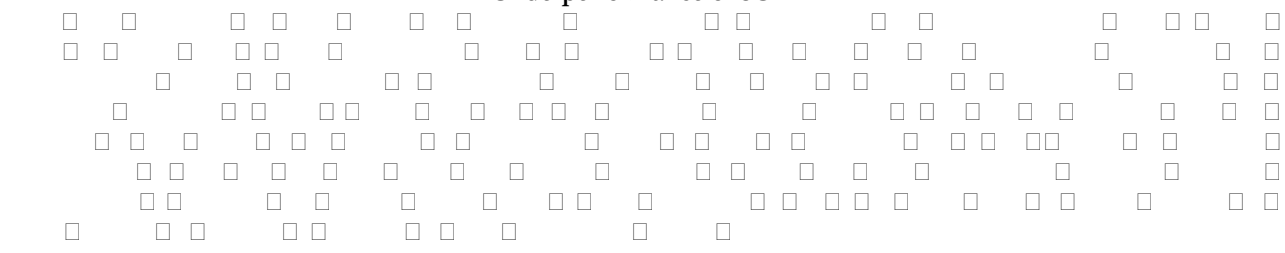
□

□ □ □ □ □

□	□□	□	□	□	□□	□	□	□	□
□		□	□	□	□	□	□	□	□
		□	□	□	□	□	□	□	□
□	□ □	□	□	□	□	□	□	□	□
		□	□	□	□	□	□	□	□
□		□	□	□	□	□	□	□	□
		□	□	□	□	□	□	□	□
	□	□	□	□	□	□	□	□	□
		□	□	□	□	□	□	□	□
□	□	□	□	□	□	□	□	□	□
		□	□	□	□	□	□	□	□
	□	□	□	□	□	□	□	□	□
		□	□	□	□	□	□	□	□
□	□ □	□	□	□	□	□	□	□	□
		□	□	□	□	□	□	□	□
□	□	□	□	□	□	□	□	□	□
		□	□	□	□	□	□	□	□
	□	□	□	□	□	□	□	□	□
		□	□	□	□	□	□	□	□
□	□	□	□	□	□	□	□	□	□
	□	□	□	□	□	□	□	□	□
	□ □	□	□	□	□	□	□	□	□
	□	□	□	□	□	□	□	□	□

□
□

Table VII
Underperformance of SOE



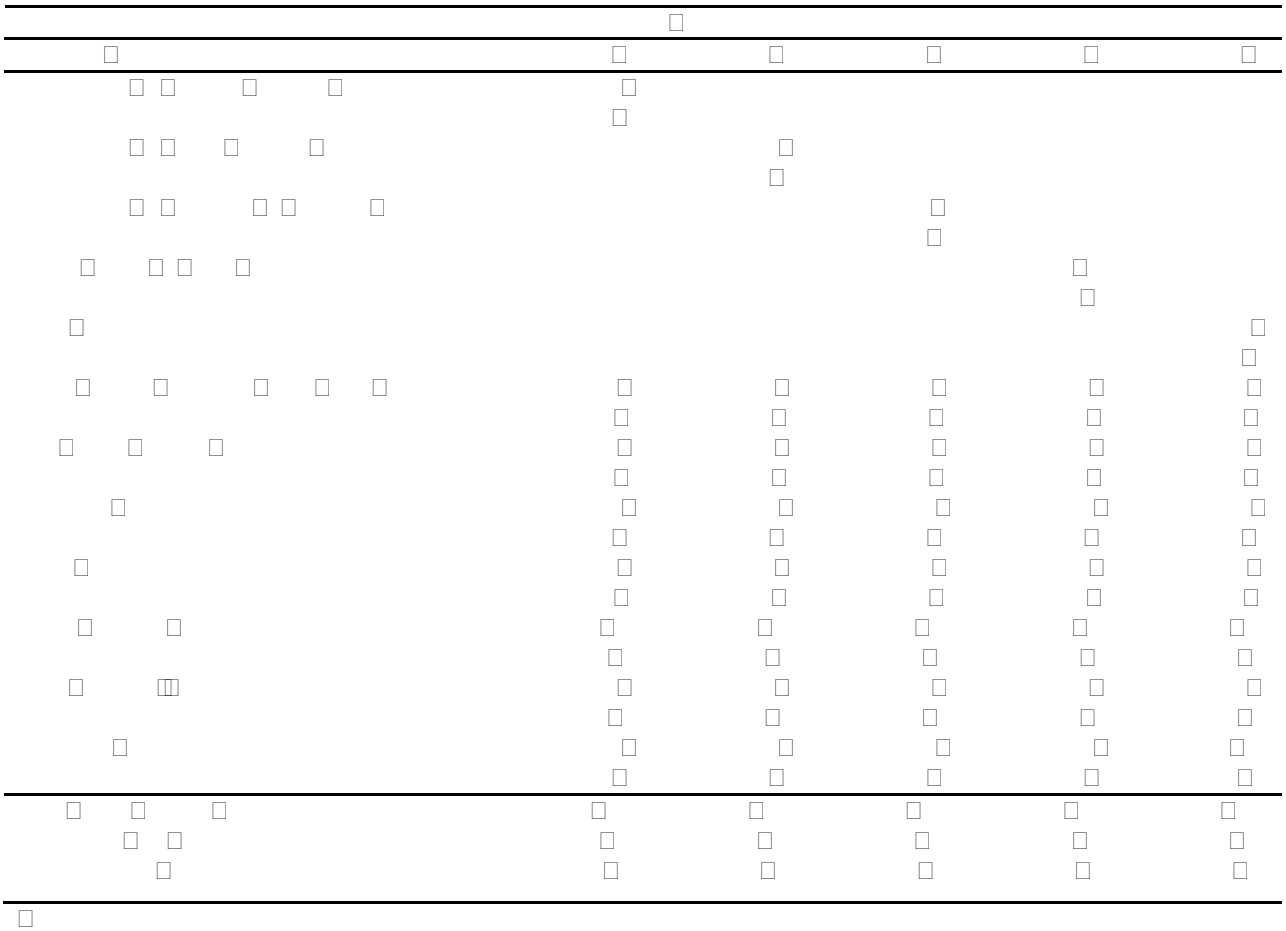


Table VIII
Long-Run Stock Performance After IPO

$$r_i = \alpha_0 + \alpha_1 \text{China Dummy}_i + \alpha_2 \text{Sales Growth} + \sum_{j=2001}^{2012} \alpha_j \text{Dummy}_j + e_i$$

Table IX
Do Firms Listed in China Have Lower Valuation?

Firm Characteristics

Country Characteristics