UNDERPRICING AND LONG-RUN PERFORMANCE OF CHINESE IPOs

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A Thesis
In
The John Molson School of Business

Presented in Partial Fulfillment of the Requirements
for the Degree of Master of Science in Administration (Finance) at
Concordia University
Montreal, Quebec, Canada

Fall 2005

Your file Votre référence
ISBN: 978-0-494-14381-0
Our file Notre référence
ISBN: 978-0-494-14381-0

Abstract

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This study examines the underpricing and long-term performance of A-share initial public offerings (IPOs) issued in China between January 1996 and December 2004. The sample is divided into State Owned Enterprises (SOEs) and non-State Owned Enterprises (non-SOEs) to investigate the difference in IPO underpricing and long-term performance between these two groups. I find that non-SOEs are significantly less underpriced than SOEs. In addition, I find that the changes in government policies do have an impact on IPO underpricing. My study confirms the results of previous studies that the long-term stock returns of Chinese IPOs is positive using a market index as a benchmark, while the long-term operating performance of these IPO firms exhibits negative changes. However, the SOE and non-SOE sub-samples do not show any significant differences in either long-term stock returns or operating performance when size- and book-to-market-matched portfolios are used as benchmarks. Finally, my findings are also consistent with the signaling theory of IPOs.

Acknowledgements

My special thanks to my supervisor, Dr. Harjeet Bhabra, for his support and help during the writing of this thesis. Many ideas in this paper have been inspired in my discussions. I also thank my committee members, Dr. Thomas Walker and Dr. Imants Paeglis, for their understanding and support. Finally, I appreciate my family to give me their full support during the years of my studies.

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1. Introduction

The purpose of this paper is to investigate the underpricing and long-term stock price and operating performance of initial public offerings (IPOs) of A-shares in China. The stock market in China has grown phenomenally over the last 15 years since the first stock exchange was established in 1990 in Shanghai followed by a second exchange in Shenzhen in 1991. Today, there are more than 1,100 firms listed on both stock exchanges combined.

In the initial years, firms that were listed on the two exchanges consisted primarily of those that were privatized by the government. However, with the rapid development of private enterprises as a result of the economic liberalization policies unleashed two decades ago, in recent years a number of firms established by entrepreneurs have taken the initiative to raise capital by listing on these exchanges. In this paper, the listed Chinese enterprises are divided into two sub-samples: State Owned Enterprises (SOEs) and non-State Owned Enterprises (non-SOEs). This division enables me to study whether underpricing and long-term performance are different in these two types of listed enterprises. Previous studies have examined the Chinese IPO market without separating the sample in such a fashion. As a result, empirical evidence from existing studies on Chinese IPOs is not directly comparable to the findings in the US and other developed and emerging markets since the samples in these studies consist mainly of SOEs. An analysis of IPOs of

non-SOEs should provide new insights on how IPOs are priced and how they perform in the long-run in this new and nascent capital market.

To date, a large body of academic literature has documented several features of IPOs in the US and many other countries. The first-day IPO underpricing and long-run underperformance are the two most commonly observed phenomena found in these markets. Loughran et al. (1994) document statistically and economically significant first-day IPO underpricing in 25 countries. In general, IPO underpricing is observed to be higher in developing than in developed markets. Long-run underperformance in the stock market is also found in many IPO markets, such as the US (Ritter 1991, Loughran and Ritter 1994), Canada (Jog 1997), Australia (Lee et al. 1996), Germany (Ljungqvist 1997), the United Kingdom (Levis 1993), Japan (Cai and Wei 1997), and Korea (Kim et al. 1995).

In recent years, numerous researchers have focused their attention on the Chinese IPO market. Mok and Hui (1998) find that between 1990 and 1993, the average underpricing of A-share initial public offerings in Shanghai was 289%. Chen et al. (2004) find an average initial return on A-share IPOs of 145% using a sample of 701 firms that went public between 1992 and 1997. Similarly, Chan et al. (2004) find that from 1993 to 1998, the average underpricing for A-share IPOs was 178%. These findings are consistent with the evidence observed in other markets that IPOs are usually underpriced.

In previous papers, share issue privatizations (SIPs) have been studied by comparing them with the private IPOs in some foreign markets such as the United Kingdom, Canada and France (Menyah et al.1990, Menyah et al. 1995, Dewenter and Malatesta 1997), while such a comparison has not been made and documented for Chinese IPOs. I add to the existing literature on the Chinese IPO market by analyzing both SOEs and non-SOEs to study IPO underpricing and long-term performance in this new market.

As in most socialist countries, SOEs in China have dominated the Chinese economy for a long time until the "Open Policy" was introduced in the 1980s when China began to gradually adopt a "market oriented approach" to reform its economic and financial system. At that time, SOEs faced a series of transformations. In addition, there was incentive for non-SOEs to emerge. In the early 1990s, after the establishment of the two stock exchanges, an important measure taken by the Chinese government was to list SOEs on both exchanges through partial share issues. In order to preserve the economy's socialist structure, the government held back a substantial proportion of SOE shares to retain control of the respective enterprise. When SOEs were experiencing the great transformation, non-SOEs were growing rapidly, too. With rapid development in their size and scale, numerous non-SOEs have shown their great power in the Chinese financial market. In the year 1993, some of first non-SOEs listed on the two exchanges with the permission of the China Securities Regulatory Committee (CSRC). The listing of non-SOEs not only added a stream of "fresh blood" to the nascent Chinese stock market, but

also built a platform for both SOEs and non-SOEs to compete and develop. The co-listing of SOEs and non-SOEs provides me with a valuable opportunity to investigate their differences in underpricing and long-run stock returns and operating performance. The rapid development of non-SOEs and the growing number of such firms listed on the Chinese stock exchanges in recent years has made it possible for me to undertake this study as there is a sufficiently large sample to perform meaningful statistical analyses and draw conclusions.

The number of non-SOEs listed on the two exchanges has rapidly increased to over one hundred as of the end of 2004. This is a large enough sample to be investigated as an individual group. Thus, in this paper, the emphasis is placed on non-SOEs as an important group of listed firms in China as the SOEs. The comparison between these two types of enterprises should provide new evidence that in the current stage of transition economy with central planning in China, whether SOEs and non-SOEs are significantly different at the time of listing and after they are listed on the stock exchanges.

I use the data for the IPOs made over the nine years from 1996 to 2004. Since the new "Enterprise Accounting Standards" and "Enterprise Financial Accounting Principles" were put into practice on July 1, 1993, which made Chinese accounting practices closer to the international standards, using the latest data helps me avoid any bias that may be caused by the traditional Chinese accounting system, and at the same time, provides more up-to-date empirical evidence on Chinese IPOs.

Furthermore, using data from reporting systems that are similar helps me to compare my results directly with the other markets as reported in the literature.

I find that the average return of Chinese A-share IPOs between 1996 and 2004 on the first day of trading is 122.99%, which is substantially higher than IPO underpricing in the US market from 1960 to 1992 where the average return is 15.3% (Ibbstson et al. 1994). Also, I find that the SOE sub-sample shows significantly higher underpricing than the non-SOE sub-sample. I examine the long-term stock returns and operating performance of Chinese IPOs in the post-issue periods as well. I find that Chinese A-share IPOs outperform their market index benchmarks for the 1- to 5-year period in the stock market, but exhibit declines in the changes in long-term operating performance over the same time interval. When size- and book-to-market-matched portfolios are used as benchmarks where a non-SOE IPO is matched with an SOE IPO made around the same time, non-SOEs and SOEs do not show any significant differences in both long-term stock returns and operating performance in the post-issue years. Finally, my additional tests support the signaling theory of IPOs. Firms that have seasoned equity offerings (SEOs) exhibit higher underpricing and these firms exhibit a better long-term stock and operating performance than firms that do not make subsequent equity offerings.

The rest of this paper is organized as follows: The next section provides some unique characteristics of the Chinese stock market. Section three provides a review of the existing literature on IPOs. Section four presents the data,

methodology, and analysis on IPO underpricing. Section five provides results for the long-term performance of IPOs. Section six presents results for additional tests. Finally, section seven concludes this paper.

2. Characteristics of the Chinese Stock Market

The Chinese stock market was established in the early 1990s with the opening of the Shanghai Stock Exchange in 1990 and the Shenzhen Stock Exchange in 1991. Compared to the developed markets, the Chinese stock market has its own unique characteristics.

The first unique characteristic of the Chinese market is that not all the shares can be traded in the secondary market. There are two types of shares in the Chinese market: tradable shares and non-tradable shares. Tradable shares include (1) A-shares, which can be purchased by domestic citizens of the People's Republic of China on the Shanghai and Shenzhen Stock Exchanges, (2) B-shares, which can be purchased only by foreign investors in mainland China, (3) H-shares, which are listed on the Stock Exchange of Hong Kong, (4) N-shares, which are listed on the New York Stock Exchange, and (5) Employee shares, which are held by the managers and employees of a firm and can not be traded until three years after the IPO. Non-tradable shares include (1) government shares, which are held by the central government and State Assets Management Bureau (SAMB) and (2) legal-entity

shares, which are held by the local government, domestic legal entities, institutions and enterprises or foreign partners. Government shares and legal-entity shares usually account for 60% of the total shares outstanding. Thus, the proportion of shares that can be traded and held by the outside investors is less than 40%. Compared with holdings by the government and the legal entities, the proportion of shares hold by the individual investors is much smaller.

The second characteristic is that the Chinese IPO market is, to a large extent, subject to the intervention of government policy and regulation. The Chinese IPO process has been influenced by the Chinese government over the years. Before March 2001, whether an enterprise could be listed on the stock exchange was determined by the government. This process of selecting which firm can be listed differs considerably from the offering process in developed markets, where the decision to list an enterprise is usually permitted by the stock exchange. In addition, the price at which an IPO could be sold was determined and regulated by the China Securities Regulatory Committee (CSRC) and these regulations changed from time to time. From 1996 to 1999, IPO pricing in China followed what can be termed as an administrative policy. The IPO price was set in a range of 13-16 times earnings per share. However, from late 1999 to 2001, the IPO pricing policy changed to make it more market-oriented by removing the upper limit for the IPO price. In January 2002, the policy changed again from then until 2004. The administrative policy was re-introduced but this time, the IPO price was set at no more than 20 times earnings per share. Finally, starting from January 1, 2005, a new policy was put in place

where investors are offered an upper and lower price limit within which to bid. The final offer price is chosen on the basis of the bids submitted.

The final characteristic of the Chinese IPO market is that there is a long time lag between the offer date and the listing date. In China, the time lag is typically two months (Chan et al. 2004), while in the US the typical elapsed time between the setting of the offer price and the issue date is 1 day. Similarly, in Japan the typical lag is two weeks (Loughran et al. 1994).

Therefore, when studying Chinese IPOs, the above mentioned characteristics should be taken into consideration as they can significantly impact the initial returns and long-term performance.

3. Literature Review

3.1 Privatization IPOs

There is a large literature on privatization. Privatization refers to procedures through a government transfers ownership of assets and control of commercial activities to the private sector. A key decision to be made by the privatizing government is the method through which the state-owned asset is transferred to private ownership. Megginson and Netter (2001) summarize four principle methods of privatization, which are: (1) *privatization through restitution.* This method is appropriate when land or other easily

identifiable property that was expropriated in years past can be returned to either the original owner or to his or her heirs, (2) *privatization through sale of state property.* This category takes two important forms. The first is *direct sales* (or asset sales) of state-owned enterprises (or some parts) to an individual, an existing corporation, or a group of investors. The second form is *share issue privatizations* (SIPs), in which some or all of a government's stake in a SOE is sold to investors through a public share offering. These are similar to IPOs in the private sector, but where private IPOs are structured primarily to raise revenue, SIPs are structured to raise money and to respond to some of the political factors, (3) *mass or voucher privatization,* whereby eligible citizens can use vouchers that are distributed free or at nominal cost to bid for stakes in SOEs or other assets being privatized. This method has been used only in the transition economies of Central and Eastern Europe, where it has brought about fundamental changes in the ownership of business assets in those countries, although it has not always changed effective control, and (4) *privatization from below,* through the startup of new private businesses in formerly socialist countries. Privatization from below has progressed rapidly in many regions (including China, the transition economies of central and Eastern Europe, Latin America, and sub-Saharan Africa).

Among these methods of privatization, share issue privatizations (SIPs) have been studied by previous researchers by comparing them with the IPOs in the private sector. Menyah et al. (1990) investigate the pricing of 13 privatization IPOs floated on the London Stock Exchange between 1981 and 1987 and compare them with private sector new issues. They track after-market performance for up to 32 weeks

after issue and find that magnitude of underpricing in the public sector corporations significantly exceeds that of the private sector issues. Menyah et al. (1995) investigate long-term stock performance 40 privatization IPOs (PIPO) listed on the London Stock Exchange between 1981 and 1991 and compare with private sector IPOs. They find that unlike private sector issues, PIPO portfolio offers a significantly positive excess return to initial subscribers and long-term investors. Dewenter and Malatesta (1997) compare initial offer prices in privatizations to initial prices in public offerings of private companies using data from 7 countries, which are Canada, France, Hungary, Japan, Malaysia, Poland, Thailand, and the United Kingdom. They find that government officials in the United Kingdom underprice IPOs significantly more than their private company counterparts. In Canada and Malaysia, however, the opposite is true. There does not appear to be a general tendency for privatizations to be underpriced to a greater degree than private company IPOs.

3.2 Underpricing of IPOs

Numerous empirical studies have shown that IPOs are significantly underpriced, on average. In the US market, Ibbstson et al. (1994) document an average initial return of 15.3% for a sample of 10,626 IPOs filed between 1960 and 1992. IPO underpricing is also found in many other countries such as Canada (Jog and Srivastava 1993), the United Kingdom (Levis 1993), Singapore (Lim et al. 1990) and Korea (Dhatt et al. 1993). Loughran et al. (1994) confirm that the IPO underpricing phenomenon exists globally by examining evidence from 25 countries.

They find that higher IPO underpricing is more prevalent in developing markets than in developed markets. Similar to the IPO underpricing in the developed markets, Chinese IPOs are also underpriced. Mok and Hui (1998) find that from 1990 to 1993, the underpricing for A-share initial public offerings on the Shanghai exchange was 289%. Chen et al. (2004) use data consisting of 701 A-share IPOs that listed between1992 and 1997 and they find that the median initial return was 145%. Chan et al. (2004) find that for the 1993-1998 period, the average underpricing for A-share IPOs was 178%.

In addition to describing the underpricing phenomenon, the existing literature offers some theoretical explanations for these puzzles. In the US market, information asymmetry and signaling theory are the two most commonly cited theories to explain the IPO underpricing puzzle. Theoretical models and explanations based on the information asymmetry theory were developed by Rock (1986) and Beatty and Ritter (1986). Rock (1986) argues that due to the existence of a group of investors whose information is superior to that of the firm as well as that of all other investors, the offering firm must price the shares at a discount in order to guarantee that uninformed investors purchase the issue. Beatty and Ritter (1986) argue that there is a monotonic relation between the expected underpricing of an initial public offering and the uncertainty of investors regarding its value. The higher the ex ante uncertainty surrounding the value of an IPO, the higher the expected underpricing will be. The signaling theory was developed by Allen and Faulhaber (1989), Grinblatt and Hwang (1989), and Welch (1989). They assume that owner–managers

(insiders) have a better knowledge about the true value of the firm than potential investors (outsiders). IPO underpricing is deliberate and voluntary to signal a firm's true value, and is justified to achieve better prices in subsequent seasoned equity offerings (SEOs).

Besides these two main explanations, Lowry and Shu (1998) use litigation risk to explain IPO underpricing. They find that firms with higher legal exposure tend to underprice their offerings by a significantly greater amount, suggesting that firms use underpricing as a form of insurance against future litigation. Aggarwal et al. (2002) develop a model to explain IPO underpricing. In their model, managers strategically underprice IPOs to maximize personal wealth from selling shares at lockup expiration. They find that higher ownership by managers is positively correlated with first-day underpricing. In the Chinese IPO market, most studies focus on the unique characteristics of that market to explain underpricing. Mok and Hui (1998) find that the proportion of non-tradable shares, the time lag between offering and listing and *ex ante* risk of new issues are the key determinants of IPO underpricing. They find that the longer the time lag between offering and listing, the higher the *ex ante* risk, the higher the underpricing. Chan et al. (2004) find that the underpricing of A-share IPOs is positively related to the time lag and the number of stock investors in the province from which the IPO comes, and negatively related to the number of shares being issued. Chen et al. (2004) find that the time lag is significantly positively related to IPO underpricing, and that high government and legal-entity shareholdings are associated with higher underpricing.

3.3 Post-IPO stock performance

Post-IPO stock performance has been the focus of researchers for some time now. In the US market, Ritter (1991) studies issuing firms from 1975 to 1984 and finds that IPO firms substantially underperform their seasoned counterparts in the long run. Subsequently, Loughran and Ritter (1995) examine firms that went public between 1970 and 1990 and find that these firms significantly underperformed their matched non-issuing firms over a period of five years after the offering date. In many other countries, IPO underperformance has been documented as well. Lee et al. (1996) investigate 266 firms that went public in Australia between 1976 and 1989 and find that aftermarket performance of IPOs is - 46.5%. Maher et al. (2004) examine 445 Canadian IPOs between 1991 and 1998 and find that these IPOs underperform in the long run. Cai and Wei (1997) study long-run stock returns of 180 initial public offerings listed on the Tokyo Stock Exchange between 1971 and 1992 and they find that the aftermarket downward drift is not only confirmed but also found to be large in magnitude relative to a number of benchmarks. Firth (1997) examines 143 IPOs in the New Zealand market and finds a negative aftermarket performance. Ljungqvist (1997) uses a sample of 189 IPO firms in Germany between 1970 and 1993 and provides evidence of long-run IPO underperformance in the German market.

Despite the overwhelming evidence that IPO firms tend to underperform in the long-run, in the Chinese market, the aftermarket performance of IPOs is actually found to be superior relative to most benchmarks. Mok and Hui (1998) study 101

A-shares IPOs during the period 1990 to 1993 and find that, after controlling for market co-movements, infrequent trading and a higher risk for new issues, the excess return of A-shares persists over a long period of time. Jing and Carol (2002) examine the short-run and long-run performance of Chinese IPOs from January 1996 through December 1997. They document superior long-run performance of Chinese IPOs. Furthermore, they find that firms that perform better in the long-run tend to make more seasoned equity offerings. Bai and Zhang (2004) select A-share IPOs issued on the Shenzhen and Shanghai Stock Exchanges between January 1998 and December 2000 and also find that the long-run stock performance of IPOs is better than that of non-IPO firms. Thus, in contrast to the underperformance of IPOs found in most markets, Chinese IPOs appear to demonstrate superior stock price performance after listing.

3.4 Post-IPO Operating Performance

Many researchers have also examined the post-IPO operating performance of IPO firms. Jain and Kini (1994) investigate changes in the operating performance of IPO firms between 1976 and 1988 in the US market. They find that IPO firms exhibit a decline in post-issue operating performance. Degeorge and Zeckhauser (1993) measure the change in operating performance of the firms that experienced reverse LBOs, a special class of IPOs. They find that reverse-LBO firms substantially underperform comparison firms in the post-IPO period. Cai and Wei (1997) study 180 initial public offerings (IPOs) listed on the Tokyo Stock Exchange during the

1971–1992 period and find negative operating performance of Japanese IPOs. In the studies on post-issue operating performance of Chinese IPOs, Sun et al. (2003) evaluate the operating performance of 634 SOEs in the period 1994-1998. They find that SOEs' earnings ability, sales, and workers' productivity are improved but that profit returns tend to decline three years after the IPO. Chan et al. (2004) study IPOs made between 1993 and 1998 and find that these firms exhibit a decline in their post-issue operating performance. Wang (2005) examines changes in operating performance of Chinese listed companies over the 1994 to 1999 interval and finds a sharp decline in post-issue operating performance.

In addition, the relationship between ownership structure and post-issue operating performance is often investigated in the literature. Mikkelson et al. (1997) examine whether the decline in operating performance of firms that go public can be explained by changes in stock ownership by managers. They conclude that the changes in equity ownership do not lead to changes in incentives that affect operating performance. Their findings and conclusions contrast with those of Jain and Kini (1994), who conclude that ownership is related to operating performance around initial public offerings. In the Chinese market, the impact of government shareholders and legal-entity shareholders on the post operating performance is the core of the discussion. Xu and Wang (1997) investigate the relation between firm value and ownership structure of Chinese listed companies that went public between 1995 and 1996, and find that firm value increases with legal-entity ownership and concentration of legal-entity ownership. At the same time, there is no relation

between firm value and state ownership or the concentration of state ownership. Qi et al. (2000) investigate IPOs between 1991 and 1996. They find that firm performance is positively related to the proportion of legal-entity shares but negatively related to the proportion of government shares. Wang (2004) find that neither state ownership nor concentration of state ownership is associated with performance changes, but that there is a curvilinear relationship between legal-entity ownership and performance changes and between the concentration of non-state ownership and performance changes.

4. IPO Underpricing

4.1 Sample and Summary Statistics

My data are retrieved from the Shanghai JuYuan database[1]. My data are composed of a total of 980 A-share IPOs offered and listed from January 1996 to December 2004 on either the Shanghai or Shenzhen Stock Exchanges. The database identifies firms as State Owned Enterprises (SOEs) or non-State Owned Enterprises (non-SOEs). The fundamental criterion used to classify SOEs and non-SOEs is based on the dominant shareholders who actually control and manage the firm. SOEs are basically controlled by the government shares, which can be held by the central government and State Assets Management Bureau (SAMB). Non-SOEs are dominated by legal-entity shares, which can be owned by local governments, the

[1] The JuYuan database comes from Shanghai Gildata Service Co., Ltd. (www.csinfo.com.cn).

domestic institutions and enterprises or by foreign entities. In my sample, 116 firms are classified as non-SOEs and 864 firms are classified as SOEs.

Table 1 presents the distribution of my sample. I notice that between 1996 and 2000, SOEs experienced a heavy issuing period and a few non-SOEs began to appear as the listed enterprises. After 2000, the IPOs of SOEs slowed down and the IPOs of non-SOEs increased rapidly, especially in the last two years. I also observe that while the numbers of firms listed on the two exchanges are comparable from 1996 to 2000, only one firm listed on the Shenzhen Stock Exchange between 2001 and 2003. This is because during that period, the China Securities Regulatory Committee (CSRC) stopped initial public offerings on the Shenzhen Stock Exchange and IPOs were limited to be listed on the Shanghai Exchange only. Overall, there are 616 firms went public on the Shanghai Stock Exchange compared to 364 firms on the Shenzhen Exchange for my sample period.

I calculate the underpricing of IPO for each firm as follows:

$$IR = \frac{1}{n}\sum_{i=1}^{n}\left(\frac{P_{ic}}{P_{io}} - 1\right) \tag{1}$$

where IR is the average initial return of the IPO on the first day of trading, P_{ic} is the closing price of stock i on the first day of trading, and P_{io} is the offering price of stock i. I first calculate the first day return of the full sample. I then divide the sample into SOEs and non-SOE sub-samples to examine whether they are significantly different in terms of IPO underpricing.

Table 2 presents the underpricing statistics for my sample. From Table 2, I observe that for the full sample, the mean (median) underpricing for A-share IPOs is 122.99% (109.66%). The underpricing phenomenon exists on both the Shanghai and Shenzhen Stock Exchange. The medians, means, and other distribution statistics for underpricing are similar across the two stock exchanges. These results are consistent with the findings in the US and other markets that IPOs are usually underpriced, and also indicate that the initial returns on Chinese IPOs are much higher compared to both developed markets (such as the US (Ibbstson et al. 1988, Loughran et al. 1994), Canada (Jog and Srivastava 1993) and the UK (Levis 1993)), and developing markets (such as Brazil (Aggarwal et al. 1993), Chile (Aggarwal et al. 1993), Korea (Dhatt et al. 1993) and Malaysia (Isa 1993)). My findings are also consistent with the results of previous studies of the Chinese IPO market (Mok and Hui 1998, Su and Fleisher 1999, Chen et al. 2004, Chan et al. 2004).

Table 2 reports the underpricing results for non-SOEs and SOEs. I find that the mean (median) underpricing for the non-SOE sub-sample is 100.60% (89.15%) and for the SOE sub-sample is 126.51% (110.74%), which indicates that the initial return for SOEs is larger than for non-SOEs. The higher underpricing of SOEs exists on both the Shanghai and Shenzhen Stock Exchange. I use t-tests and z-tests to investigate the difference in the underpricing between these two sub-samples. I find that the difference in the mean (25.90%) and median (21.59%) underpricing for these two sub-samples are statistically significant. SOEs are, on average, more underpriced than non-SOEs. I will investigate the factors that could explain these

differences in a later section.

I do an additional test on the impact of government regulation on IPO underpricing. As noted in Section 2, the pricing of an IPOs is regulated by the China Securities Regulatory Committee (CSRC). Since government policies changed over my sample period, it is interesting for me to investigate whether underpricing is affected by changes in government policies. During my sample period, from 1996 to July 1999, IPOs were priced according to a system which can be referred to as an administrative policy. The IPO price was set at a range of 13 to16 times earnings per share. From July 1999 to 2001, IPO pricing policy changed so that it was more market-oriented and the CSRC allowed issuers and underwriters to set an initial offering price range. Though this change was intended to ensure that IPOs were priced closer to their fair market value, it instead resulted in a substantial increase in the initial returns for most IPOs. As a result, the CRSC changed the policy again in 2002. From 2002 to 2004, CSRC decided to apply the administrative policy again but this time, IPO prices was set at no more than 20 times earnings per share.

I divide my sample into three sub-samples according to the time periods when the different policies were in effect. Then, I use a simple regression model to test the difference in the level of underpricing among these three periods. Table 3 provides underpricing statistics for the different time periods. In Table 3, I observe that the mean (median) initial return is 130.43% (116.08%) for the first period. The highest initial return is found in the second period with a mean of 140.21% and a median of

131.00%. The initial return is the least in the third period with its mean and median initial return of 88.96% (79.62%), respectively. This result supports the fact that in the second period from August 1999 to 2001, the new policy did not result in IPOs being priced closer to their fair market value. Instead, IPOs seemed to deviate much more from their fair market price. It was an important consideration why the CSRC again reverted to the administrative policy and adjusted the price range in the third period.

The regression parameters in Table 3 confirm that IPOs in the third period are significantly less underpriced than in the second period. The IPOs in the third period are less underpriced than in the first period due to the adjustment of price range. These findings provide me with some interesting evidence of the effects of government regulation on the IPO underpricing, which is very unique to the Chinese IPO market.

4.2 Factors of IPO underpricing

4.2.1 The characteristics of Chinese IPOs

Before I use the cross sectional regression models to explain IPO underpricing in China, I first look at the characteristics of Chinese IPOs. I classify the characteristics of Chinese IPOs into three groups: issuing characteristics, ownership characteristics, and firm characteristics. Issuing characteristics include OP (the offer price), LNSIZE (the natural log of total proceeds of shares issued), AGE (the

number of days from the foundation date of the firm to the date of the IPO divided by 365) and LAG (the number of days between the offering and listing dates). Ownership characteristics are proxied by GOV (the percentage of shares held by the government), LEGAL (the percentage of shares owned by legal entities), and IND (the percentage of shares held by individual investors). Firm characteristics are represented by NT (the ratio of net income over total assets), LEV (the ratio of total debt over total assets) and BM (the ratio of book value over market value of the equity, where the market value is calculated as the number of total shares outstanding multiplied by the closing price on the first day of trading).

Seventeen out of 980 IPO firms have missing data on variables. If information is missing for a firm, I remove that firm from my sample. As a result of these deletions, I have 963 firms in my final sample, 114 of which are non-SOEs and 849 firms are SOEs. Table 4 presents descriptive statistics for the sample.

In Table 4, I find that the offer price of SOEs is significantly lower than for non-SOEs. Generally speaking, a higher offer price is associated with better firm quality. For non-SOEs, only those firms with a higher quality can expect to be listed on the exchange, while SOEs may be listed on the exchange for other reasons such as government support rather than better firm quality. Thus, in order to induce investors to subscribe for shares of SOEs, the new issues are priced cheaply. The LNSIZE for SOEs and non-SOEs is not significantly different. Furthermore, I find that the mean and median AGE is 3 and 2.73 years, respectively, for the full sample.

However, I find that non-SOEs are significantly older (4.09 years) than SOEs (2.85 years) at the time of the IPO. This result is intriguing. In general, a firm should have 3 years of operating history before it can be listed and SOEs are expected to have a longer history compared to non-SOEs. A more detailed analysis of the company information reveals that most SOEs are subsidiaries and were separated from their parent companies just before listing[2]. Non-SOEs are, however, entrepreneurial firms. The subsidiaries of SOEs were separated from the parent companies as a new listed firm once the information of parent companies were audited and checked for initial public offering, and the offering was permitted by the China Securities Regulatory Committee (CRSC). The database does not use the founding date of their parent companies but uses the founding date and listing date in the prospectus of the newly listed subsidiaries in order to keep the information consistent with public disclosures. That is why in my sample, the SOEs appear to be of younger age than non-SOEs. Finally, I observe that LAG is significantly different between SOEs and non-SOEs. SOEs, on average, have a longer time lag between the offering date and the listing date (30 days) than non-SOEs (21 days).

I use GOV, LEGAL, and IND to study the ownership characteristics of IPOs. GOV is the percentage of shares held by government shareholders, LEGAL is the percentage of shares held by legal-entity shareholders, and IND is the percentage of shares held by individual investors. Government shares and legal-entity shares are non-liquid shares and do not trade on exchanges whereas individual shares are

[2] In China, subsidiaries are firstly separated from their parent companies, and then only the subsidiaries are listed on the stock exchanges while the parent companies are not listed on the stock exchanges. This is not a typical equity carve-out.

tradable shares. SOEs and non-SOEs may have both government shares and legal-entity shares, but the essential difference between SOEs and non-SOEs lies in the dominant shareholders who actually control and manage the firm. I observe that the percentage of legal-entity shares is much higher for non-SOEs than for SOEs. The mean (median) percentage is 60.24% (65.58%) for non-SOEs and while it is 25.46% (14.41%) for SOEs. Correspondently, the percentage of government shares is much lower for non-SOEs than for SOEs. For non-SOEs, the mean (median) percentage of government shares is 5.29% (0.00%) while for SOEs it is as high as 39.47% (47.02%). The percentage of individual shares is found to be significantly higher for non-SOEs than for SOEs. SOEs continue to be controlled by the government since the government retains a substantial proportion of shares even after the IPO. A possible reason could be the government's intention to preserve the economy's socialist structure. Non-SOEs are entrepreneurial firms and they tend to issue more shares to individual investors without the consideration of maintaining the socialist structure. In addition, non-SOEs also find it more difficult to obtain debt financing compared to SOEs, which may also partly account for the larger percentage of shares issued by non-SOEs.

For the firm characteristics, I observe that the total asset of the firm is significantly larger for SOEs than for non-SOEs. The ratio of net income over total assets is not significantly different between non-SOEs and SOEs, which indicates that the profitability of SOEs and non-SOEs is similar at the time of the IPO. The leverage ratio is significantly lower for non-SOEs than for SOEs. With the support of the

government, SOEs have better access to debt financing while non-SOEs do not have such an advantage. Non-SOEs need to be more strictly examined by the bank if they want to borrow. Thus, non-SOEs tend to turn to the stock market for their financing needs and have a lower a leverage ratio than SOEs. The book-to-market ratio, in my sample, is not significantly different between non-SOEs and SOEs.

4.2.2 Results from cross sectional analysis

I use four regression models to examine cross-sectional variations in underpricing for my samples. These models investigate the relationship of underpricing with issuing, ownership and firm characteristics. The four models examined are:

$$IR = \beta_0 + \beta_1 OP + \beta_2 LNSIZE + \beta_3 LNAGE + \beta_4 LAG + e \quad (2)$$

$$IR = \beta_0 + \beta_1 GOV + \beta_2 LEGAL + \beta_3 IND + e \quad (3)$$

$$IR = \beta_0 + \beta_1 NT + \beta_2 LEV + \beta_3 BM + e \quad (4)$$

$$IR = \beta_0 + \beta_1 OP + \beta_2 LNSIZE + \beta_3 LNAGE + \beta_4 LAG + \beta_5 GOV + \beta_6 LEGAL + \beta_7 IND + \beta_8 NT + \beta_9 LEV + \beta_{10} BM + e \quad (5)$$

In these models, the dependent variable IR is the first day return of IPOs. OP is the offer price, LNSIZE is the natural log of the proceeds of shares issued, LNAGE is the natural log of number of days from the founding of the firm to the date of the IPO, and LAG is the number of days between offering and listing. These issuing variables are the independent variables in Model 1. GOV is the percentage of shares owned by the government, LEGAL is the percentage of shares held by legal entities,

and IND is the percentage of shares issued to individual investors. These ownership variables are the independent variables in Model 2. NT is the ratio of net income over total assets, LEV is the ratio of total debt over total assets, and BM is the ratio of book value over market value of equity. These firm variables are the independent variables in Model 3. In the final model, all independent variables in the previous three models are included. I use these models to examine the impact of these variables on underpricing for the full sample, as well as non-SOE and SOE sub-samples.

For the issuing variables, I predict a negative relationship between offer price and underpricing. The higher the offer price, the smaller will be the underpricing. LNSIZE is predicted to have a negative relationship with undepricing since the equity offering increases the asset base of a firm, larger firms will have less information asymmetry than smaller firms, thus will have lower risk and lower underpricing. I expect a negative relationship between LNAGE and underpricing. According to the information asymmetry theory, the age of the firm can be used as a measure of the level of information asymmetry. Since there would be less information asymmetry for the firms with a longer history than for firms with a shorter history, the older firms should be less underpriced than younger firms. I assume a positive relationship between LAG and underpricing. Unlike in the US and other developed markets, there is a longer time lag between offer date and listing date for Chinese IPOs. A longer time lag introduces more uncertainty for the investors. Thus, the longer the time lag between the issuing date and the listing date,

the higher is the level of risk faced by the investors. As a result, the larger is the degree of underpricing required.

For the ownership variables, the previous literature on Chinese IPOs documents controversial findings on the effects of the variables GOV and LEGAL on IPO underpricing. To summarize, one point of view is that the percentage of non-tradable shares (the sum of both government shares and legal-entity shares) is negatively related to the first day returns. Mok and Hui (1998) examine 87 IPOs made between 1990 and 1993 while Chan et al. (2004) tested IPOs issued between 1993 and 1998. Both studies find the relationship to be negative and significant. The other point of view is that high retention of government shares may have a positive relationship with underpricing. Su and Fleisher (1999) examine IPOs between 1987 and 1995, Su (2004) examines the 348 IPOs between 1994 and 1999, and Chen et al. (2004) use 701 A-share IPOs between 1992 and 1997. These researchers find a positive relationship between the percentage of government shares and underpricing. As a result, I predict that GOV and LEGAL may have either a positive or a negative relationship with underpricing. On one hand, since government and legal-entity shares are non-tradable shares, a higher retention of government and legal-entity shares may increase the risk of the firm, thus inducing higher underpricing. On the other hand, as the insiders of the firm, government and legal-entity shareholders should have better information than outsider investors, thus a higher retention of the firm may be perceived as a vote of confidence for the firm's future. In this case, a higher retention of government and legal-entity shares may lower the level of

uncertainty of the firm and therefore have a negative relationship with underpricing.

For the firm variables, I expect a negative relationship between NT and underpricing. The ratio of net income over total assets indicates the profitability of a firm. Firms with a higher ratio of net income over total assets are expected to be of better quality and face less risk in their operating activities, thus they should be less underpriced. I expect that LEV could have either a negative or a positive relationship with underpricing. On one hand, firms with a higher leverage ratio are expected to have a higher level of risk faced by stockholders, which will induce higher underpricing. On the other hand, firms with a higher leverage ratio will be subject to more monitoring from debt holders, which will make the managers more efficient in their decision making, thus a negative relationship may be found. I predict a negative relationship between BM and underpricing. The book-to-market ratio can be viewed as a measure of level of risks. Growth firms with lower book-to-market ratios usually have higher risks compared to value firms with higher book to market ratio. Thus, larger underpricing is required for firms with lower book-to-market ratios and higher levels of risks.

Moreover, since the purpose of my paper is to investigate the difference between non-SOEs and SOEs, I further focus on the non-SOE and SOE sub-samples to examine the factors that may explain the differences in IPO underpricing. My results in Section 4 indicate that non-SOEs are less underpriced than SOEs. In order to find potential explanations for this difference, I examine different characteristics

between non-SOEs and SOEs.

The regression results are reported in Table 5. In Model 1, I find that offer price is significantly negatively related to underpricing for the full sample, as well as non-SOEs and SOEs. This result is in line with my expectation and is consistent with the findings of Chan et al. (2004). LNSIZE is also significantly negatively related to underpricing for the full sample and for the sub-sample of SOEs. This result is similar to previous studies such as Mok and Hui (1998), Su and Fleisher (1999), and Chen et al. (2004). The negative relationship is, however, not significant for non-SOEs. LNAGE is found to have no significant relationship with underpricing. LAG is found to be significantly positively related to underpricing for the full sample as well as for non-SOEs and SOEs. This result is consistent with my prediction that the longer the time lag between the issuing date and the listing date, the higher the risk the investors will face, thus the larger the required underpricing. The finding is also consistent with Mok and Hui (1998), Chen et al. (2004), and Chan et al. (2004).

In Model 2, for the full sample, I find a significantly negative relationship between government ownership and underpricing, and also between legal-entity ownership and underpricing. These findings are similar to the findings of Mok and Hui (1998) and Chan et al. (2004). For non-SOEs and SOEs, the GOV and LEGAL variables do not exhibit significant relationship with underpricing. IND does not have a significant relationship with underpricing in either sample.

In Model 3, I find a significant negative relationship between NT and underpricing for the full sample, as well as for non-SOEs and SOEs. This result is consistent with my prediction. I find a significant positive relationship between LEV and underpricing for the full sample and for non-SOEs but not for SOEs. In addition, a significant negative relationship was found between BM and underpricing for all three samples. These results are consistent with my expectation and provide evidence that the higher the risks the investor will face, the higher underpricing will be required.

In Model 4, when all the independent variables are included, I notice that for the full sample and for SOEs, OP, LNSIZE and LAG have similarly significant relationship as in Model 1. The variable LNAGE, however, exhibits a significant positive relationship with underpricing. This relationship stands in contrast to the information asymmetry theory. However, as noted in Section 4.1, in my sample, the LNAGE of SOEs is measured from the founding date to the IPO date of subsidiaries, but not the parent companies. Thus, we refrain from drawing any conclusions based on this result. For non-SOEs, only OP and LNSIZE have the same significant relationship with underpricing, and LAG is found to be not significantly related to underpricing. I find mixed results for ownership characteristics. For the full sample and for SOEs, GOV does not show significant a relationship with underpricing, but LEGAL and IND show a significant negative and positive relationship with underpricing, respectively. For non-SOEs, only IND has a significant positive relationship with underpricing. For firm characteristics, I find that for non-SOEs,

LEV and BM exhibit the same significant relationship as in model 3. NT is not found to be significantly related to underpricing. For the full sample and for SOEs, only BM is found to have a significant negative relationship with underpricing.

Next, I focus on Model 4 for the non-SOE and SOE sub-samples to investigate the factors that may explain the higher underpricing of SOEs compared to non-SOEs. I notice that LAG is found to be significantly positively related to underpricing for SOEs but this relationship is not significant for non-SOEs. A longer lag indicates higher level of uncertainty and will induce higher underpricing. In my sample, SOEs are found to have a longer lag (30 days) than non-SOEs (21 days), which may explain the higher underpricing of SOEs. I also notice that for SOEs, LEGAL is significantly negative related to underpricing while this significant relationship does not exist for non-SOEs. The legal-entity shareholders are supposed to play a more effective role in monitoring the firm. Thus, the higher percentage of legal-entity shares may lower the risk of a firm and also its underpricing. Given my observation that the proportion of the legal-entity shares is significantly lower for SOEs than for non-SOEs, the significant negative relationship between LEGAL and underpricing for SOEs may explain the higher underpricing of SOEs. In addition, I find LEV to be significantly positively related to underpricing for non-SOEs, yet this positive relationship is not significant for SOEs. A higher leverage ratio could have two effects on firm value. On one hand, a higher leverage ratio is expected to increase the level of firm risk, thus inducing higher underpricing. On the other hand, a higher leverage ratio indicates additional monitoring from debt holders, which will make

the managers more efficient in decision making, thus increasing the firm's value. My results confirm the first explanation. In my sample, non-SOEs are reported to have a significant lower leverage ratio than SOEs, thus this significant relationship only for non-SOEs may also provide an explanation for the lower underpricing of non-SOEs. To summarize, a longer time lag between offer date and listing date, less percentage of legal-entity shares and a higher leverage ratio of SOEs may jointly explain the higher underpricing of SOEs compared to non-SOEs.

5. Long-term performance

5.1 Long-term stock performance

In this section, I examine the stock price performance for IPOs in the 1-year to 5-year post-issue periods. From the same database, I obtain the monthly returns for each listed firm in the post-issue period. I calculate buy-and-hold returns (BHRs) to measure long-term stock return performance. Previous work such as Conrad and Kaul (1993) has shown that BHR is more accurate in measuring long-term returns since they do not suffer from the upward bias in single period returns. I follow the approach of Loughran and Ritter (1995) and calculate the BHR as follows:

$$R_{iT} = \prod_{t=start}^{\min[T,delist]} (1 + r_{it}) - 1 \qquad (6)$$

where R_{iT} is the buy-and-hold return for firm i in the post-issue period, *start* is the

date of first day of trading, min[*T, delist*] is the earlier of the last day of trading or the end of the three- or five-year window, and r_{it} is the raw return of firm *i* on date *t*. BHR measures the total return from a buy-and-hold strategy where a stock is purchased at the first closing market price after going public and held for three or five years. In Loughran and Ritter (1995), the months are defined as successive 21-trading-day periods relative to the IPO date. Since the database I use only provides the monthly returns for each stock, I am unable to obtain returns for successive 21-trading-day periods relative to the IPO date. Thus, in my tests, long-term BHRs are computed from the start of the calendar month following the IPO. I do not include returns in the first calendar month after listing in my calculations. The *t*-statistic in my tests is based on the data from the second calendar month after listing to 12, 36, or 60 months after the IPO.

First, I calculate 1-year, 3-years and 5-years raw BHRs for the full sample as well as non-SOE and SOE sub-samples. Next, I examine the index-adjusted BHRs which are calculated as the raw BHRs minus the market index BHRs in the same period.

$$ADR_{iT} = R_{iT} - R_{iTmarket} \quad (7)$$

where ADR_{iT} is the adjusted BHR, R_{iT} *is* the BHR for firm i over period T, and $R_{iTmarket}$ is the market index BHR for the same period. Following previous studies that have employed Chinese data, I use the Shanghai and the Shenzhen A-Index as corresponding market benchmarks. Both are capitalization-weighted indices using all A-shares listed on the respective stock exchange.

Table 6 provides results for the raw BHRs and index-adjusted BHRs for 1-, 3- and 5-years after the IPO. In Panel A, I find that for the full sample, the 1-, 3- and 5-years raw BHRs are 0.13, 0.48, and 0.65, respectively. These raw BHRs are significantly positive. When the full sample is divided into a non-SOEs and SOE sub-sample, I find that 3- and 5-years raw BHRs for the non-SOE sub-sample are positive, but are not significant. For the SOE sub-sample, the raw BHRs for 1-, 3- and 5-years are all positive and significant. The difference of raw BHRs between non-SOEs and SOEs are -0.16 in 1 year, -0.36 in 3 years, and -0.32 in 5 years, which indicates that the non-SOE sub-sample has lower raw BHRs than the SOE sub-sample. The difference is statistically significant for both 1-year and 3-years returns.

Panel B reports the results for the index-adjusted BHRs. For the full sample, the index adjusted BHRs are 0.05, 0.22, and 0.29 in the 1-year, 3- and 5-years after the IPO, and each of these returns are significantly positive. These findings are consistent with the previously documented results for the Chinese markets (Mok and Hui 1998, Jing and Carol 2002, Bai and Zhang 2004). Contrary to evidence reported for developed markets (Loughran and Ritter 1994, Lee et al. 1996, Cai and Wei 1997, Firth 1997, Maher et al. 2004), I find that Chinese IPOs outperform their market index in the long-term. For the non-SOE sub-sample, the index-adjusted BHRs are all positive but not significant. However, for the SOE sub-sample, the index-adjusted BHRs are all positive and significant in the post issuing years. Thus, while SOEs outperform the market index, non-SOEs do not. The difference of

adjusted BHRs between non-SOEs and SOEs are -0.01, -1.15, and -0.64 in 1-year, 3- and 5-years after IPO, respectively, but these differences are not statistically significant.

Since the emphasis of my paper is to investigate the difference between non-SOEs and SOEs, I further test the long-term stock returns of non-SOEs and SOEs by constructing size-matched and the book-to-market (BM)-matched portfolios. However, instead of benchmarking an IPO firm to a non-issuing firm, I match a non-SOE firm to an SOE IPO firm. Thus, every non-SOE firm is matched to an SOE firm based on firm size and book-to-market ratio to compare the difference in the stock market performance between the two issuing firms. In my sample, firm size is measured by total asset of the firm, and the book-to-market ratio is calculated as the book value over the market value of the equity. For the size-matched and BM-matched portfolios, the matched SOE firm should be listed in the same calendar month or earlier than the non-SOE firm. The matching firm is chosen to be the one that has the closest value of total assets and BM ratio to the non-SOE IPO. When I calculate the BM ratio, the market value is defined as the number of total shares outstanding multiplied by the closing price on the first day of trading.

Table 7 reports results for the stock performance in the post-issue years for non-SOE and their size- and BM-matched SOE portfolios. Panel A presents the results of size-matched SOE portfolios. I find that for non-SOEs and their size-matched SOE portfolios, the raw and adjusted BHRs in the post-issue years are

not statistically significant. This result is intriguing since in Table 6, I observe that the SOE sub-sample outperformed the market when considering either raw or index-adjusted BHRs. The result in Table 6, therefore, appears to be driven by larger SOEs. The raw BHRs of non-SOEs appear to be a little higher than their matched SOEs after listing but the differences are not significant. When adjusted index BHRs are used, I find that the differences between non-SOEs and SOEs are still not significant.

I find similar results for the BM-matched SOE portfolios. Panel B reports the results of BM-matched SOE portfolios. I find that for non-SOEs and their BM-matched SOE portfolios, the raw and adjusted BHRs in the post-issue years are not significant. Non-SOEs and their BM-matched portfolios do not show any significant differences in their stock performance after the listing. Again, when adjusted BHRs are computed, the differences between non-SOEs and their BM-matched SOEs are not significant. From the above comparisons, I find that the differences in BHRs between non-SOEs and SOEs are very sensitive to the benchmarks used. When the market index and matched portfolios are not used as benchmarks, the raw BHRs between the non-SOE sub-sample and the SOE sub-sample are significantly different. But when the market index is considered, the differences in index-adjusted BHRs between these two sub-samples become insignificant. Similarly, when size- and BM-matched portfolios are used as benchmarks, the differences in both raw and index-adjusted BHRs between non-SOEs and SOEs are not significant.

5.2 Long-term operating performance

In this section, I examine the changes in operating performance of Chinese IPOs after their listing. Three variables are used to measure the operating performance: return on assets (ROA), the asset turnover rate (ATO), and the sales growth rate (SG). Since the database does not provide pre-IPO data for these variables, I mainly focus on operating performance changes in the post-issue years. Similar to the procedure adopted for investigating the stock performance in the post-issue years, I first examine the changes in operating performance for the full sample, and for the non-SOE and SOE sub-samples. Next I use the size- and BM-matched portfolios to reexamine the differences in operating performance between the non-SOE and SOE sub-samples.

Table 8 reports results for changes in operating performance relative to the IPO year. The results indicate that for the full sample, changes in ROA and ATO decline significantly after the IPO in all the event windows examined. Changes in SG exhibit increases but the increases are only significant in the 5-year window. For the non-SOE sub-sample, changes in ROA and ATO exhibit significant declines in the post-issue years. Changes in SG also decline but the declines are not significant. For the SOE sub-sample, ROA and ATO exhibit significant negative changes in the post-issue years while SG exhibits significant positive changes. To summarize, ROA and ATO exhibit significant negative changes in the post-issue years in all of three sample groups. SG shows significant positive changes only for the SOE sub-sample. The differences in changes in ROA, ATO, and SG between non-SOEs

and SOEs are all negative but not significant in the post-issue years, which indicate that non-SOEs and SOEs do not exhibit significant differences in their operating performance after the IPO. These results indicate that Chinese IPOs exhibit a decline in their post IPO operating performance but that this decline is not related to sales activity. My results are consistent with the evidence found both in developed markets (Degeroge and Zeckharser 1993, Jain and Kini 1994, Cai and Wei 1997) and in the Chinese market (Chan et al. 2004, Wang 2004).

However, the declining changes in ROA and ATO of IPOs are not consistent with the superior performance I found in stock returns, which suggest that in the post-issue years, the operating performance of the firms is not fully reflected in the stock price. One possible explanation is that the information on business growth is more related to the stock price in the post-issue years since only the sales growth rates show positive changes after listing. In addition, the Chinese stock market is still in an early stage of development. Thus the informational inefficiencies are more pronounced, which could also contribute to the conflicting results documented for the post-issue stock price and operating performance.

I repeat my analysis by constructing size- and BM-matched portfolios to compare differences of changes in operating performance between non-SOEs and SOEs. The matching procedure is similar to that used in examining stock return performance in the previous section. Each non-SOE firm is matched with an SOE firm that has been listed in the same time and has the closest value of total asset or BM ratio in the IPO year. Table 9 presents the results for these matched samples. In Panel A, I find that

non-SOEs exhibit a significant decline in ROA and ATO in the post-issue years. Their size-matched SOEs also show a significant decline in long-term ROA. However, the declines in long-term ATO are not significant. The changes in SG are negative for non-SOEs but positive for SOEs. The differences in ROA, ATO, and SG between non-SOEs and their size-matched SOEs are all negative but not significant except for the changes in SG in the third year after the IPO. Panel B reports results for a comparison between non-SOEs and their BM-matched SOE portfolios. BM-matched SOEs show a significant decline in long-term ROA. The declines in long-term ATO are significant in 1-year and 5-years event window. The difference in ROA, ATO and SG between non-SOEs and their BM-matched SOEs are all negative but not significant except for the changes in ATO in the third year after the IPO. The results are similar when compared to the size-matched SOEs in Panel A. To summarize, the differences of changes in operating performance between non-SOEs and SOEs are not significant whether I use size-matched or BM-matched SOEs portfolios as benchmarks. These results are consistent with my stock performance findings documented previously and indicate that non-SOEs and SOEs that are of the same size or have similar BM ratios do not show significant differences in both stock returns and operating performance in the post-issue years.

6. Additional Tests

To better understand the positive long-run stock returns and negative long-run

operating performance of Chinese IPOs, I examine the relationship between the post-issue performance and characteristics of the listed companies in the IPO year.

6.1 Factors affecting the long-run stock performance

In my test, I use the 3-years and 5-years index-adjusted BHRs and the characteristics of IPOs to examine the factors that may be related to the long-term stock returns. Similar to the analysis undertaken in section 4, I use four regression models for the three groups: the full sample, the non-SOE and SOE sub-samples. The dependent variable ADBHR is the 3-years and 5-years index adjusted BHR. OP is the offer price of the IPO, LNSIZE is the natural log of total proceeds of A-shares issued, LNAGE is the natural log of numbers of days from the foundation of the firm to the date of the IPO, and LAG is the number of days between offer date and listing date. In addition to these variables, I include IR, which is the initial return on the first day of trading as an independent variable in the model. These issuing characteristics are the independent variables in Model 1. GOV is the percentage of the shares owned by the government, LEGAL is the percentage of shares owned by legal entities and IND is the percentage of shares issued to individual investors. These ownership characteristics are the independent variables in Model 2. NT is the ratio of net income over total assets, LEV is the ratio of total debt over total assets and BM is the ratio of book value over market value of equity. These firm characteristics are the independent variables in Model 3. In the final model, all independent variables in the previous three models are included. The four models

estimated are:

$$ADBHR = \beta_0 + \beta_1 IR + \beta_2 OP + \beta_3 LNSIZE + \beta_4 LNAGE + \beta_5 LAG + e \quad (8)$$

$$ADBHR = \beta_0 + \beta_1 GOV + \beta_2 LEGAL + \beta_3 IND + e \quad (9)$$

$$ADBHR = \beta_0 + \beta_1 NT + \beta_2 LEV + \beta_3 BM + e \quad (10)$$

$$ADBHR = \beta_0 + \beta_1 IR + \beta_2 OP + \beta_3 LNSIZE + \beta_4 LNAGE + \beta_5 LAG + \beta_6 GOV + \beta_7 LEGAL + \beta_8 IND + \beta_9 NT + \beta_{10} LEV + \beta_{11} BM + e \quad (11)$$

For issuing characteristics, I predict a negative relationship between IR and long-run stock returns. Carter and Dark (1990) examine the correlation between initial returns and 18-month aftermarket returns and find that firms with higher initial returns tend to provide slightly lower long-run returns than firms having lower initial returns. Ritter (1991) finds that firms that are more underpriced than others perform worse in the long-run. OP is expected to be positively related to long-run stock returns since a higher offer price is associated with a higher quality of the firm. I predict that LNSIZE is negatively related to long-run stock returns since larger offering size will increase the asset base of the firm. Larger firms will display a lower information asymmetry than smaller firm, thus the larger offering size will lower the risk of a firm and lower the stock returns. Another explanation is that according to Jing and Carol (2002), the offering size of the company can be treated as a proxy for risk. Since Chinese securities markets are not mature enough, institutional investors may manipulate the stock price. Compared to individual shareholders, institutional investors have a large amount of capital to buy a large

proportion of the outstanding shares being issued in order to control the stock price and to earn abnormal returns. Although this kind of market manipulation is illegal, it exists in the Chinese markets. The smaller the offering size of a listed company, the easier it is for institutional shareholders to control the price of the stocks and the higher the risk individual investors face. Thus, the higher will be the expected long-run returns.

For ownership characteristics, I predict that GOV and LEGAL may have two different effects on the stock performance of IPOs. On one hand, as the insiders of the firm, government and legal entities may hold a higher percentage of shares if they are confident in the quality of the firm. On the other hand, since the government and legal-entity shares do not trade on the stock exchange, a higher percentage of GOV and LEGAL may be perceived as higher risk. Thus, GOV and LEGAL may have either a positive or a negative relationship with the long-term stock return performance.

For firm characteristics, I expect a positive relationship between NT and long-term stock returns since a high ratio of net income over total assets indicates a higher quality of the firm in the IPO. Thus, a better stock price performance is expected to reflect high quality. Since LEV may have two different effects on the firm's value, I perceive that LEV may have either a positive or a negative relationship with long-term stock returns. In addition, I predict that BM will have a negative relationship with long-term stock returns. A higher book-to-market ratio indicates

lower risk, thus it will induce lower returns in the stock market.

The regression results are presented in Table 10. Panel A presents the regression results for 3-years stock returns. I find that IR is found to be significantly negatively related to 3-years adjusted BHRs for the full sample and the SOE sub-sample. This result is consistent with Carter and Dark (1990) and Ritter (1991). For the non-SOE sub-sample, this negative relationship is not significant. LNSIZE is found to be negatively related to 3-years adjusted BHRs for the full sample and the SOE sub-sample, which is consistent with the findings of Jing and Carol (2002). This negative relationship is not significant for non-SOEs. For all three samples, LNAGE and LAG do not show a significant relationship with 3-years index-adjusted BHRs. I find that GOV and LEGAL are significantly negatively related to 3-year adjusted BHRs for the full sample. This result indicates that as non-tradable shares, a higher percentage of GOV and LEGAL may be perceived as higher risk. This result is consistent with Jing and Carol (2002). For non-SOE sub-sample, this relationship is not significant. For SOEs, I find that GOV and IND are significantly related to 3-years adjusted BHRs. Finally, NT is significantly positively related to 3-year adjusted BHRs for all three samples. LEV is found to be significantly positively related to 3-years adjusted BHRs for the full sample in Model 3, which suggests that a higher leverage ratio will induce more monitoring from the debt holders, thus increasing the firm's value. BM is found to be significantly positively related to 3-years adjusted BHRs for the full sample in Model 3. This result is in contrast with my prediction that the higher the firm's risk the investors face, the higher the stock

returns that are required as compensation. I focus on Model 4 to investigate the difference between non-SOE and SOE sub-samples. I observe that no independent variable is significantly related to 3-year stock returns for non-SOEs, while for SOEs, IR, LNSIZE, GOV, and NT are found to be significantly related to 3-years stock returns.

Panel B reports regression results for 5-years adjusted BHRs. For the full sample and the SOE sub-sample, I find similar results for issuing and firm characteristics compared to the results for 3-years adjusted BHRs. The largest difference exists in ownership characteristics. I find a significant positive relationship between GOV, LEGAL and 5-years stock returns. In addition, IND is found to be significantly positively related to 5-years adjusted BHRs for the full sample and the SOE sub-sample. For non-SOEs, LNSIZE, OP, GOV, and LEGAL are found to be significantly related to 5-years stock returns.

6.2 Factors affecting long-run operating performance

After testing the long-term stock return performance, it is interesting to do similar tests on the long-term operating performance. In Section 5, I found that Chinese IPOs exhibited significant declines in ROA and ATO after the IPO. The changes in SG were positive but not significant. In this section, I use changes in 3-years and 5-years ROA, ATO, and SG as dependent variables, and the same characteristics

used in Section 6.1 as independent variables in my regression models to examine the factors that impact long-term operating performance. The models I estimate are:

$$OPPERF = \beta_0 + \beta_1 IR + \beta_2 OP + \beta_3 LNSIZE + \beta_4 LNAGE + \beta_5 LAG + e \quad (12)$$

$$OPPERF = \beta_0 + \beta_1 GOV + \beta_2 LEGAL + \beta_3 IND + e \quad (13)$$

$$OPPERF = \beta_0 + \beta_1 NT + \beta_2 LEV + \beta_3 BM + e \quad (14)$$

$$OPPERF = \beta_0 + \beta_1 IR + \beta_2 OP + \beta_3 LNSIZE + \beta_4 LNAGE + \beta_5 LAG + \beta_6 GOV + \beta_7 LEGAL + \beta_8 IND + \beta_9 NT + \beta_{10} LEV + \beta_{11} BM + e \quad (15)$$

Among the issuing characteristics, I predict that LNAGE is positively related to long-term operating performance since firms with a longer history are expected to perform better in the long-run. LNSIZE is predicted to have a positive relationship with long-term operating performance since a larger amount of value of the equity issued indicates a larger size of the firm, thus better operating performance is expected. I expect that IR, OP, and LAG are not significantly related to long-term operating performance since these characteristics are more related to stock returns performance.

For ownership characteristics, previous papers on the Chinese market have drawn different conclusions on the impact of government and legal-entity shareholders on the post-issue operating performance. Xu and Wang (1997) find that firm value increases with legal-entity ownership and concentration of ownership, whereas there is no relation between the firm value and state ownership or the concentration of

ownership. Qi et al. (2000) find that firm performance is positively related to the proportion of legal-entity shares but negatively related to the proportion of government shares. Wang (2004) find that neither state ownership nor concentration of ownership is associated with performance changes, but there is a curvilinear relation between legal-entity ownership and performance changes and between concentration of non state ownership and performance changes. I predict that GOV and LEGAL will have either a positive or a negative effect on the long-term performance of the firm. On one hand, government and legal-entity shares are not tradable, thus a higher retention of government and legal entities shares can be regarded as an indicator of higher risk. On the other hand, as the dominant shareholders in the firm, government and legal entities shareholders are certain to play a positive role of monitoring to guarantee the quality of the firm. Thus, GOV and LEGAL could have two different effects on the long-term operating performance.

For firm characteristics, I expect a positive relationship between NT and long-term operating performance since the high ratio of net income over total assets indicates a higher quality of the firm in the IPO. Thus, better operating performance is expected. Since LEV may have two different effects on the firm's value, I perceive that LEV may have a positive or a negative relationship with long-term operating performance. In addition, I predict that BM has a positive relationship with long-term operating performance. A higher book-to-market ratio indicates lower risk, thus will making operating performance more stable.

The results of the 3-years and 5-years changes in operating performance are reported in Table 11, Table 12 and Table 13, respectively. Table 11 presents the results for the changes in ROA. In Panel A, for the full sample, I find only LNSIZE is significantly positively related to the 3-years changes in ROA, but this relationship becomes insignificant in Model 4. GOV and LEGAL do not show any significant relationship with the changes in ROA. IND is found to be significantly positively related to 3-years changes in ROA, while this relationship becomes insignificant in Model 4. NT is found to be significantly negatively related to 3-years and 5-years changes in ROA. This result is in contrast with my prediction. LEV and BM are not found to have any significant relationship with changes in ROA. For both the non-SOE and SOE sub-sample, LNSIZE is found to be significantly positively related to 3-years changes in ROA. In Panel B, I observe that for the full sample and the SOE sub-sample, only NT is found to be significantly negatively related to 5-years changes in ROA. For non-SOEs, IR, LNSIZE, GOV, LEGAL, NT and BM are found to be significantly related to 5-year changes in ROA.

Table 12 presents results for the changes in ATO. I find that for the full sample and SOEs, LNSIZE and LNAGE are significantly positively related to the 3-years changes in ATO. This result is consistent with my prediction that the larger and the longer the history of the firm, the better the operating performance. LAG is found to be significantly positively relative to 3-years changes in ATO for the full sample, but this relationship is not significant in Model 4. For the ownership characteristics,

GOV and IND do not show any significant relationship with the changes in ATO. Only LEGAL is found to be significantly positively related to 5-years changes in ATO. NT is found to be significantly negative related to 3-years and 5-years changes in ATO. LEV and BM are not found to have any significant relationship with changes in ATO. The results for SOEs are similar when compared to the results for the full sample. For non-SOEs, I do not find any significant relationship between independent variables and 3-years changes in ATO. I find similar results for 5-years changes as for 3-years changes in ATO for all samples.

Table 13 presents results for the changes in SG. For the full sample and non-SOEs, issuing characteristics are not found to be significantly related to 3-years and 5-years changes in SG. For the ownership characteristics, GOV shows a significant positive relationship with the 3-years changes in SG for the full sample and for SOEs. LEGAL is found to be significantly positively related to 3- and 5-years changes in SG only for the SOE sub-sample. Again, NT is found to be significantly negatively related to the 3-years and 5-years changes in SG. LEV and BM are not found to have any significant relationship with changes in SG.

To summarize, I find mixed results on the relationship between firm characteristics and long-term operating performance. A significant negative relationship is found between NT and long-term changes in ROA, ATO, and SG. This negative relationship may be caused by the overstating of the income or the understating of expenses in the firm's balance sheets in the IPO year. Firms may tend to manipulate their ratio of profitability in order to be listed on the exchange and earnings may be

overstated. This negative relationship may also be caused by timing activity of the managers. Managers may choose the time to go public when the firm's earnings are good looking.

6.3 Reissue activity after the IPO

In this section, I do some additional tests on underpricing and long-term performance of the firms that make seasoned equity offerings (SEOs) and the non SEO firms. Signaling theory developed by Allen and Faulhaber (1989), Grinblatt and Hwang (1989), and Welch (1989) assume that owner–managers (insiders) have a better knowledge about the true value of the firm than potential investors (outsiders). IPO underpricing is deliberate and voluntary to signal a firm's true value, and is justified to achieve better prices in subsequent seasoned equity offerings. Jegadeesh et al. (1993) used US data to test the signaling theory by estimating the probability of an SEO as a function of IPO underpricing. They find only weak evidence that firms that underprice their IPOs are more likely to issue subsequent equity. Garfinkel (1993) tests the signaling theory by assessing the likelihood of insider selling as a function of IPO underpricing but finds no correlation. In Chinese markets, Su and Fleisher (1999), Chen et al. (2004), and Su (2004) obtain empirical results consistent with signaling theory. Unlike the previous literature that include the SEO as an independent variable in their regression models to explain IPO underpricing, I regard SEO as an event after the IPO and test the signaling theory by dividing the sample into firms making SEOs and the non SEOs group. If

signaling theory holds for my sample, I expect that the firms making SEOs will be more underpriced than the firms that do not make SEOs. In addition, I examine the stock return performance and operating performance of firms that making SEOs and non SEO firms to investigate whether firms making SEOs really have better performance than non SEO firms after their IPO.

6.3.1 Underpricing of the firms that make SEOs

In my sample, I have 63 out of 980 firms that make seasoned equity offerings after the IPO. Among these 63 SEO firms, 19 firms have SEOs within three years after the IPO and 53 firms have SEOs within the five years after the IPO. In my test, I use 19 firms, 53 firms, and 63 firms as three sample groups to investigate their IPO underpricing and long-term performance after the IPO.

Table 14 reports the results on IPO underpricing of firms making SEOs and non SEO firms for the three groups. For the first group, the mean (median) underpricing of firms making SEOs is 161.02% (137.83%) and the mean (median) underpricing of non SEO firms is 122.24% (108.46%). For the second group, the mean (median) underpricing of firms making SEOs is 152.34% (135.99%) and the mean (median) of non SEO firms is 121.29% (108.18%). For the third group, the mean (median) underpricing of firms making SEOs is 145.24% (125.00%) and the mean (median) underpricing of non SEO firms is 121.46% (108.40%). For each group, firms making SEOs are significantly more underpriced than non SEO firms. The mean

(median) differences between non SEO firms and firms making SEOs are -38.68% (-29.37%), -31.55% (-27.81%) and -23.80% (-16.60%), respectively, and these differences are all statistically significant. These findings support the signaling theory that firms making SEOs are likely to be more underpriced in their initial public offering. My results are consistent with the evidence found in the Chinese market (Su and Fleisher 1999, Chen et al. 2004, and Su 2004). In addition, I find that the shorter the lag between initial public offering and seasoned equity offering, the higher is their IPO underpricing. Table14 shows that the firms making SEOs within three years after listing exhibit the highest underpricing in their IPO, and the firms making SEOs within five years after listing are statistically less underpriced. I also find that out of total 63 firms that make SEOs, 58 firms are State Owned Enterprises and only 5 firms are non State Owned Enterprises. The proportion of firms making a seasoned equity offering is a little higher for State Owned Enterprises (58 out of 866 firms) than for Non State Owned Enterprises (5 out of 114 firms). State Owned Enterprises appear more likely to make seasoned equity offerings than non State Owned Enterprises. This result may also provide evidence to explain my previous findings that State Owned Enterprises are more underpriced than non State Owned Enterprises.

6.3.2 Long-term performance of firms that make SEOs

Next I examine the stock return performance and operating performance of firms making SEOs and non SEO firms in the post IPO years. Since the results for three

groups are similar, I mainly focus on the results of the third group to present the stock return and operating performance of firms making SEOs and non SEOs.

In Table 15, I find that firms making SEOs and non SEO firms exhibit superior stock returns performance in the post-issue years. The raw and index adjusted BHRs are significantly positive in all the event windows for both firms making SEOs and non SEOs. Furthermore, the differences of both raw BHRs and index adjusted BHRs are negative between non SEO firms and firms making SEOs. Firms making SEOs statistically outperform non SEO firms in the 1-year and 3-year after IPO in the stock market. In the 5-year after issuing, firms making SEOs still have a better stock performance than non SEO firms but the difference is not significant. These results provide the evidence that firms making SEOs exhibit better stock returns performance than non SEOs after IPO.

Table 16 presents the operating performance of firms making SEOs and non SEO firms after IPO. I find that non SEO firms exhibit significant decline in the changes in ROA and ATO regardless of event windows. Firms making SEOs have negative changes in their ROA and ATO, but not all of the negative changes are significant. The changes in SG, for non SEO firms, are all positive but only significant in 5-years after IPO. For firms making SEOs, the changes in SG are all significantly positive. The differences in the changes in ROA between non SEO firms and firms making SEOs are significantly negative in the 3-years (-1.27%) and 5-years (-2.50%) after IPO. The differences in the changes in ATO are significantly negative in the

1-year (-0.05%) and 3-years (-0.07%) after IPO. The differences in the changes in SG between non SEO firms and firms making SEOs are significantly negative in 1-year (-10.79%) and 3-years (-11.00%) after IPO. These results indicate that firms making SEOs obviously exhibit better operating performance than non SEO firms after IPO. The differences in operating performance between non SEOs and firms making SEOs are consistent with the differences found previously in stock return performance. Above findings confirm that firms making SEOs have much better performance than non SEO firms in both stock returns and operating performance after IPO. My empirical findings again provide evidence consistent with the signaling theory in the Chinese IPO market.

7. Conclusions

This paper studies the underpricing and the long-term performance of A-share IPOs issued in China between January 1996 and December 2004. In particular, I divide the A-share IPOs into two sub-samples: non-State Owned Enterprises (non-SOEs) and State Owned Enterprises (SOEs) to investigate the differences between these two types of firms. Consistent with the findings of previous studies, this study finds that there is a large underpricing of A-share IPOs, with an average return on the first day of trading of 122.99%. At the same time, this study finds that the SOE sub-sample shows significantly higher underpricing than the non-SOE sub-sample. In addition, I test the underpricing in three different periods when different

government policies on IPO pricing are in effect. I find that the changes in government policies do have an impact on IPO underpricing.

I differentiated between issuing, ownership and firm characteristics that could explain cross-sectional variations in the underpricing of A-share IPOs. For issuing characteristics, my results are consistent with the findings in previous papers that find that offer price (OP) and log of proceeds of share issued (LNSIZE) are significantly negative related to underpricing, and that the time lag between the offer date and the listing date (LAG) is significantly positive related to underpricing. For ownership characteristics, I find a significant negative relationship between the percentage of shares held by legal entities (LEGAL) and underpricing, and a significant positive relationship between the percentage of shares held by individual shareholders (IND) and underpricing. These results are not documented in previous papers and may indicate that the monitoring role played by legal-entity shareholders and individual shareholders have been considered as a positive factor to reduce the risk of the firm, thus lowering the underpricing. With respect to firm characteristics, I find underpricing to be significantly negatively related to the book-to-market (BM) ratio, suggesting that the higher the risk a firm's investors face, the higher the undepricing they require. I further examine the characteristics of non-SOEs and SOEs to explain the higher underpricing of SOEs compared to non-SOEs. I notice that the relationship between underpricing and the variables LAG and LEGAL is only significant for the SOE sub-sample, and that the relationship between underpricing and LEV is only significant for the non-SOE sub-sample. Thus, a

longer lag between offer and listing day, less percentage of legal-entity shares and a higher leverage may jointly explain the higher underpricing of SOEs compared to non-SOEs.

The stock performance and operating performance of IPOs are also examined in this study. Consistent with previous studies in the Chinese market, this study finds that Chinese A-share IPOs outperform their market index benchmarks during a 1- to 5-years period. In addition, this study finds that SOEs exhibit a slightly significant better performance than the non-SOE sub-sample using raw buy-and-hold returns (BHRs). When market index returns or size- and book-to-market-matched portfolios are used as benchmarks, the differences in the stock returns between non-SOEs and SOEs become insignificant. In contrast with superior long-run stock performance, I find that Chinese IPOs exhibit declines in their long-term operating performance. The differences in the operating performance between non-SOEs and SOEs are not significant when size- and BM-matched SOEs portfolios are used as benchmarks, which is consistent with my findings of insignificant differences in post-issue stock returns performance.

As additional tests, I investigate the characteristics affecting long-term stock return performance and operating performance. I find that for issuing characteristics, long-term stock performance is only significantly related to underpricing (IR) and log of proceeds of share issued (LNSIZE). For ownership characteristics, the percentage of shares held by the government (GOV) and percentage of shares of shares held by the legal entities (LEGAL) are found to be significantly negatively

related to 3-years adjusted BHRs while they are positively related to 5-years adjusted BHRs. For firm characteristics, the ratio of net income over total asset (NT) is found to have a significant positive relationship with long-term stock return performance. I find mixed results on the relationship between firm characteristics and long-term operating performance. A significant negative relationship is found between NT and long-term operating performance. This negative relationship may be explained by the fact that firms may tend to manipulate their earnings in order to be listed on the exchange, or by the timing activity of the managers. Finally, this study examines the underpricing and long-term performance of IPOs by dividing them into firms making seasoned equity offerings (SEOs) and firms that do not. My study is consistent with the signaling theory of IPO underpricing, and finds that firms which make SEOs are more underpriced than firms without SEOs. Moreover, firms making SEOs outperform firms without SEOs both in terms of stock performance and operating performance after the IPO.

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Table 1
Distribution of the sample

Year	Shanghai Exchange	Shenzhen Exchange	Total	Non-SOEs	SOEs	Total
1996	80	71	151	3	148	151
1997	79	108	187	13	174	187
1998	50	45	95	2	93	95
1999	46	51	97	6	91	97
2000	88	49	137	17	120	137
2001	76	1	77	9	68	77
2002	69	0	69	11	58	69
2003	67	0	67	18	49	67
2004	61	39	100	37	63	100
Total	616	364	980	116	864	980

This table reports the distribution of Chinese IPOs between January 1996 and December 2004. For the sample period, 616 IPOs are listed on the Shanghai Exchange and 364 are listed on the Shenzhen Exchange. Of these, 116 IPOs are issued by non-State Owned Enterprises (non-SOEs) and 864 are issued by State Owned Enterprises (SOEs).

Table 2
Underpricing statistics

A-Shares		Mean (%)	Median (%)	Standard deviation (%)	Minimum (%)	Maximum (%)
1. Full sample:						
Total	(N = 980)	122.99***	109.66***	83.47	-9.00	830.21
Shanghai	(N = 616)	119.08	105.28	77.66	-5.24	476.77
Shenzhen	(N = 364)	129.60	116.36	92.20	-9.00	830.21
2. Non-SOEs						
Total	(N = 116)	100.60***	89.15***	71.05	-9.00	324.89
Shanghai	(N = 71)	104.82	89.27	70.00	-5.24	311.57
Shenzhen	(N = 45)	93.94	86.65	72.96	-9.00	324.89
3. SOEs						
Total	(N = 864)	126.51***	110.74***	84.58	-6.17	830.21
Shanghai	(N = 544)	120.93	107.53	78.47	0.18	476.77
Shenzhen	(N = 320)	134.62	118.85	93.60	-6.17	830.21

	N	Mean (%)	t-value	Median (%)	z-value
Non-SOEs	116	100.60***		89.15***	
SOEs	864	126.51***		110.74***	
Difference		-25.90***	-3.60	-21.59***	-3.35

This table reports underpricing statistics for Chinese IPOs between January 1996 and December 2004. IPO underpricing is calculated for three sample groups: the full sample, non-SOEs and SOEs. The initial returns of the IPOs are calculated as

$$IR = \frac{1}{n}\sum_{i=1}^{n}\left(\frac{P_{ic}}{P_{io}} - 1\right)$$

where IR is the average return of the IPOs on the first day of trading, P_{ic} is the closing price of stock i on the first day of trading, and P_{io} is the offer price of stock i. Tests for the differences in IPO underpricing between non-SOEs and SOEs are also reported in this table. t-value and z-value are the results of T-test and Wilcoxon-test of means and medians being different from zero.

* Significant at the 10% level,

** Significant at the 5% level,

*** Significant at the 1% level.

Table 3
Government policy and underpricing

Period	Mean (%)	Median (%)	Standard deviation (%)	Minimum (%)	Maximum (%)
1. From 1996 to July 1999					
Full sample (N= 491)	130.43***	116.08***	84.87	-6.16	830.21
Non-SOEs (N= 22)	129.34	127.07	70.53	8.27	296.79
SOEs (N= 469)	130.48	114.46	85.55	-6.16	830.21
2. From Aug 1999 to Dec 2001					
Full sample (N= 253)	140.21***	131.00***	85.48	0.28	476.77
Non-SOEs (N= 28)	139.36	133.91	67.16	2.81	248.41
SOEs (N= 225)	140.32	130.46	87.62	0.28	476.77
3. From Jan 2002 to Dec 2004					
Full sample (N= 236)	88.96***	79.62***	67.57	-9.00	428.25
Non-SOEs (N= 66)	74.57	62.89	61.93	-9.00	324.89
SOEs (N= 170)	94.55	86.85	69.01	1.57	428.25

Regression Results	intercept	$Coeff_1$	t-value	$Coeff_2$	t-value
	1.40	-0.09	-1.56	-0.17***	-6.97

This table reports underpricing statistics for Chinese IPOs in three periods when different government policies were in effect in pricing IPOs. IPO underpricing is calculated for three sample groups in each period: the full sample, non-SOEs and SOEs. The initial returns of the IPOs are calculated as

$$IR = \frac{1}{n}\sum_{i=1}^{n}\left(\frac{P_{ic}}{P_{io}} - 1\right)$$

where IR is the average initial return of the IPOs on the first day of trading, P_{ic} is the closing price of stock i on the first day of trading, and P_{io} is the offer price of stock i. The differences in underpricing between different periods are tested by using a simple regression model: $IR = \beta_0 + \beta_1 T_1 + \beta_2 T_3 + e$

where T is a dummy variable to represent time period, in our model, period 2 is represented by the intercept. Thus the $Coeff_1$ is the difference of IPO underpricing between period 2 and period 1, and $Coeff_2$ is the difference between period 2 and period 3.

* Significant at the 10% level,

** Significant at the 5% level,

*** Significant at the 1% level.

Table 4
Characteristics of IPO firms

	Full Sample N=963		Non-SOEs N=114		SOEs N=849		Difference	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
IR (%)	123.41	109.81	100.70	88.63	126.98	110.74	-26.30***	-22.11***
Issuing Characteristics								
OP	7.04	6.36	9.92	8.74	6.66	6.15	3.26***	2.59***
LNSIZE	10.3	10.31	10.38	10.37	10.29	10.30	0.09	0.07
AGE (years)	2.99	2.73	4.09	3.43	2.85	2.56	1.25***	0.87***
LAG (days)	29.59	21.00	21.57	16.00	30.69	22.00	-9.12***	-6.00***
Ownership characteristics								
GOV (%)	35.43	40.15	5.29	0.00	39.47	47.02	-34.20***	-47.02***
LEGAL (%)	29.57	21.67	60.24	65.58	25.46	14.41	34.78***	51.17***
IND (%)	29.06	29.35	31.24	30.78	28.77	29.17	2.47**	1.61**
Firm characteristics								
TA (million)	1987.14	796.53	872.86	712.34	2136.41	809.06	-1263.55**	-97.02*
NT (%)	6.35	6.33	6.36	6.34	6.35	6.34	0.01	0.00
LEV (%)	15.25	13.99	11.70	9.53	15.72	14.70	-4.02**	-5.17***
BM (%)	25.64	23.97	25.92	25.85	25.61	23.82	0.31	2.03

This table reports the characteristics of Chinese IPOs for three groups: the full sample, non-SOEs and SOEs. IR represents the first day IPO return. OP is the offer price. LNSIZE is the natural log of proceeds of shares issued. AGE is the number of years between foundation of the firm and the date of the IPO. LAG is the number of days between the offering and the listing. GOV is the percentage of the shares owned by the government. LEGAL is the percentage of shares owned by legal entities. IND is the percentage of the shares owned by individual investors. TA is the total asset of the firm. NT is the ratio of net income over total assets of the firm. LEV is the ratio of total debt over total assets. BM is the ratio of book value over market value of the equity, where the market value is computed as the number of total shares outstanding multiply by the closing price on the first day of trading.

* Significant at the 10% level,

** Significant at the 5% level,

*** Significant at the 1% level.

Table 5
Regression results of models explaining underpricing
Panel A: Full sample

Independent variables	Model 1	Model 2	Model 3	Model 4
OP	-0.0189**			-0.0587***
	(-2.25)			(-10.22)
LNSIZE	-0.3687***			-0.0938***
	(-11.27)			(-3.97)
LNAGE	0.0069			0.0284***
	(0.56)			(3.19)
LAG	0.0038***			0.0029***
	(4.32)			(5.10)
GOV		-0.5056*		-0.2226
		(-1.64)		(-1.13)
LEGAL		-0.5115*		-0.3434*
		(-1.63)		(-1.76)
IND		0.1913		1.7454***
		(0.61)		(8.72)
NT			-2.5155***	-0.7819
			(-3.85)	(-1.21)
LEV			0.4368**	0.1608
			(2.51)	(0.99)
BM			-6.3601***	-6.5230***
			(-34.50)	(-37.58)
Intercept	5.0157***	1.5134***	2.9628***	3.7346***
	(14.93)	(6.25)	(37.22)	(13.13)
Adjusted R^2	0.1528	0.0010	0.5530	0.6614
N	963	963	963	963
p-value	< 0.0001	0.2696	< 0.0001	< 0.0001

Table 5 (continued)
Panel B: Non-SOEs

Independent variables	Model 1	Model 2	Model 3	Model 4
OP	-0.0324**			-0.0237***
	(-1.99)			(-2.61)
LNSIZE	-0.1388			-0.1629**
	(-0.97)			(-2.26)
LNAGE	-0.0487			-0.0004
	(-1.08)			(-0.42)
LAG	0.0130***			0.0028
	(2.94)			(1.24)
GOV		-0.0047		0.3168
		(-0.00)		(0.65)
LEGAL		-1.3155		0.0759
		(-1.51)		(0.17)
IND		-0.3704		1.7052***
		(-0.36)		(2.72)
NT			-4.1874***	-1.0472
			(-2.72)	(-0.62)
LEV			1.1369***	0.9496***
			(3.03)	(2.65)
BM			-6.6025***	-6.6425***
			(-16.22)	(-18.17)
Intercept	1.3641***	1.9154**	2.8515***	3.9574***
	(5.72)	(2.45)	(16.40)	(4.59)
Adjusted R^2	0.1249	0.0693	0.7044	0.7908
N	114	114	114	114
p-value	0.0009	0.0122	< 0.0001	< 0.0001

Table 5 (continued)
Panel C: SOEs

Independent variables	Model 1	Model 2	Model 3	Model 4
OP	-0.0112			-0.0700***
	(-1.06)			(-9.67)
LNSIZE	-0.3885***			-0.0814***
	(-11.26)			(-3.19)
LNAGE	0.0119			0.0326***
	(0.92)			(3.41)
LAG	0.0034***			0.0028***
	(3.69)			(4.69)
GOV		-0.4026		-0.3167
		(-1.23)		(-1.47)
LEGAL		-0.1190		-0.4219*
		(-0.59)		(-1.94)
IND		0.2837		1.8287***
		(0.86)		(8.56)
NT			-3.0677***	-0.6418
			(-3.62)	(-0.92)
LEV			0.2508	0.0653
			(1.32)	(0.37)
BM			-6.3110***	-6.5603***
			(-31.74)	(-34.00)
Intercept	5.1383***	1.3978***	3.0075***	3.7144***
	(14.78)	(5.48)	(34.87)	(12.23)
Adjusted R^2	0.1557	0.0037	0.5433	0.6492
N	849	849	849	849
p-value	< 0.0001	0.1050	< 0.0001	< 0.0001

Table 5 presents the regression results of underpricing of Chinese IPOs for three groups, the full sample, non-SOEs and SOEs.The dependent variable is IR, the initial return of IPOs. The independent variables are: OP, the offer price; LNSIZE, the natural log of proceeds of shares issued; LNAGE, the natural log of number of years from the founding of the firms to the date of the IPO; and LAG, the number of days between the issue date and the listing date. These four variables are classified as issuing characteristics. GOV, the percentage shares held by the government; LEGAL, the percentage shares held by the legal entities; and IND, the percentage of shares held by individual investors. These three variables are classified as ownership characteristics. NT, the ratio of net income over total assets; LEV, the ratio of total debt over total assets; and BM, the ratio of book value over market value of the equity. These three variables are classified as firm characteristics. Four regression models are used to explain the underpricing for each group. Model 1 is the regression of issuing characteristics, model 2 is the regression of ownership characteristics, model 3 is the regression of firm characteristics and model 4 is the cross sectional regression of all the independent variables. The models are:

$$IR= \beta_0 +\beta_1 OP+\beta_2 LNSIZE+\beta_3 LNAGE+\beta_4 LAG+e \quad (1)$$

$$IR= \beta_0+\beta_1 GOV+\beta_2 LEGAL+\beta_3 IND+e \quad (2)$$

$$IR= \beta_0+\beta_1 NT+\beta_2 LEV+\beta_3 BM +e \quad (3)$$

$$IR= \beta_0 + \beta_1 OP + \beta_2 LNSIZE + \beta_3 LNAGE + \beta_4 LAG +\beta_5 GOV +\beta_6 LEGAL+\beta_7 IND+\beta_8 NT+ \beta_9 LEV+\beta_{10} BM + e \quad (4)$$

*Significant at the 10% level,

** Significant at the 5% level,

*** Significant at the 1% level.

Table 6

Average buy-and-hold returns (BHRs) in the post-issue periods

Panel A: Raw BHRs						
	1-year	t-value	3-year	t-value	5-year	t-value
Full sample	0.13***	7.36	0.48***	10.85	0.65***	9.35
N	951		769		593	
Non-SOEs	-0.03	-0.69	0.14	1.03	0.34	1.41
N	107		55		35	
SOEs	0.14***	7.46	0.50***	10.93	0.67***	9.27
N	844		714		558	
Difference	-0.17***	-3.65	-0.36**	-2.45	-0.32	-1.26

Panel B: Index Adjusted BHRs						
	1-year	t-value	3-year	t-value	5-year	t-value
Full sample	0.05***	3.81	0.22***	5.91	0.29***	5.21
N	951		769		593	
Non-SOEs	0.04	1.13	0.10	0.96	0.18	1.00
N	107		55		35	
SOEs	0.05***	3.65	0.23***	5.84	0.30***	5.25
N	844		714		558	
Difference	-0.01	-0.29	-0.13	-1.15	-0.12	-0.64

This table reports the stock return performance of Chinese IPOs in the post-issue periods. 1-year, 3-year and 5-year stock returns are reported for three groups: the full sample, non-SOEs and SOEs. Raw BHR is calculated as

$$R_{iT} = \prod_{t=start}^{\min[T,delist]} (1 + r_{it}) - 1$$

where R_{iT} is the raw buy and hold return. *start* is the first day of trading. min[*T, delist*] is the earlier of the last day of trading or the end of the three- or five-year window and r_{it} is the raw return of firm *i* on day *t*. Index adjusted BHR is calculated as the raw BHR minus the market index BHR in the same period.

$ADR_{iT} = R_{iT} - R_{iTmarket}$

The Shanghai and the Shenzhen A-share Index are used as the corresponding market indices.

* Significant at the 10% level,

** Significant at the 5% level,

*** Significant at the 1% level.

Table 7

Average BHRs in the post-issue periods with a matched SOE firm

Panel A: Size-matched SOEs						
Raw BHRs	1-year	t-value	3-year	t-value	5-year	t-value
Non-SOEs	-0.05	-1.07	0.08	0.57	0.20	0.90
Matched SOEs	-0.11***	-2.74	0.05	0.53	0.01	0.03
N	105		53		33	
Difference	0.06	0.99	0.03	0.13	0.19	0.77
Adjusted BHRs	1-year	t-value	3-year	t-value	5-year	t-value
Non-SOEs	0.04	0.99	0.07	1.09	0.14	0.78
Matched SOEs	-0.02	-0.58	0.08	0.65	0.04	0.48
N	105		53		33	
Difference	0.06	1.12	-0.01	-0.09	0.10	0.49
Panel B: BM-matched SOEs						
Raw BHRs	1-year	t-value	3-year	t-value	5-year	t-value
Non-SOEs	-0.03	-0.74	0.11	0.84	0.33	1.30
Matched SOEs	-0.08**	-2.14	0.02	0.24	0.63	1.12
N	105		54		34	
Difference	0.05	0.86	0.09	0.55	-0.30	-0.50
Adjusted BHRs	1-year	t-value	3-year	t-value	5-year	t-value
Non-SOEs	0.04	1.10	0.09	0.83	0.18	0.78
Matched SOEs	-0.03	-0.86	0.17	0.65	0.54	1.01
N	105		54		34	
Difference	0.07	1.39	0.08	0.61	-0.36	-0.78

This table reports the stock return performance of non-SOEs and their size-matched and BM-matched SOEs in the post-issue period. Every non-SOE firm is matched to an SOE firm based on size and the book-to-market ratio of the equity. Size is measured by total asset of the firm, and BM is calculated as book value divided by market value of the equity. The market value is calculated as the number of total shares outstanding multiplied by the closing price on the first trading day. The matched SOEs should be listed in the same calendar month or earlier than the non-SOEs. The matching firm is chosen which has the closest value of total assets or BM ratio in the IPO year.

* Significant at the 10% level,

** Significant at the 5% level,

*** Significant at the 1% level.

Table 8

Changes in operating performance after the IPO

	Year relative to the IPO year					
Mean change (%)	From 0 to 1	t-value	From 0 to 3	t-value	From 0 to 5	t-value
Full sample						
ROA	-0.68***	-6.05	-2.16***	-16.40	-4.00***	-18.21
ATO	-0.10***	-13.93	-0.12***	-12.12	-0.14***	-6.56
SG	3.03	1.57	2.80	1.54	6.55***	2.76
N	884		747		533	
Non-SOEs						
ROA	-1.17*	-1.81	-2.00***	-5.06	-4.04***	-7.87
ATO	-0.11***	-6.16	-0.12***	-4.32	-0.26***	-2.87
SG	-3.59	-0.54	-12.45	-1.27	-10.97	-0.72
N	79		50		24	
SOEs						
ROA	-0.64***	-5.96	-2.18***	-15.70	-4.00***	-17.47
ATO	-0.10***	-12.85	-0.11***	-11.49	-0.13***	-5.55
SG	3.68*	1.83	3.89**	2.15	7.38***	3.10
N	805		697		509	
Differences						
ROA	-0.53	-0.82	-0.18	-0.41	-0.04	-0.07
ATO	-0.01	-0.83	-0.01	-0.18	-0.13	-1.37
SG	-7.27	-1.05	-16.34	-1.63	-18.35	-1.20

This table reports the changes in operating performance for three sub-samples: the full sample, non-SOEs and SOEs. ROA is the return on assets, and is measured as the net income divided by total assets. ATO is the asset turnover rate measured as net sales divided by total assets. SG is the sales growth rate.

* Significant at the 10% level,

** Significant at the 5% level,

*** Significant at the 1% level.

Table 9

Changes in operating performance after the IPO with a matched SOE firm

Panel A: Size-matched SOEs			Year relative to the IPO year			
Mean change (%)	From 0 to 1	t-value	From 0 to 3	t-value	From 0 to 5	t-value
Non-SOEs						
ROA	-1.22*	-1.86	-2.04***	-5.06	-3.99***	-7.48
ATO	-0.12***	-6.16	-0.12***	-4.24	-0.25***	-2.70
SG	-4.47	-0.61	-12.90	-1.29	-12.06	-0.76
Matched SOEs						
ROA	-0.20	-0.73	-1.39***	-3.15	-3.36***	-4.26
ATO	-0.09***	-2.83	-0.04	-0.72	-0.05	-0.35
SG	1.21	0.25	5.84	1.13	12.85**	2.08
Differences						
ROA	-1.02	-1.43	-0.65	-1.08	-0.63	-0.66
ATO	-0.03	-0.95	-0.08	-1.50	-0.20	-1.29
SG	-5.28	-0.64	-18.74*	-1.66	-24.91	-1.47
N	78		49		23	

Panel B: BM-matched SOEs			Year relative to the IPO year			
Mean change (%)	From 0 to 1	t-value	From 0 to 3	t-value	From 0 to 5	t-value
Non-SOEs						
ROA	-1.22*	-1.86	-2.04***	-5.06	-3.99***	-7.48
ATO	-0.12***	-6.16	-0.12***	-4.24	-0.25***	-2.70
SG	-4.47	-0.61	-12.90	-1.29	-12.06	-0.76
Matched SOEs						
ROA	-0.60**	-2.44	-1.28***	-4.18	-3.68***	-6.28
ATO	-0.08***	-4.17	-0.04	-1.07	-0.13*	-1.81
SG	-1.36	-0.26	4.55	0.84	-2.40	-0.29
Differences						
ROA	-0.61	-0.88	-0.76	-1.51	-0.31	-0.39
ATO	-0.04	-1.25	-0.08*	-1.87	-0.12	-1.05
SG	-2.71	-0.32	-17.45	-1.53	-9.66	-0.54
N	78		49		23	

Table 9 reports the changes in operating performance of non-SOEs and their size- and BM-matched SOEs in the post-issue period. Every non-SOE firm is matched to an SOE firm based on size and book to market ratio. Size is measured by total assets of the firm, and BM is calculated as book value divided by market value of the equity. The market value is calculated as the number of total shares outstanding multiplied by the closing price on the first trading day. The matching firm is that firm which has the closest value of total assets or BM ratio in the IPO year. ROA is return on assets and is measured as the net income divided by total assets. ATO is the asset turnover rate measured as net sales divided by total assets. SG is the sales growth rate.

* Significant at the 10% level,

** Significant at the 5% level,

*** Significant at the 1% level.

Table 10
Regression results for long-term stock returns
Panel A: 3-year stock returns

Independent	Full sample				Non-SOEs	SOEs
variables	Model 1	Model 2	Model 3	Model 4	Model 4	Model 4
IR	-0.1896***			-0.3208***	-0.5213	-0.2200***
	(-4.07)			(-3.05)	(-1.57)	(-2.91)
OP	-0.0007			-0.0198	0.0178	-0.0241
	(-0.05)			(-1.33)	(0.60)	(-1.33)
LNSIZE	-0.3485***			-0.2583***	-0.1781	-0.2560***
	(-6.76)			(-4.75)	(-0.73)	(-4.51)
LNAGE	-0.0228			0.0108	-0.0875	0.0159
	(-1.31)			(0.56)	(-1.36)	(0.79)
LAG	0.0006			0.0001	-0.0011	0.0009
	(0.50)			(0.74)	(-0.19)	(0.74)
GOV		-0.8791**		-0.6992*	-1.5565	-0.7417*
		(-2.15)		(-1.61)	(-1.10)	(-1.62)
LEG		-0.7610*		-0.7217*	-1.0179	-0.7225
		(-1.80)		(-1.65)	(-0.79)	(-1.56)
IND		-0.4141		1.1809**	2.5289	1.0816**
		(-0.98)		(2.37)	(1.34)	(2.26)
NT			10.8123***	9.9691***	8.7965	10.0110***
			(8.33)	(7.02)	(1.39)	(6.75)
LEV			0.8214**	0.4864	0.9925	0.4774
			(2.26)	(1.27)	(0.67)	(1.20)
BM			0.7289*	-0.4935	-5.2842	-0.4311
			(1.79)	(-0.71)	(-1.58)	(-0.59)
Intercept	4.1695***	0.8747***	-0.8029***	2.7437***	3.7514	2.7252***
	(4.76)	(2.77)	(-4.97)	(3.95)	(1.10)	(3.78)
Adjusted R^2	0.0656	0.0032	0.0835	0.1275	0.0698	0.1258
N	758	758	758	758	54	704
p-value	< 0.0001	0.1452	< 0.0001	< 0.0001	0.2266	< 0.0001

Table 10 (continued)
Panel B: 5-year stock returns

Independent variables	Full sample				Non-SOEs	SOEs
	Model 1	Model 2	Model 3	Model 4	Model 4	Model 4
IR	-0.3384***			-0.3032***	-0.3519	-0.3096***
	(-5.17)			(-2.95)	(-0.89)	(-2.92)
OP	-0.0122			-0.0136	0.1173*	-0.0175
	(-0.44)			(-0.44)	(1.75)	(-0.52)
LNSIZE	-0.5907***			-0.6349***	-0.4945***	-0.6131***
	(-7.96)			(-8.02)	(-4.78)	(-7.49)
LNAGE	-0.0268			0.0337	-0.0659	0.0487*
	(-0.30)			(1.43)	(-0.80)	(1.77)
LAG	-0.0012			-0.0015	-0.0013	-0.0017
	(-0.72)			(-0.92)	(-0.19)	(-0.97)
GOV		-0.2147		1.5808***	5.2543**	1.4824**
		(-0.37)		(2.57)	(2.02)	(2.33)
LEG		0.6659		1.8066***	5.5627**	1.7223***
		(1.12)		(2.93)	(2.25)	(2.70)
IND		-0.0423		1.8563***	3.3851	2.0064***
		(-0.07)		(2.74)	(1.20)	(2.83)
NT			5.9601***	3.3769*	6.7097	3.1302
			(2.98)	(1.70)	(0.76)	(1.51)
LEV			0.7458	-0.0389	1.7577	-0.1464
			(1.36)	(-0.07)	(0.78)	(-0.26)
BM			1.5261**	0.7951	-1.0565	0.7591
			(2.53)	(0.81)	(-0.28)	(0.75)
Intercept	6.8769***	0.0381	-0.6289**	5.0314***	10.6926**	4.8535***
	(9.08)	(0.09)	(-2.38)	(5.15)	(2.31)	(4.82)
Adjusted R^2	0.1286	0.0045	0.0173	0.1465	0.5210	0.1397
N	584	584	584	584	34	550
p-value	< 0.0001	0.1319	0.0044	< 0.0001	0.0019	< 0.0001

Table 10 presents the regression results of 3- and 5-year stock returns of Chinese IPOs for three groups: the full sample, non-SOEs and SOEs. The dependent variable ADBHR is the 3- or 5-year adjusted BHRs. The independent variables are: IR, the initial return of IPOs; OP, the offer price; LNSIZE, the natural log of proceeds of shares issued; LNAGE, the natural log of numbers of years from the founding of the firms to the date of the IPO; and LAG, the number of days between the issue date and the listing date. These five variables are classified as issuing characteristics. GOV, the percentage of shares held by the government; LEGAL, the percentage of shares held by legal entities; and IND, the percentage of shares held by individual investors. These three variables are classified as ownership characteristics. NT, the ratio of net income over total assets; LEV, the ratio of total debt over total assets; and BM, the ratio of book value over market value of the equity. These three variables are classified as firm characteristics. Four regression models are used to explain the 3- and 5-year stock return for each group. Model 1 is the regression of issuing characteristics. Model 2 is the regression of ownership variables. Model 3 is the regression of firm characteristics and model 4 is the cross sectional

regression of all the independent variables. The models are:

$$ADBHR = \beta_0 + \beta_1 IR + \beta_2 OP + \beta_3 LNSIZE + \beta_4 LNAGE + \beta_5 LAG + e \quad (1)$$

$$ADBHR = \beta_0 + \beta_1 GOV + \beta_2 LEGAL + \beta_3 IND + e \quad (2)$$

$$ADBHR = \beta_0 + \beta_1 NT + \beta_2 LEV + \beta_3 BM + e \quad (3)$$

$$ADBHR = \beta_0 + \beta_1 IR + \beta_2 OP + \beta_3 LNSIZE + \beta_4 LNAGE + \beta_5 LAG + \beta_6 GOV + \beta_7 LEGAL + \beta_8 IND + \beta_9 NT + \beta_{10} LEV + \beta_{11} BM + e \quad (4)$$

In this table, for non-SOEs and SOEs, only the regression results of Model 4 are presented.

* Significant at the 10% level,

** Significant at the 5% level,

*** Significant at the 1% level.

Table 11
Regression results for changes in Return on asset (ΔROA)
Panel A: 3-year ΔROA

Independent	Full sample				Non-SOEs	SOEs
variables	Model 1	Model 2	Model 3	Model 4	Model 4	Model 4
IR	0.1491			0.0857	-1.8712	0.1078
	(0.89)			(0.32)	(-1.36)	(0.39)
OP	0.0108			0.0344	0.0774	0.0287
	(0.22)			(0.62)	(0.67)	(0.43)
LNSIZE	0.5732***			0.3009	1.5697*	0.3592*
	(3.06)			(1.48)	(-1.65)	(1.70)
LNAGE	0.0887			0.0844	-0.0619	0.0928
	(1.43)			(1.18)	(-0.26)	(1.23)
LAG	0.0003			-0.0001	0.0088	-0.0001
	(0.07)			(-0.20)	(0.41)	(-0.22)
GOV		1.2594		3.0096	0.7638	1.7220
		(0.88)		(0.63)	(0.14)	(0.16)
LEG		0.4950		4.8155	2.1380	0.9577
		(0.33)		(1.08)	(0.41)	(0.56)
IND		3.2440**		7.4704	7.0937	1.7114
		(2.19)		(1.56)	(1.02)	(0.95)
NT			-19.5171***	-14.5012***	-34.1502	-13.7664**
			(-4.19)	(-2.79)	(-1.50)	(-2.54)
LEV			-2.7045**	-1.6223	-1.6954	-1.6453
			(-2.05)	(-1.15)	(-0.29)	(-1.12)
BM			0.1501	-0.1419	-21.8476	0.4147
			(0.10)	(-0.06)	(-1.53)	(0.16)
Intercept	8.8252***	-3.6749***	-0.4671	-6.4482***	9.9932	-6.9737***
	(-4.56)	(-3.32)	(-0.80)	(-2.50)	(1.55)	(-2.62)
Adjusted R^2	0.0127	0.0058	0.0198	0.0230	0.0194	0.0223
N	735	735	735	735	49	686
p-value	0.0136	0.0634	0.0005	0.0033	0.5347	0.0059

Table 11 (continued)

Panel B: 5-year ΔROA

Independent variables	Full sample				Non-SOEs	SOEs
	Model 1	Model 2	Model 3	Model 4	Model 4	Model 4
IR	-0.3747			-0.1769	-2.4393*	-0.1032
	(-1.30)			(-0.40)	(1.98)	(0.22)
OP	-0.1968			0.0175	0.5349	0.0080
	(-1.47)			(0.12)	(1.59)	(0.05)
LNSIZE	0.5863*			0.3264	-2.5654***	0.3733
	(1.77)			(0.94)	(-2.77)	(1.04)
LNAGE	0.0860			-0.0067	0.0299	0.0005
	(0.87)			(-0.06)	(-0.14)	(0.00)
LAG	0.0092			0.0049	0.0216	0.0048
	(1.33)			(0.69)	(0.77)	(0.66)
GOV		0.5627		-0.3453	16.8885**	-0.5520
		(-0.25)		(-0.13)	(2.10)	(-0.20)
LEG		-2.1507		1.3707	16.9157**	-1.7012
		(-0.91)		(-0.52)	(2.41)	(-0.63)
IND		2.4693		-0.8401	12.1397	-1.2841
		(0.73)		(-0.29)	(1.49)	(-0.43)
NT			-34.4949***	-34.2387***	-51.9795***	-33.6789***
			(-4.24)	(-3.97)	(-3.21)	(-3.75)
LEV			-1.6242	-1.3183	-1.5630	-1.2834
			(-0.73)	(-0.57)	(1.21)	(-0.54)
BM			3.6036	1.1684	-33.4516***	1.9327
			(1.51)	(0.28)	(-3.21)	(0.45)
Intercept	-8.9417***	-3.6627**	-2.0146	-4.0296	11.1878*	-4.5499
	(-2.59)	(-2.11)	(-1.80)	(-0.94)	(1.64)	(-1.03)
Adjusted R^2	0.0110	0.0035	0.0454	0.0391	0.4931	0.0391
N	522	522	522	522	23	499
p-value	0.0571	0.1859	< 0.0001	0.0009	0.0434	0.0013

Table 11 presents the regression results of 3- and 5-year changes in ROA of Chinese IPOs for three groups: the full sample, non-SOEs and SOEs. The dependent variable OPPERF is the 3- or 5-year changes in ROA. The independent variables are: IR, the initial return of IPOs; OP, the offer price; LNSIZE, the natural log of proceeds of shares issued; LNAGE, the natural log of numbers of years from the founding of the firms to the date of the IPO; and LAG, the number of days between the issue date and the listing date. These five variables are classified as issuing characteristics. GOV, the percentage of shares held by the government; LEGAL, the percentage of shares held by legal entities; and IND, the percentage of shares held by individual investors. These three variables are classified as ownership characteristics. NT, the ratio of net income over total assets; LEV, the ratio of total debt over total assets; and BM, the ratio of book value over market value of the equity. These three variables are classified as firm characteristics. Four regression models are used to explain the 3- and 5-year changes in ROA for each group. Model 1 is the regression of issuing characteristics. Model 2 is the regression

of ownership variables. Model 3 is the regression of firm characteristics and model 4 is the cross sectional regression of all the independent variables. The models are:

$$OPPERF = \beta_0 + \beta_1 IR + \beta_2 OP + \beta_3 LNSIZE + \beta_4 LNAGE + \beta_5 LAG + e \quad (1)$$

$$OPPERF = \beta_0 + \beta_1 GOV + \beta_2 LEGAL + \beta_3 IND + e \quad (2)$$

$$OPPERF = \beta_0 + \beta_1 NT + \beta_2 LEV + \beta_3 BM + e \quad (3)$$

$$OPPERF = \beta_0 + \beta_1 IR + \beta_2 OP + \beta_3 LNSIZE + \beta_4 LNAGE + \beta_5 LAG + \beta_6 GOV + \beta_7 LEGAL + \beta_8 IND + \beta_9 NT + \beta_{10} LEV + \beta_{11} BM + e \quad (4)$$

In this table, for non-SOEs and SOEs, only the regression results of Model 4 are presented.

* Significant at the 10% level,

** Significant at the 5% level,

*** Significant at the 1% level.

Table 12
Regression results for changes in Asset turn over rate (ΔATO)
Panel A: 3-year ΔATO

Independent	Full sample				Non-SOEs	SOEs
variables	Model 1	Model 2	Model 3	Model 4	Model 4	Model 4
IR	0.0228*			0.0278	0.0158	0.0295
	(1.93)			(1.47)	(0.17)	(1.50)
OP	-0.0032			-0.0006	0.0059	0.0002
	(-0.93)			(-0.16)	(0.75)	(0.04)
LNSIZE	0.0471***			0.0421***	-0.0727	0.0467***
	(3.55)			(2.93)	(-1.10)	(3.13)
LNAGE	0.0192***			0.0156***	-0.0197	0.0159***
	(4.36)			(3.01)	(1.17)	(3.10)
LAG	0.0005*			0.0005	0.0008	0.0005
	(1.84)			(1.53)	(0.55)	(1.60)
GOV		-0.0199		0.1145	0.0984	0.0988
		(-0.19)		(0.80)	(0.25)	(0.82)
LEG		0.0291		0.1568	-0.1076	0.1847
		(0.27)		(1.36)	(-0.29)	(1.52)
IND		0.0545		-0.0423	-0.1909	-0.0465
		(0.51)		(-0.35)	(-0.40)	(-0.37)
NT			-1.4865***	-0.9079**	-2.3408	-0.7900**
			(-4.46)	(-2.47)	(-0.83)	(-2.06)
LEV			0.0416	-0.1179	0.5934	0.1397
			(0.44)	(1.18)	(0.64)	(1.35)
BM			-1.1046	0.0599	0.0934	0.0338
			(-1.00)	(0.33)	(0.64)	(0.18)
Intercept	-0.7320***	-0.1299	0.0054	-0.7187***	0.6010	-0.7888***
	(-5.34)	(-1.62)	(0.13)	(-3.95)	(0.67)	(-4.19)
Adjusted R^2	0.0434	0.0090	0.0305	0.0578	0.0072	0.0607
N	735	735	735	735	49	686
p-value	< 0.0001	0.5113	< 0.0001	< 0.0001	0.4397	< 0.0001

Table 12 (continued)
Panel B: 5-year ΔATO

Independent	Full sample				Non SOEs	SOEs
variables	Model 1	Model 2	Model 3	Model 4	Model 4	Model 4
IR	0.0493*			0.0804*	0.2608	0.0817*
	(1.82)			(1.93)	(0.88)	(1.92)
OP	-0.0394***			-0.0186	0.0809	-0.0176
	(-3.13)			(-1.31)	(1.00)	(-1.19)
LNSIZE	0.1011***			0.0957***	-0.3009	0.1075***
	(3.24)			(2.94)	(-1.35)	(3.23)
LNAGE	0.0112			0.0077	-0.0352	0.0096
	(1.21)			(0.72)	(-0.69)	(0.88)
LAG	0.0001			0.0006	0.1444**	0.0004
	(1.36)			(0.84)	(2.15)	(0.60)
GOV		0.3359		0.3409	-0.6007	0.3417
		(1.56)		(1.39)	(-0.31)	(1.37)
LEG		0.3990*		0.4754*	-0.8751	0.5127**
		(1.78)		(1.92)	(-0.52)	(2.04)
IND		0.2099		-0.0712	1.8315	-0.0613
		(0.89)		(-0.26)	(0.93)	(-0.22)
NT			-2.8564***	-2.3169***	0.3058	-2.1589***
			(-3.66)	(-2.96)	(0.05)	(-2.60)
LEV			0.2087	0.2840	1.3446	0.3078
			(0.98)	(1.30)	(0.76)	(1.39)
BM			-0.0827	0.2260	2.2224	0.1782
			(-0.36)	(0.58)	(0.89)	(0.45)
Intercept	1.0608***	-0.4244**	0.0699	-1.3069***	0.9809	1.4496***
	(-3.27)	(-2.56)	(0.66)	(-3.26)	(0.36)	(-3.53)
Adjusted R^2	0.0317	0.0011	0.0387	0.0621	0.0470	0.0627
N	522	522	522	522	23	499
p-value	0.0006	0.3094	< 0.0001	< 0.0001	0.4394	< 0.0001

Table 12 presents the regression results of 3- and 5-year changes in ATO of Chinese IPOs for three groups: the full sample, non-SOEs and SOEs. The dependent variable OPPERF is the 3- or 5-year changes in ATO. The independent variables are: IR, the initial return of IPOs; OP, the offer price; LNSIZE, the natural log of proceeds of shares issued; LNAGE, the natural log of numbers of years from the founding of the firms to the date of the IPO; and LAG, the number of days between the issue date and the listing date. These five variables are classified as issuing characteristics. GOV, the percentage of shares held by the government; LEGAL, the percentage of shares held by legal entities; and IND, the percentage of shares held by individual investors. These three variables are classified as ownership characteristics. NT, the ratio of net income over total assets; LEV, the ratio of total debt over total assets; and BM, the ratio of book value over market value of the equity. These three variables are classified as firm characteristics. Four regression models are used to explain the 3- and 5-year changes in ATO for each group. Model 1 is the regression of issuing characteristics. Model 2 is the regression

of ownership variables. Model 3 is the regression of firm characteristics and model 4 is the cross sectional regression of all the independent variables. The models are:

$$OPPERF = \beta_0 + \beta_1 IR + \beta_2 OP + \beta_3 LNSIZE + \beta_4 LNAGE + \beta_5 LAG + e \quad (1)$$

$$OPPERF = \beta_0 + \beta_1 GOV + \beta_2 LEGAL + \beta_3 IND + e \quad (2)$$

$$OPPERF = \beta_0 + \beta_1 NT + \beta_2 LEV + \beta_3 BM + e \quad (3)$$

$$OPPERF = \beta_0 + \beta_1 IR + \beta_2 OP + \beta_3 LNSIZE + \beta_4 LNAGE + \beta_5 LAG + \beta_6 GOV + \beta_7 LEGAL + \beta_8 IND + \beta_9 NT + \beta_{10} LEV + \beta_{11} BM + e \quad (4)$$

In this table, for non-SOEs and SOEs, only the regression results of Model 4 are presented.

* Significant at the 10% level,

** Significant at the 5% level,

*** Significant at the 1% level.

Table 13
Regression results for changes in Sales growth rate (ΔSG)
Panel A: 3-year ΔSG

Independent			Full sample		Non-SOEs	SOEs
variables	Model 1	Model 2	Model 3	Model 4	Model 4	Model 4
IR	1.9309			3.6596	2.7145	2.9962
	(0.83)			(0.99)	(0.09)	(0.82)
OP	-1.7600**			-0.9433	-0.5081	-1.4587*
	(-2.57)			(-1.24)	(-0.21)	(-1.67)
LNSIZE	1.3138			-4.2395	8.0659	-3.0837
	(0.50)			(-1.52)	(0.40)	(1.11)
LNAGE	0.8728			0.6411	-.1458	1.1408
	(1.01)			(0.65)	(-0.61)	(1.16)
LAG	0.0226			-0.0145	-0.4882	0.0030
	(0.38)			(-0.24)	(-0.61)	(0.05)
GOV		19.3034		40.3843*	32.2674	40.2332*
		(0.98)		(1.81)	(0.27)	(1.80)
LEG		11.0812		32.5137	22.6753	36.9983*
		(0.54)		(1.45)	(0.20)	(1.64)
IND		55.8875***		35.4744	-84.6285	35.0056
		(2.73)		(1.50)	(-0.57)	(1.48)
NT			-297.5894***	-300.5011***	-1547.8585***	-218.5198***
			(-4.64)	(-4.21)	(-3.17)	(-3.07)
LEV			-14.7594	-27.1137	-79.7041	-20.0812
			(-0.81)	(-1.40)	(-0.64)	(-1.04)
BM			13.3635	40.2975	218.8143	21.5719
			(0.66)	(1.15)	(0.76)	(0.62)
Intercept	-6.8914	-23.1151	21.9617***	25.6288	19.4066	12.2838
	(-0.26)	(-1.51)	(2.74)	(0.73)	(0.07)	(0.35)
Adjusted R^2	0.0050	0.0081	0.0285	0.0388	0.2426	0.0251
N	735	735	735	735	49	686
p-value	0.122	0.0303	< 0.0001	< 0.0001	0.0231	0.0030

Table 13 (continued)
Panel B: 5-year ΔSG

Independent		Full sample			Non-SOEs	SOEs
variables	Model 1	Model 2	Model 3	Model 4	Model 4	Model 4
IR	0.9842			3.7767	38.5992	2.2372
	(0.32)			(0.80)	(0.84)	(0.47)
OP	-4.9865***			-1.9531	3.4004	-2.1626
	(-3.45)			(-1.22)	(0.27)	(-1.31)
LNSIZE	2.8885			1.4213	4.9025	-1.1426
	(0.81)			(-0.39)	(0.14)	(-0.31)
LNAGE	0.9038			-0.5249	-3.6547	1.0099
	(0.85)			(0.49)	(-0.46)	(0.83)
LAG	0.0444			-0.0276	0.3156	-0.0215
	(0.59)			(-0.37)	(0.30)	(-0.29)
GOV		15.2039		37.8288	-103.4691	38.2727
		(0.62)		(1.36)	(-0.34)	(0.43)
LEG		18.5833		42.8913	-83.9695	47.2227*
		(0.73)		(1.53)	(-0.32)	(1.69)
IND		51.6092*		25.5355	-169.9681	27.0670
		(1.93)		(0.83)	(-0.56)	(0.87)
NT			-562.2903***	-532.4929***	-2172.8192**	-466.9624***
			(-6.48)	(-5.80)	(-2.21)	(-5.04)
LEV			-51.6378**	-54.1396	-188.9415	-48.1209*
			(-2.18)	(-2.20)	(-0.68)	(-1.95)
BM			2.4619	27.6655	154.3855	19.0345
			(0.10)	(0.63)	(0.40)	(0.43)
Intercept	0.2915	-18.0666	56.5302***	37.7241	147.0863	28.0958
	(0.01)	(-0.96)	(4.75)	(0.76)	(0.35)	(0.62)
Adjusted R^2	0.0155	0.0017	0.0763	0.0754	0.1894	0.0615
N	522	522	522	522	23	499
p-value	0.0226	0.24778	< 0.0001	< 0.0001	0.2677	< 0.0001

Table 13presents the regression results of 3- and 5-year changes in SG of Chinese IPOs for three groups: the full sample, non-SOEs and SOEs. The dependent variable OPPERF is 3- or 5-year changes in SG. The independent variables are: IR, the initial return of IPOs; OP, the offer price; LNSIZE, the natural log of proceeds of shares issued; LNAGE, the natural log of numbers of years from the founding of the firms to the date of the IPO; and LAG, the number of days between the issue date and the listing date. These five variables are classified as issuing characteristics. GOV, the percentage of shares held by the government; LEGAL, the percentage of shares held by legal entities; and IND, the percentage of shares held by individual investors. These three variables are classified as ownership characteristics. NT, the ratio of net income over total assets; LEV, the ratio of total debt over total assets; and BM, the ratio of book value over market value of the equity. These three variables are classified as firm characteristics. Four regression models are used to explain the 3- and 5-year changes in SG for each group. Model 1 is the regression of issuing characteristics. Model 2 is the regression of ownership variables. Model 3 is the

regression of firm characteristics and model 4 is the cross sectional regression of all the independent variables. The models are:

$$OPPERF = \beta_0 + \beta_1 IR + \beta_2 OP + \beta_3 LNSIZE + \beta_4 LNAGE + \beta_5 LAG + e \quad (1)$$

$$OPPERF = \beta_0 + \beta_1 GOV + \beta_2 LEGAL + \beta_3 IND + e \quad (2)$$

$$OPPERF = \beta_0 + \beta_1 NT + \beta_2 LEV + \beta_3 BM + e \quad (3)$$

$$OPPERF = \beta_0 + \beta_1 IR + \beta_2 OP + \beta_3 LNSIZE + \beta_4 LNAGE + \beta_5 LAG + \beta_6 GOV + \beta_7 LEGAL + \beta_8 IND + \beta_9 NT + \beta_{10} LEV + \beta_{11} BM + e \quad (4)$$

In this table, for non-SOEs and SOEs, only the regression results of Model 4 are presented.

* Significant at the 10% level,

** Significant at the 5% level,

*** Significant at the 1% level.

Table 14

Subsequent Seasoned Equity Offerings (SEOs) and IPO underpricing

SEOs within 3 years after listing	N	Mean (%)	t-value	Median (%)	z-value
Firms without SEOs	961	122.24***		108.46***	
Firms undertaking SEOs	19	161.02***		137.83***	
Difference		-38.68*	-1.88	-29.37**	-2.07

SEOs within 5 years after listing	N	Mean (%)	t-value	Median (%)	z-value
Firms without SEOs	927	121.29***		108.18***	
Firms undertaking SEOs	53	152.84***		135.99***	
Difference		-31.55**	-2.39	-27.81**	-2.47

Total	N	Mean (%)	t-value	Median (%)	z-value
Firms without SEOs	917	121.46***		108.40***	
Firms undertaking SEOs	63	145.24***		125.00***	
Difference		-23.80**	-2.02	-16.60**	-2.04

This table reports underpricing statistics for firms that undertake SEOs and those that do not. In my sample, 19 out of 980 firms make seasoned equity offerings within three years after IPO, 53 firms make seasoned equity offering within five years after the IPO. Totally, there are 63 out of 980 firms making subsequent equity offering after IPO. The initial returns of the IPOs are defined as

$$IR = \frac{1}{n}\sum_{i=1}^{n}\left(\frac{P_{ic}}{P_{io}} - 1\right)$$

where IR is the average initial return of the IPO on the first day of trading, P_{ic} is the closing price of stock i on the first day of trading, and P_{io} is the offering price of stock i. t-value and z-value are the results of T-test and Wilcoxon-test of means and medians being different from zero.

* Significant at the 10% level,

** Significant at the 5% level,

*** Significant at the 1% level.

Table 15

Subsequent SEOs and post-IPO stock returns

Panel A: Raw BHRs						
	1-year	t-value	3-year	t-value	5-year	t-value
Firms without SEOs	0.11***	6.58	0.44***	9.93	0.63***	8.77
N	888		706		537	
Firms undertaking SEOs	0.33***	3.42	0.91***	4.51	0.79***	3.23
N	63		63		56	
Difference	-0.22**	-2.24	-0.47**	-2.28	-0.15	-0.60
Panel B: Adjusted BHRs						
	1-year	t-value	3-year	t-value	5-year	t-value
Firms without SEOs	0.04***	3.18	0.19***	5.16	0.27***	4.82
N	888		706		537	
Firms undertaking SEOs	0.19**	2.24	0.54***	3.00	0.45**	2.42
N	63		63		56	
Difference	-0.15*	-1.75	-0.35*	-1.90	-0.18	-0.93

This table reports post-issue stock returns for firms that undertake SEOs and those that do not. In my sample, 19 out of 980 firms make seasoned equity offerings within three years after IPO, 53 firms make seasoned equity offering within five years after the IPO. Totally, there are 63 out of 980 firms making subsequent equity offering after IPO. Since the results for these three groups are similar, I give the results of 63 SEOs group to represent long-term stock return performance. Raw BHR is calculated as

$$R_{iT} = \prod_{t=start}^{\min[T,delist]} (1 + r_{it}) - 1$$

where R_{iT} is the raw buy and hold return. *start* is the date of first day of trading. min[*T, delist*] is the earlier of the last day of trading or the end of the three- or five-year window and r_{it} is the raw return on firm *i* in event date *t*. The index adjusted BHR is calculated as the raw BHR minus the market index BHR in the same period. The Shanghai and the Shenzhen A-share Index are used as the corresponding market indices.

$ADR_{iT} = R_{iT} - R_{iTmarket}$

* Significant at the 10% level,

** Significant at the 5% level,

*** Significant at the 1% level.

Table 16

Subsequent SEOs and post-IPO changes in operating performance

	Year relative to the IPO year					
Mean change (%)	From 0 to1	t-value	From 0 to 3	t-value	From 0 to 5	t-value
Firms without SEOs						
ROA	-0.70***	-5.84	-2.27***	-16.24	-4.25***	-17.96
ATO	-0.10***	-14.02	-0.12***	-12.42	-0.15***	-6.52
SG	2.26	1.11	1.87	0.96	5.52**	2.19
N	821		684		481	
Firms undertaking SEOs						
ROA	-0.51*	-1.65	-1.00***	-2.89	-1.75***	-3.99
ATO	-0.05*	-1.84	-0.05	-1.29	-0.06	-1.06
SG	13.05***	2.81	12.87***	2.91	16.12**	2.28
N	63		63		52	
Differences						
ROA	-0.19	-0.43	-1.27***	-3.41	-2.50***	-5.03
ATO	-0.05*	-1.77	-0.07*	-1.91	-0.08	-1.37
SG	-10.79**	-2.12	-11.00**	-2.28	-10.60	-1.33

This table reports post-issue operating performance for firms that undertake SEOs and those do not make SEOs. In my sample, 19 out of 980 firms make seasoned equity offerings within three years after IPO, 53 firms make seasoned equity offering within five years after the IPO. Totally, there are 63 out of 980 firms making subsequent equity offering after IPO. Since the results for these three groups are similar, I give the results of 63 SEOs group to represent changes in operating performance. ROA is return on assets and is measured as the net income divided by total assets. ATO is the asset turnover rate measured as net sales divided by total assets. SG is the sales growth rate.

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level.