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# The Role of Venture Capitalists in Small and Medium Enterprise IPOs

## -----Evidence from China

### Abstract

Despite the rapid growth and importance of Small and Medium Enterprises and the Venture Capital (VC) industry in China, this is the first paper to examine comprehensively the role of VCs in public firms listed on the Small and Medium Enterprise Board and the Growth Enterprise Board. Supporting the monitoring and certification hypotheses, we find that VC backed IPOs have higher premiums, lower *initial underpricing* and higher *subsequent market reaction*. The grandstanding motive is documented for younger VCs who offer higher levels of *initial underpricing* to enhance their positions in the industry but no evidence is found to support grandstanding by foreign VCs.

**JEL classification:** G24, G28, G32

**Keywords:** VC Backed IPO, Small and Medium Enterprises Financing, China, Underpricing

## I. Introduction

Small and Medium Enterprises (SMEs) account for 99% of the enterprises in China and contribute approximately 60% to GDP, 50% to tax revenues and 80% to the country's employment in 2011<sup>1</sup>. However, SMEs are generally less profitable or have limited collateral and thus find it difficult to gain funding from banks, which are the main financing channels for firms given the developing nature of financial markets in China<sup>2</sup>. In this regard, Venture Capital (VC)<sup>3</sup> investments, with a focus on providing finance to SMEs, play a critical role in the financing of these firms and in maintaining the continued growth of China's economy.

Though venture capitalists generally take concentrated ownership stakes in financed firms and have a substantial influence on management, they have to exit portfolio firms to realise a return on their investment. Initial Public Offerings (IPOs) offer a potentially attractive exit route (which is also the dream of many entrepreneurs of SMEs) and mark an important milestone in the lives of young and growing firms. Going public may provide access to external capital, lower a firm's cost of capital, improve liquidity in its shares and enable existing shareholders to diversify their portfolios and harvest their investments - an

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<sup>1</sup> According to the statistics of the Ministry of Industry and Information Technology of the People's Republic of China (<http://www.miit.gov.cn>).

<sup>2</sup> For example, according to World Bank data, the amount of domestic credit provided by the banking sector (% of GDP) is 145% while the new capital raised in the domestic stock market accounted for 1.37% in 2009.

<sup>3</sup> Following Wright and Robbie (1998) and Wright et al (2005), we adopt a broad definition of venture capital to include the range of finance from early stage 'classic' venture capital (VC) through to later stage private equity (PE).

important consideration for both entrepreneurs and venture capitalists. However, it is well documented that IPOs in developed economy markets are underpriced and that the involvement of a VC affects this underpricing.

Regarding the role of VCs in IPOs, the existing literature offers three explanations. First, Barry, Muscarella, Peavy and Vetsuypens (1990) argue that VC firms have incentives to “monitor” the companies they have invested in and their ability and monitoring skills should be reflected in lower underpricing when the companies go public (the “monitoring hypothesis” from now on). Second, Megginson and Weiss (1991) focus on the “certification” role of venture capitalists in IPO firms. It is argued that VCs can reduce the information asymmetry between insiders and outside investors. As a result, the underpricing of VC backed IPOs should be lower than those of non-VC backed IPOs (hereafter, the “certification hypothesis”). Third, Gompers (1996) proposes a “grandstanding hypothesis” which suggests that younger VC firms use higher levels of underpricing to build up their reputation quickly in the capital market and attract future fund inflow.

Although the role of VCs in IPOs is well examined in western developed markets, limited attention has been paid to the role of VCs in IPOs by SMEs in emerging markets. In 2010, China became the largest IPO market in the world. However, VC backed IPOs were not popular until 2004 when China introduced the Small and Medium Enterprise Board (SME Board) to help SMEs raise funds in the capital market. Furthermore, in 2009 the Growth Enterprise Board (ChiNext) was established to offer a platform for innovative enterprises to raise capital. VCs played an active role in bringing their portfolio companies to this market: as of March 2010, VC backed IPOs have accounted for more than 50% of the listed companies on ChiNext. This highlights the importance of examining the role that VCs play in the world’s largest IPO market. Moreover, the Chinese Venture Capital market

has experienced rapid growth during recent decades and has become the largest private equity industry in Asia<sup>4</sup>. Compared with the rapid growth and the importance of the VC industry in China, the related research is quite limited. This study aims to shed light on the role VCs play in IPOs by Chinese Small and Medium Enterprises. To the best of our knowledge, this is the first comprehensive examination of this topic. We are aware of only one example of a recently published study on the roles of VCs in Chinese IPO firms (Tan et al., (2013)). The study by Tan et al. considers stocks in the SME board, whereas the current study analyses a broader sample including the Chinext market where a lot of VC investments are made. Furthermore, the current study explores the roles of VCs by examining the effects of VC backing on value creation, initial underpricing and subsequent market reaction. It is the breadth and depth of the current analysis of the role of VCs in China's stock market which contributes to the extant literature.

In addition, China's IPO market has the largest first-day return in the world. The average IPO first-day return is as high as 100% with large variations in most years. This magnitude provides an opportunity to separate the deliberate underpricing by VCs (or pre-IPO owners) and optimistic market reaction in the IPO total first day return. Specifically, using the industry median Price/Earnings ratio to estimate the intrinsic value of IPO firms, we decompose the total first-day return into two components: *initial underpricing* and *subsequent market reaction*.

The rest of the paper is organized as follows. We first set out the background to the Chinese VC industry and IPO markets in Section II. In section III we present our

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<sup>4</sup> APER 2010 Year End Review, Asia Private Equity Review,  
[http://www.asiape.com/?Publications:Asia\\_Private\\_Equity\\_Review:APER1012YE](http://www.asiape.com/?Publications:Asia_Private_Equity_Review:APER1012YE)

decomposition of first-day returns and develop our hypotheses based on the existing literature. We describe the data and provide an overview of our research methodology in Section IV. We report the main analyses and results in section V and section VI concludes.

## **II. Institutional Background**

### **A. SME Financing: VCs in China**

As elsewhere, SMEs in China face significant difficulties in raising finance for their growth. Compared to their larger counterparts, SMEs find it difficult to obtain bank loans as they have less collateral and often operate without state support. Even when they do obtain loans they often have to pay higher costs as they have a higher perceived default risk. These difficulties are confirmed in a World Bank study of SME bank financing in 45 countries (Beck et al. 2008). Furthermore, the cost of raising debt financing through issuing debt security is even higher and very few SMEs can afford to participate in this segment of the market<sup>5</sup>. Therefore, debt financing is not easy to obtain and is costly for SMEs. This increased demand for equity financing is one of the drivers behind the growth of the Venture Capital/Private Equity (PE) industry in China.

The development of the VC industry is important to the Chinese economy. Equally, the rapidly growing economy in China provides attractive investment opportunities to VC firms. In the following we review briefly the development of the VC industry in China.

While a few pioneering VCs entered the China market during the 1980s, the development of the VC industry intensified only after 1998 when the Chinese government

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<sup>5</sup> For example, only eight SMEs issued debt security in China by 2010 (Modern Bankers, a Chinese magazine. <http://bank.hexun.com/2010-06-09/123938465.html> )

adopted a number of policy schemes to promote venture investments (Batjargal and Liu, 2004). The short history and the seeming lack of legitimacy of private capital and enterprises is a major issue in China (Ahlstrom and Bruton, 2001; DeSoto, 2000).

Another major concern of VCs in China is so called “regionalism”. China is a country of 31 provinces, across which laws and their implementation can vary significantly depending on the nature and attitudes of local bureaucrats (Clarke, 1991; Peng, 2000; Tan, 1999). In addition, the large land area with the complicated institutional background presents a great challenge to VCs in terms of monitoring their funded firms. As a result, VCs often try to fund firms that are located nearby and try to build networks with local bureaucrats to understand the local regulations in the area in which they make their investments (Bruton and Ahlstrom, 2003).

Other salient characteristics concerning the China VC market include the fact that due diligence generally takes a long time and building commercial relationships can be difficult and time-consuming (Goa et al., 1996). When providing advice to funded firms a VC must deal appropriately with the rather formidable cognitive institution known as *mianzi*—face or respect (Bruton and Ahlstrom, 2003) and the lack of intellectual property protection (Peng, 2000).

[Insert Figure 1 about here]

These unique characteristics have not, however, prevented China from creating a rapidly growing market for venture capital. China’s VC market has become the largest private equity industry in Asia. Figure 1 plots the VC activities for the period from 1999 to 2010. Figure 1 shows that the investments by VCs enjoyed a compound annual growth rate of 34%, with the amount increasing from US\$1.2 billion in 1999 to US\$31.4 billion in 2010;

the growth being especially quick after 2005. VC investments have increased fourfold from US\$ 7.9 billion in 2005 to US\$ 31.4 billion in 2010.

In contrast to the rapid growth of the VC market, the development of the legal environment has lagged far behind. Until 1998, for example, VC firms were regarded as financial institutions that provided privileged loans to small firms (Batjargal and Liu, 2004). Even today, there is no formal law on the regulation and management of the VC industry in China. Among all the policies, the Temporary Methods on VC Management, issued in 2005 by 11 ministries and commissions in China, are considered as some of the most important regulations of VCs in China. The Temporary Methods on VC Management include regulations on the set up, the operation of, and the policy encouragement and supervision of VCs in China. Since then, while the VC industry in China has experienced significantly faster growth, research on the VC industry in China has remained rather limited<sup>6</sup>.

## **B. The Chinese Stock Market**

China's two stock exchanges, the Shanghai Securities Exchange (SHSE) and the Shenzhen Stock Exchange (SZSE), were established in December 1990 and July 1991, respectively. Both of them serve as the main boards in China. The VC backing of IPOs is very rare on these two main boards with less than 20 listed companies having been VC backed in their IPOs since the 1990s. In contrast, most of the VC backing of IPOs is found in the public firms listed on the Small and Medium Enterprise Board (SME Board) and the Growth Enterprise Board (ChiNext).

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<sup>6</sup> Current research includes Bruton and Ahlstrom (2003), Batjargal and Liu (2004), Lu and Tao (2010), Tan et al., (2013).



The SME Board was introduced by SZSE in 2004 to provide a direct financing platform for the small and medium enterprises with a prominent core business. Listing standards, and laws and regulations governing the main board still apply to the SME Board but it operates under a separate trading system, regulatory system, stock coding and stock price index. ChiNext was introduced by SZSE in 2009 to offer a new capital platform tailor-made for the needs of enterprises engaged in independent innovation and other growing venture enterprises. In comparison with the SME Board, ChiNext has lower thresholds and financial requirements and higher company governance requirements. With the introduction of the SME and ChiNext boards, VC backed IPOs became popular from 2005 (see Figure 2).

[Insert Figure 2 about here]

The Chinese stock market has developed rapidly in the past two decades. During the course of the development, there has been a series of policy changes in the IPO pricing mechanism. In the first decade (1990-2000), the CSRC adopted a strict IPO listing quota system, under which, the regulators decided which firms should be listed at what price. In the first half of the decade, the CSRC used a fixed-price mechanism with the IPO offer price set in reference to the book value. In the second half of the decade, the pricing mechanism was changed to a controlled Price/Earnings ratio of around 15. The restriction of the number of IPOs and the control of IPO listing prices resulted in a huge over-subscription rate and large IPO first-day returns<sup>7</sup>. Starting from 2001, China abolished the listing quotas system in IPOs and moved to a standard registration system. The pricing mechanisms have also been changed towards being more market-oriented. In July 1999, the CSRC introduced

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<sup>7</sup> For example, Chan et al. (2004) find an average underpricing of 178% for Chinese IPOs from 1993 to 1998.

a cumulative auction system, under which, the underwriters set a price range and the offer price was determined by individual investors bidding within the range. Theoretically this pricing mechanism should lead to an offer price determined by the market and reduce the high levels of IPO underpricing. However, this trial did not cool down the overheated IPO market. Instead, it resulted in some overheated IPOs with very high Price/Earnings ratios<sup>8</sup>. Therefore, from July, 2002 to 2004, a controlled P/E ratio system with an upper limit of 20 for the offering's Price/Earnings ratio was introduced. From 2005, the CSRC finally adopted the book-building system, which suggests that IPO pricing in China has finally become (at least partially) market driven.

### **III. Literature, Measurement and Hypotheses Development**

In this section we explore the factors which potentially underlie the roles of VCs in bringing a private company to a publicly traded financial market. We first synthesize the theoretical and empirical literature in the area. We then discuss the decomposition of the first-day return variable. Finally, hypotheses are developed in the context of China.

#### **A. Literature Review**

As noted in the introduction, three main hypotheses have been put forward in examining the role of VCs in affecting IPO pricing and information asymmetry.

First, Barry et al. (1990) hypothesize and empirically document that VCs specialize their investments in a specific number of firms so as to be able to provide intensive *monitoring* services. They find that with their monitoring role, VCs take concentrated equity

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<sup>8</sup> A well-known example is Fujian Mindong that listed at a record high P/E ratio of 88.69 in July, 2000.

positions, maintain their investment beyond the IPO, and serve on the boards of their portfolio firms. They also document that better monitoring from VCs enhances firm quality and reduces underpricing in the IPOs. Following this line of argument, Chahine and Goergen (2011) provide evidence that VCs have a positive impact on the IPO premium which is the difference between the offer price and the book value of a share.

Second, Megginson and Weiss (1991) propose and empirically study the *certification* role of VCs in IPOs. They find that VC backed IPOs are able to attract more prestigious auditors and underwriters than Non-VC backed IPOs. In addition, VC backed IPOs also elicit greater interest from institutional investors during the IPO and are able to go public at a younger age than other firms. As a result VC backed IPOs have significantly lower first day returns. These results suggest that the presence of VCs in the issuing firms serves to lower the total costs of going public and to maximize the net proceeds to the offering firm.

Supporting the certification hypothesis, Hsu (2004) shows that high-reputation VCs acquire start-up equity at a 10–14% discount in the context of multiple finance offers from competing VCs. This evidence supports the notion that VCs add value to the company they backed beyond their financial investment. Sapienza (1992) conducted a survey of the entrepreneur-CEOs of companies with VCs as lead investors and asked them to rate the VCs' involvement in the ventures. One of his key findings is that because VCs can add value beyond the money supplied, choosing the right one at the outset is very important; once in, it is important to keep communication channels open; and high innovation ventures benefit most from the involvement of VCs. Sapienza's findings are consistent with both the certification and monitoring hypotheses. It also suggests that certification value is likely to be significant in the context of China given the relatively immature nature of the pool of management talent.

A third strand of the literature concerns the motivation of the VC to leave more money on the table at the time of IPOs. Gompers (1996) proposes a grandstanding hypothesis and shows that VCs that are unable to take portfolio companies public have difficulty in raising future capital. In contrast, VC firms that take a portfolio company public once are able to raise additional capital quickly. He argues that establishing a reputation as a VC firm that is capable of taking portfolio companies public is critical to future fundraising.

Consistent with the grandstanding hypothesis, Lee and Wahal (2004) find that VC backed IPOs experience larger first-day returns than comparable non-VC backed IPOs. This finding suggests that younger and new to IPO VC firms use higher levels of underpricing to build up their reputation and attract future fund flow.

Overall, the existing empirical evidence offers mixed support for these hypotheses. There is no single dominant theory on the roles of VCs in their ventures' IPOs. However, these alternative explanations need not be exclusive. One explanation can be of more importance for some types of VC given the specifics of their development and the broader context. Therefore, it is the relative importance of these explanations that matter. To date, there has been little empirical work attempting to assess the relative importance of different roles of VC involvement in IPOs. One of the main obstacles is the difficulty in interpreting a contaminated measure of underpricing; namely, the first (or the first few) day return post IPO.

## **B. Decomposing IPO First Day Returns**

A number of the above mentioned studies rely on the interpretation of total underpricing as a necessary cost to a firm when going public. The presence of a VC would reduce this cost

through a certification/monitoring role or increase it through the grandstanding motive. In this subsection, we explore the components of the total underpricing.

The first-day return is often used as a measure of underpricing in the previous literature. To make first-day returns a meaningful measure of underpricing, two assumptions have to be made: the first-day closing price is an unbiased measure of a firm's intrinsic value and the presence of a VC does not induce a higher level of market reaction. In an emerging market like China, where 'irrational' individual investors are prevalent (Xiong et al, 2007), these two assumptions are very likely to be violated. Therefore, there is a need to be cautious when using the first-day return as a measure of the underpricing faced by pre-IPO owners.

We propose that there are two components in the total underpricing of IPOs and these are especially relevant to China: the *initial underpricing* and the *subsequent market reaction*. Specifically, the *initial underpricing* and the *subsequent market reaction* measure the price difference between the IPO offer price and the intrinsic value of an IPO, and the difference between the intrinsic value of an IPO and the first-day secondary market closing price, respectively. The key is to determine the firm's intrinsic value. We follow the method by Purnanandam and Swaminathan (2004) and use the median P/E ratio of the same industry as a benchmark and multiply the diluted earnings per share at IPO by the matched P/E ratio to obtain the intrinsic value (IV) of an IPO<sup>9</sup>.

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<sup>9</sup> Purnanandam and Swaminathan (2004) propose this decomposition method to study IPO underpricing which is also featured in Gao's (2010) study of Chinese IPOs. Using benchmark multiples of comparable firms in valuating start-ups remains the accepted tool as shown by Gaviious and Schwartz (2011).

The *initial underpricing* is calculated as IV divided by the IPO offer price minus one. The *subsequent market reaction* is defined as the first day secondary market closing price divided by IV minus one<sup>10</sup>. We refer to the overall first-day return as ‘*total underpricing*’.

### **C. Monitoring Hypothesis**

Regarding the monitoring role of VCs in the Chinese context, Bruton and Ahlstrom (2003) find that there is a need for much more direct monitoring of the funded firms by their VCs than is the case for western firms. They point out that to overcome the limitations of incomplete information and accounting systems in China, VCs often seek to build personal contacts with relevant individuals who could provide information on the firm’s background. However, for VC firms that are relatively new to the market, locating these individuals and building the necessary relationships can be difficult, time-consuming and expensive. This suggests experience and networks are important determinants of a VC’s effective monitoring of firms in China. Therefore, whether VCs can perform their monitoring role in China remains an empirical question. Following Chahine and Goergen (2011) VC monitoring is expected to enhance value creation during the IPO. Using IPO premiums (the difference between the offer price and book value of a share) to measure IPO value creation, we have the following hypothesis:

H1. If the monitoring hypothesis holds, VC backed IPOs have higher *IPO premiums*.

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<sup>10</sup> As a robustness check we also used the 5th day closing price to calculate the *subsequent market reaction* and *total underpricing*. The results are similar to those presented in this paper and are available on request from the authors.

#### **D. Certification Hypothesis**

Rock (1986) and Carter and Manaster (1990) show that the underpricing of an IPO is related to uncertainty about the IPO firm's value. The certification hypothesis implies that VCs can help reduce information asymmetry between insiders and outside investors. Therefore, the *initial underpricing* of VC backed firms should be lower. As a result, VC backed IPOs should have a lower *initial underpricing*. In sum, if the certification hypothesis hold in China's IPOs, we should observe that IPOs backed by VC are priced closer to their intrinsic value and the *initial underpricing* of VC backed IPOs is lower. However, the emerging nature of the Chinese capital market may prevent VCs from performing their certification roles in IPOs because of informational asymmetries and weak contractual enforcement. Hence whether VC backed IPOs have lower *initial underpricing* remains an empirical question.

We, therefore, have the following hypothesis:

H2. If the certification hypothesis holds, VC backed IPOs have lower *initial underpricing*.

#### **E. Subsequent Market Reaction**

Behavioural finance argues that investors are over-optimistic about the prospects of IPO firms, which may drive the IPO offer price and the secondary market price. For example, Loughran and Ritter (1995) argue that the prior success and rapid growth of IPO companies makes it easy to justify the high valuation of new IPO firms by investors who believe that they have identified the next big winner. The monitoring and certification hypotheses both imply that VC backing could be a source of over-optimism in IPOs. Essentially, the presence of VCs in emerging markets, where law and finance is underdeveloped, may serve

as a strong signal for quality and, therefore, increase the market's appetite for such IPOs. This will push the price above the intrinsic estimate according to the industry benchmark. Therefore, we have the third hypothesis:

H3. If the certification and monitoring hypotheses hold, the *subsequent market reactions* for VC-backed IPOs are larger.

#### **F. Grandstanding Hypothesis**

The grandstanding hypothesis argues that underpricing is a cost that VCs are willing to bear in order to establish their reputation in the industry. Given the developing nature of the VC market in China, one may expect that the majority of VCs have a need to establish themselves in the industry. Therefore, grandstanding motives are likely to be strong in most of these VCs and the grandstanding effect may dominate the monitoring/certification effect on the *initial underpricing*.

The grandstanding hypothesis has two potential implications for the *subsequent market reaction*. On the one hand, VCs who have a grandstanding motive are those with less experience in the market. Their reputation is yet to be established and, therefore, the market reaction to these IPOs should be lower compared to those backed by reputable VCs. On the other hand, if the market reactions are driven more by sentiment, the deliberate high *initial underpricing* may induce higher levels of market reaction. We, therefore, have no directional expectation of the relationship between VC backed IPOs and the *subsequent market reaction* under the grandstanding hypothesis.

The need to grandstand may vary given a VC's experience in the market. Even in China, not all VCs are young. We would expect younger VCs to have more of a need to grandstand in the market. Therefore, we have the following hypothesis:



H4. Due to grandstanding motives, IPOs backed by younger VCs have a higher level of *initial underpricing*.

In recent years, foreign VC investments have increased substantially in terms of both the amounts of money and the number of cases in China. Foreign VCs are new to the China market and face the challenge of the new business environment and culture in China. Therefore, in order to establish their reputation in this market, they may have grandstanding motives and use higher *initial underpricing* to signal their quality to the market. However, an alternative view may be true. Foreign VCs are reputable and experienced in other, often more developed market places. Their experience and reputation should enhance their monitoring/certification role which suggests lower *initial underpricing* in IPOs backed by foreign than domestic VCs. Given these two explanations, we formulate the following as a testable hypothesis:

H5. Due to grandstanding motives, IPOs backed by foreign VCs have a higher level of *initial underpricing*.

#### **IV. Data and Summary Statistics**

We start with all the IPOs in the China stock market since the end of the 1990s. Preliminary summary statistics show that VC backed IPOs are rare in the SHSE and SZSE main boards. We, therefore, restrict our sample to the IPOs on the SME and ChiNext boards. The first batch of 8 firms was listed on the SME Board on June 25, 2004. ChiNext was established later than the SME Board with the first batch of 28 firms being listed on ChiNext in October, 2009. Our final sample contains 479 IPOs listed from June, 2004 to March, 2010.

We obtain IPO data, firm financial statement data and stock return data from CSMAR, a leading data vendor in China serving the academic community. VC backing data and VC characteristics are taken from ChinaVenture, a professional data vendor providing VC data.

[Insert Table 1 about here]

Table 1 reports the basic statistics of the firm characteristics by VC backing type. Definitions of the variables are given in the Appendix. It shows that companies go public about six years after they have been established. This characteristic is similar for both the Non-VC and VC backed subsamples. However, firms backed by VCs are more diverse in size with generally smaller companies (a lower median total assets) and some extremely large companies which inflates the mean. They are also the companies that use less leverage. These differences are significant as indicated by the median test.

More importantly, VC backed companies have higher sales growth and are more profitable (higher ROA) as indicated by the significant differences in both means and medians; this is in line with the general investment principles of VCs targeting high growth and profitable businesses. This prompted us to address for the potential endogeneity between the VC's choice of investment and the subsequent pricing in our analysis in section V. In terms of using reputable financial advisors for the IPOs, there is no significant difference between the two subsamples. There is also no significant difference in the pre IPO accounting quality.

There are two significant differences in the IPOs of firms which are VC backed and those that are not. First, VC backed IPOs are valued at higher levels of earnings multiples. This difference could be the first piece of evidence supporting the monitoring role of the VC. The valuation of the IPOs sends out a signal that the companies with VC backings are

higher quality in their earnings and growth prospects. Second, VC backed IPOs raised more fresh funds.

The regional characteristics are also reported in Table 1. These three indices (CMI, GDI and LEI) are original developed by Fan and Wang (2001) for a NERI Index project, which was sponsored by the NERI and the China Reform Foundation. The NERI indices capture the progress of institutional transition in China's 30 provinces (excluding Tibet, due to the lack of data). Appraisals of regional institutions are made along several dimensions. The credit market index (CMI) measures the percentage of deposits taken by non-state financial institutions and the percentage of short-term loans to the non-state sector for each province or provincial level region; the government decentralization index (GDI) is based on government spending as a percentage of GDP, the tax rates in a province, and the amount of government administrative regulations for each province (a higher index suggests less government involvement); the legal environment index (LEI) measures by the number of lawyers as a percentage of the population, the efficiency of the local courts and protection of property rights, for each province or provincial level region<sup>11</sup>. Table 1 shows that VCs are more likely to back firms in a region with poor credit market development and more legal protection (the difference in the legal environment index is significant in the median test). This finding suggests that legal protection is an important element of a VC's choice in backing a company.

The characteristics of VCs show that the median number of VCs involved in an IPO is one with a maximum number of seven. These VCs are on average about eight years old at

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<sup>11</sup> A similar data set is also used in Fan, Wong and Zhang (2012).

the time of the IPOs. The average and median holding is 14 and 12 percent respectively with a maximum of 71 percent.

Our main dependent variables of interest are the *IPO premium*, *initial underpricing* and *subsequent market reaction*. The IPO premiums are positive in general ranging from 0.18 to 3.91 times of the book value per share. The mean levels of the premium at 1.76 and 2.02 for non-VC backed and VC backed are considerably higher than those observed in the developed market; for example, Chahine and Goergen (2011) show that the mean IPO premium is approximately 0.785. Importantly, the mean and median levels of the IPO premiums are higher in VC backed than non-VC backed IPOs. The differences are significant at the one percent level and offer support for the monitoring hypothesis. This provides evidence in support of the monitoring hypothesis that VC backing enhances IPO premiums.

For the underpricing measures, Table 1 shows that the mean level of first day returns (*total underpricing*) of approximately 100% is high even when compared to those for hot issue periods documented in developed markets<sup>12</sup>. More importantly, the split between *initial underpricing* and *subsequent market reaction* for VC and non-VC backed IPOs are in clear contrast; VC backed companies have approximately 1/3 of the first day return attributed to *initial underpricing* while for non-VC backed companies it is approximately 2/3. The mean (median) *initial underpricing* for VC backed IPOs is 0.36 (0.21) while for non-VC backed IPOs it is 0.63 (0.50). Both the t-test and median test suggest significant differences in the *initial underpricing* between VC backed and Non-VC backed IPOs. This provides the first piece of

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<sup>12</sup> For example, the average IPO underpricing for the internet bubble period (1999-2000) is 65% (see Ritter and Welch, 2002 , Table 1).

evidence supporting our hypothesis that VCs play a certification role in the IPOs they back and offer lower *initial underpricing*. However, though VC backing leads to lower *initial underpricing*, the *subsequent market reaction* is also higher for these issues. The mean (median) of *subsequent market reactions* is 0.69 (0.54), which is significantly higher than that of Non-VC backed IPOs [0.32 (0.17)]. This univariate analysis confirms our third hypothesis that VC backing leads to a higher *subsequent market reaction*.

Overall, this preliminary analysis documents some significant differences in the characteristics of companies between non-VC and VC backed IPOs and shows some support for the monitoring and certification hypotheses.

## **V. Main Analyses**

The univariate analysis has shown some support for the monitoring and certification hypotheses but to disentangle the monitoring, certification and the grandstanding roles of VCs in the Chinese IPO market, we examine the relationship between VC backing and IPO performance from the following angles. First, we examine the effect of VC backing on the IPO premium and pricing measures using 2-stage Heckman regressions. Second, focusing on the VC backed IPO sub sample, we present an analysis of the Grandstanding hypotheses H4 and H5.

### **A. Determinants of IPO Premiums/Pricing**

#### ***Model specifications***

Lee and Wahal (2004) find that venture financing is not randomly distributed. They show that VC backed IPOs are significantly clustered across both industry and geographies. In

this paper, we control for the possible endogeneity of VC backing by running the 2-stage Heckman test. We employ the first stage regression as follows:

$$\begin{aligned}
VCbacked_i = & \alpha_i + \beta_1 * Firmsize_i + \beta_2 * Age_i + \beta_3 * ROA_i + \beta_4 * Leverage_i + \beta_5 * Salesgrowth_i \\
& + \beta_6 * CMI_i + \beta_7 * GDI_i + \beta_8 * LEI_i \\
& + \sum \lambda_j * Industry_j + \varepsilon_i
\end{aligned} \tag{1}$$

where VCbacked is a dummy variable taking the value 1 if the IPO is backed by VCs and 0 otherwise. The definitions of the explanatory variables are given in the Appendix. Three sets of the variables are included in the equations. First, we introduce firm level variables including firm size, age, profitability (ROA), leverage, and sales growth, which are found to be potential determinants of venture capital investment decisions in the previous literature (see Wells, 1974; Tyebjee and Bruno, 1984; Gompers, 1995; Megginson and Weiss, 1991). Second, we control for possible regional development disparities by including three measurements of regional development from Fan and Wang (2004), who study the relative process of marketization of each region in China. Finally, Gompers (1995) shows that industry is an important concern in venture capital decision making; a set of industry dummies is added to control for industry differences in the VCs backing.

To test our hypotheses regarding *premiums*, the *initial underpricing* and the *subsequent market reaction*, we run the second stage regressions based on the following equation:

$$\begin{aligned}
Pricing_i = & \alpha_i + \beta_1 * VCbacked_i + \beta_2 * Firmsize_i + \beta_3 * Age_i + \beta_4 * Auditor\_rep_i \\
& + \beta_5 * Underwriter\_rep_i + \beta_6 * Holding_i + \beta_7 * DACC_i + \beta_8 * PEdummy_i \\
& + \beta_9 * Pastunderpricing_i + \beta_{10} * Mr\_90_i + \beta_{11} * Turnover_i \\
& + \beta_{12} * CMI_i + \beta_{13} * GDI_i + \beta_{14} * LEI_i \\
& + \theta * Mills + \sum \lambda_j * Industry_j + \varepsilon_i
\end{aligned} \tag{2}$$

where the dependent variables are the four pricing variables (*IPO premium*, *initial underpricing*, *subsequent market reaction* and total-underpricing). The definitions of the explanatory variables

are given in the Appendix. The key explanatory variable is the VCbacked dummy variable. A set of firm specific characteristics are included based on previous studies of IPO underpricing which include firm size (Ritter, 1984), age of the firm (Ritter,1984; Megginson and Weiss, 1991; Ljungqvist and Wilhelm, 2003 and others), auditor's reputation (Titman and Trueman,1986), underwriter's reputation (Booth and Smith,1986; Beatty and Ritter, 1986; Carter and Manaster, 1990), owners' retained shareholdings (Barry et al,1990) and earnings quality DACC (Kao, Wu and Yang, 2009). In addition, a dummy variable (PEdummy) is used to capture those firms' offering prices that are set at 30 times the price-earnings ratio<sup>13</sup>. Ljungqvist, Nanda and Singh (2006) show that investor sentiment can affect the IPO initial day return. We further add two variables to capture market sentiment which include the first day turnover (Turnover)<sup>14</sup>, which is only included in the *subsequent market reaction* and total underpricing equations as it is not observed at the *initial pricing* of the offer price, and the market return in the past 90 days (Mr\_90)<sup>15</sup>. In order to control for the primary market sentiment on underpricing (i.e. the effect of 'hot' issue documented in Ritter, 1984), we construct an additional sentiment variable capturing average "total underpricing" (Pastunderpricing) on the preceding IPOs within three months prior to the current IPO.

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<sup>13</sup> In China there is an implicit offer price P/E cap of 30 for many IPOs by CSRC even after book building is adopted. We introduce this dummy to control for this potential intervention from the regulator. In our sample, 96 (20%) IPOs are priced at a fixed Price/Earnings Ratio of 30 times.

<sup>14</sup> For example, see Chang et al. (2008).

<sup>15</sup> Loughran and Ritter (2004) document that the market return prior to IPOs has a positive impact on IPO initial returns. The average 90 day market return before IPO in our sample is 5% suggesting potential market timing effects.

McGuinness (2012) highlights the pivotal nature of primary market sentiment on IPO underpricing in a related Chinese market setting (Hong Kong). Moreover, we add three measures of regional developmental disparity (CMI, GDI and LEI) to control for the heterogeneity of the economic, law and regulatory environment of the province where the IPO firm is from. In all regressions, industry fixed effects are controlled as suggested by Benveniste et al (2003). Finally, the inverse mills ratio (Mills\_vcbacked) from Equation (1) is included to control for the non-random selection of firms with VC backing.

### ***Role of VC Backing in IPO Pricing***

Table 2 reports the estimation of the determinants of VC backing. It shows that the only significant determinant of VC investing is the sales growth which is consistent with the VCs' investment objectives. Furthermore, the control for industry effect suggests that the information technology industry receives a significantly higher level of VC investment which is as expected<sup>16</sup>.

[Insert Table 2 about here]

Table 3 reports the pricing regressions after controlling for the potential endogeneity of VC investment. Consistent with the univariate test in Table 1, VC backed IPOs have a higher level of premium, a lower level of *initial underpricing* and higher level of *subsequent market reaction* compared to non-VC backed IPOs. These findings support our H1 to H3 hypotheses. In addition, VC backing does not have an impact on the total first-day return which is used as a measure of underpricing in the literature.

[Insert Table 3 about here]

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<sup>16</sup> To preserve space, results of industry dummies are not reported in the table.



For the premium analysis, larger issuers (Firmsize) and those with offering price set at 30 times the price-earnings ratio (PE\_dummy) have lower IPO premiums. In contrast, IPOs sponsored by higher reputation underwriters and have more retained ownership (Holding) have higher IPO premiums. Furthermore, regional characteristics have significant effect on the value creation of the IPOs. Specifically, companies in regions with better credit market and law protection have higher IPO premiums suggesting the positive impact on firm value of these regional factors. Higher governance decentralization reduces the IPO premium and suggests that part of the IPO premium is from the government's attention and approach to the region's development. More government intervention has positive effects on the IPO premiums.

Larger issuers (Firmsize) and those with offering price set at 30 times of price-earnings ratio (PE\_dummy) are more *initially underpriced*, which suggests that these IPOs could have been priced at an even higher P/E ratio, while issues with more reputable underwriters and companies with more ownership retention by the pre-IPO shareholders (Holding) are less *initially underpriced*. This suggests that IPO issues with more backing from the pre-IPO owners and reputable underwriters required less *initial underpricing* to signal their quality. Finally the primary market sentiment (Pastunderpricing) has a positive effect on the *initial underpricing*.

The *subsequent market reaction* and total-underpricing regressions show that the first-day market reactions to the IPOs are strongly linked to market sentiment. Both the past market return (MR\_90) and first day trading activities (Turnover) are positively correlated with the level of after-market reaction and the total first-day return. Higher levels of ownership retention (Holding) by the pre-IPO owner also serve as a good quality signal to the market and induce a positive reaction in the share price on the IPO day.

Overall, our evidence suggests that the VC's role in IPOs in China is consistent with the monitoring and certification hypotheses. The involvement of VCs increases the IPO premium and certifies the company which leads to an IPO price that is closer to its intrinsic value. Their involvement also serves as a quality signal and induces a higher market response. These two contrasting effects of lower *initial underpricing* and *higher subsequent market* reaction lead to no difference in total underpricing in VC backed as compared to non VC backed IPOs.

## **B. Grandstanding hypotheses**

The results presented in the last subsection suggest, in general that grandstanding is not an overarching objective of VCs when they bring their portfolio companies to the public market. On average VC backed IPOs offer less rather than more initial underpricing. However, this does not exclude the possibility that some VC firms, especially young and inexperienced ones, would use underpricing to make a grandstand in the market. The monitoring effort and costs are substantially higher in China than in the West (Brunton and Ahlstrom, 2003) and the accounting numbers are often unreliable. As a consequence, it takes times to build trust with the top management team which suggests that young and foreign VCs would be less effective, *ceteris paribus*, in monitoring their funded firms. If the grandstanding hypothesis holds, then younger and less experienced VCs will have higher *initial underpricing*.

In order to understand VC characteristics and pricing behaviour, we focus on VCs as the unit of analysis and expand the 153 VC backed IPOs to 250 VC-IPO events. Table 4 shows the summary statistics for the backing VCs' characteristics recorded immediately

before each IPO. These include the VC's age which is measured by the number of years since establishment (EstYear) and the VCtype.

Table 4 examines the pricing variables for the VC backed IPOs which are sorted by the VC's age which is measured by the number of years since establishment (EstYear) and the VC's funding source type (VC Type). We divide the sample into four quartiles according to VC's age and use the Jonckheere-Terpstra (JT) test to test for ordered differences in the pricing measures in the quartiles with the null hypothesis that there is no trend in the statistics<sup>17</sup>. The JT test is also applied to test the difference between the VC Types. We also report the mean of EstYear in the parantheses for each EstYear group.

[Insert Table 4 about here]

Although there is no prediction regarding the IPO premium, we include it in our analysis for completeness. Table 4 shows that there is indeed no directional relationship between VC's age and IPO premiums. The results of the underpricing analyses confirm, however, the grandstanding hypothesis (H4). In particular, younger VCs offer higher *initial underpricing* in the IPOs they back. The JT statistics are negative and significant suggesting a decreasing trend in the level of *initial underpricing* as a VC's age increases. This suggests that inexperienced VCs offer higher levels of *initial underpricing* to establish their reputation in the industry. When total underpricing is considered, it shows that more experienced VCs indeed leave less money on the table when they take their portfolio companies to the market. In other words, less experienced VCs have to offer more total underpricing to make their stand in the market.

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<sup>17</sup> The JT test is a  $k$ -sample test for trend that was suggested independently by Jonckheere (in 1954) and Terpstra (in 1952). A positive (negative) standardized JT statistic indicates an increasing (decreasing) order. The significance level indicates whether the increasing (decreasing) ordering effect may be assumed to be different from no order.

Regarding the difference in the role of domestic and foreign VCs, Table 4 shows that the number of IPOs that involved foreign VC (52) is low in the market compared to their domestic counterparts (198) - suggesting it is still early days for foreign VCs in this market<sup>18</sup>. Table 4 further shows that VC type has no effect on the IPO premium. Furthermore, the mean and median statistics indicate that foreign VCs neither offer higher *initial underpricing* nor induce a higher *subsequent market reaction* while there is evidence that foreign VC backed IPOs have higher total underpricing.

To examine the robustness of the findings in the above univariate analysis, we run regression analyses based on the following equation:

$$\begin{aligned}
Pricing_i = & \alpha_i + \beta_0 * EstYear_i + \beta_1 * ForeignVC_i + \beta_2 * NumVC_i \\
& + \beta_3 * Firmsize + \beta_4 * Age_i + \beta_5 * Auditor\_rep_i + \beta_6 * Underwriter\_rep_i \\
& + \beta_7 * Holding_i + \beta_8 * DACC_i + \beta_9 * PEdummy_i \\
& + \beta_{10} * Pastunderpricing_i + \beta_{11} * Mr\_90_i + \beta_{12} * Turnover_i \\
& + \beta_{13} * CMI_i + \beta_{14} * GDI_i + \beta_{15} * LEI_i \\
& + \theta * Mills + \sum \lambda_j * Industry_j + \varepsilon_i \quad (3)
\end{aligned}$$

where the dependent variables are the four pricing variables (*IPO premium*, *initial underpricing*, *subsequent market reaction* and total underpricing). The definitions of the explanatory variables are given in the Appendix. The key variables are EstYear and ForeignVC with an additional control variable to capture the number of VCs in a syndicate, other control variables are similar to those in Equation (2)<sup>19</sup>. An IPO observation will be

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<sup>18</sup> In unreported analysis, we find that there are 33 IPOs with lead-VCs which are either solely or jointly funded by foreign capital out of the 153 VC backed IPO sample. Foreign VCs are found to invest in companies with significantly higher sales growth and profitability than those backed by their domestic counterpart.

<sup>19</sup> Number of successful IPO is also used to capture VC's reputation in existing literature (see, e.g., Nahata, 2008). For robustness check, we also use VC\_IpoNum (the number of IPOs the VC has backed before the current IPO) as an alternative measure of VC experience and the results are similar and, therefore, unreported.

included in the analysis more than once when there is more than one VC involved in an IPO. In order to control for potential clustering in the error due to IPO firm clusters, we use clustering error adjusted estimation.

Table 5 reports the regression results. Consistent with the univariate results, no significant relationship is documented between IPO premium and VC's age and funding source. Importantly, however, our results of the underpricing analysis confirm the grandstanding hypothesis (H4). Specifically, the coefficient of EstYear is negative and significant at 5% in the *initial underpricing* equation, suggesting that younger VCs offer higher *initial underpricing*.

In addition, the *subsequent market reaction* is lower for younger VCs after controlling for firm size. It suggests that investors favour those IPOs backed by older VCs. This confirms the need for the IPOs backed by younger VCs to offer higher *initial underpricing*, should they intend to use a higher total underpricing as a signal of quality and attracting future fund flows. Our univariate analysis does show that IPOs backed by younger VCs have higher total underpricing as a result.

[Insert Table 5 about here]

Finally, we find that the IPO pricing variables for those backed by foreign VCs do not differ from those backed by domestic VCs which reject the grandstanding hypothesis for foreign VCs (H5). Such a lack of differences could be due to two counter effects that foreign VCs have in this process. On the one hand, they are reputable and experienced VCs in other, often more developed market places. Their experience and reputation should enhance their certification role which suggests lower *initial underpricing* in IPOs backed by foreign as compared to domestic VCs. On the other hand, they are new to this market place and in order to establish their reputation they may have a grandstanding motives which

suggest higher *initial underpricing* in IPOs backed by foreign than domestic VCs. Empirically, we show that neither of these two effects dominates and, therefore, there is no significant difference in the pricing variable for foreign as compared to domestic VCs

In summary, this sub-section's analyses find that grandstanding motives are found in younger VCs. They offer higher *initial underpricing* in order to attract future fund flow. However, there is no significant difference between foreign and domestic VCs in the IPO pricing and market responses, especially when other firm specific characteristics and market conditions are allowed for.

### **C. Robustness Tests**

One of the potential limitations of the main analysis is that only the presence, and not the **size of VC-equity stakes**, is explicitly considered<sup>20</sup>. Both the certification and monitoring hypotheses would suggest that the extent of a VC's backing on the IPO pricing would strengthen with the size of its equity stake. We, therefore, use the VC's investment over the total equity as a proxy of a VC's stake in a company and replace the VC-backed dummy variable with this new variable in the regression analyses (Equation 1). The coefficients of the size of VC-equity stakes in these regressions are all significant at 1%. Furthermore, the results are consistent with those using the VC backed dummy variable. Specifically, higher VC ownership increases the IPO premium and market reaction but reduces *initial underpricing*.

The summary statistics in Table 2 show that some variables exhibit considerable variation around mean levels with extreme values in the range. To check the robustness of

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<sup>20</sup> We thank an anonymous referee for this important comment.

our conclusions to the presence of outliers, we re-estimate the results using median-regressions and the findings are similar to those in the main analysis<sup>21</sup>.

## VI. Conclusions

Using 479 IPOs between 2004 and 2010 from the Chinese market, we study the role of domestic and foreign VCs in the pricing of IPOs by Chinese SMEs. We consider the premium between the book value and offer price of an IPO, and decompose the first-day IPO return into *initial underpricing* by issuers and *subsequent market reaction*. Our analyses produce a number of results which bridge the gap between the theories and empirical evidence on the roles of VCs in the Chinese financial market. First, our results show that VC backed IPOs have a higher premium level and a lower level of *initial underpricing*. This implies that the backing by a VC does enhance firm value and maximize the expected net proceeds to the offering firm which support the monitoring and certification hypotheses. Furthermore, VC backing leads to higher *subsequent market reaction*, which further supports the monitoring and certification role of VCs. Although the VC backed IPOs are priced closer to their intrinsic value, the market reacts more favourably to these certified issues. This suggests that the market recognizes the quality difference in IPOs backed by VCs and is willing to price them higher than their industrial peers. Importantly, the presence of VCs do not have a significant relationship with the total underpricing measured by the first-day market return, which confirms the importance of our decomposition of the first day return of IPOs.

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<sup>21</sup> Results of the robustness tests are available on request from the authors.

Second, our extended analysis on the VC backed IPO subsample shows supportive evidence for the grandstanding hypothesis H4. Younger VCs have higher levels of *initial underpricing* which suggests that they have incentives to underprice the IPO intentionally to make an impression (grandstand) in the market. Furthermore, the *subsequent market reaction* to these IPOs are lower further confirming the need for younger VCs to underprice their portfolio companies in order to generate a comparable (or even higher) total underpricing level to their more senior counterparts. However, there is no evidence to support the hypothesis (H5) that foreign VCs grandstand.

In summary, this paper offers two important empirical findings: first, in general, the pricing of IPOs in China suggests that VCs enlarge the IPO proceedings of SMEs by fulfilling monitoring and certification roles much as they do in well established IPO markets; second, younger VCs seem to grandstand when pricing IPOs, which increases the cost of SMEs to go public. The above results suggest that, although the development of the capital markets in China and the presence of VCs are relatively recent phenomena, the roles VCs play in Chinese IPOs are similar to those played in well established capital markets. Thus, given that the context of China has many specifics, the results show that the theories concerning the role of VCs in IPOs have general applicability. In particular, VCs have a role to play in the face of the asymmetries of financial markets (certification and monitoring), and as is the case for any business, they have to compete to establish themselves (grandstanding). These results can be seen as surprising or to be expected depending on the perspective taken. From the perspective that the hypotheses tested here were developed for well established western markets, the confirmatory nature of the results is surprising given the relative youth of the capital markets and venture capital in China. However, from another perspective, the



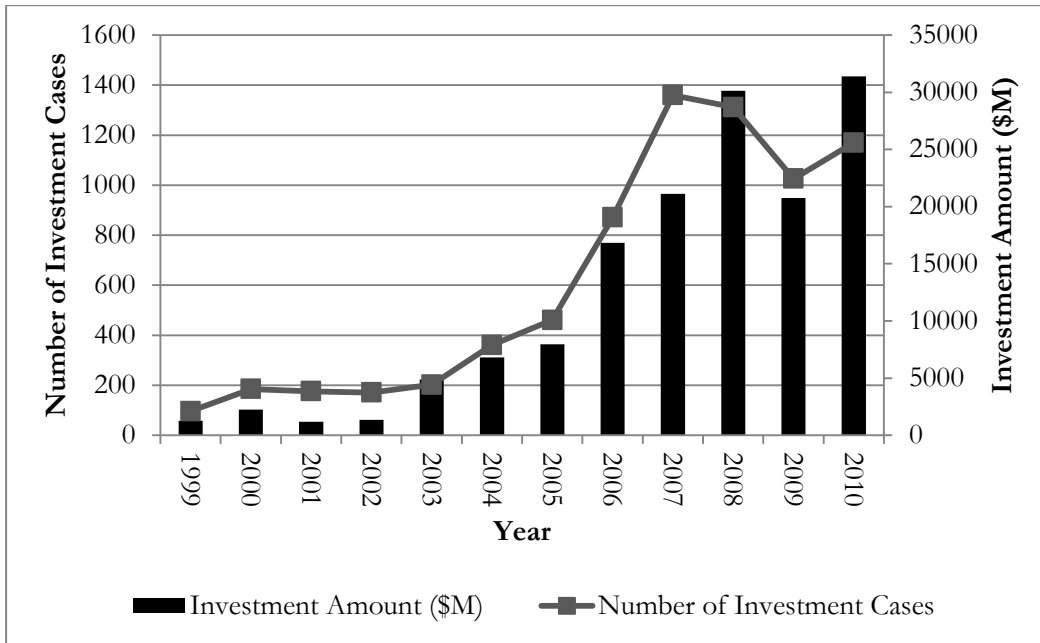
results are to be expected given that asymmetries and the need to develop reputations are likely to be greater in relatively immature markets.

Given the rapidly growing nature of the financial markets in China and the increasing presence of VCs in SMEs, the role of the latter in various aspects of the funding, development and governance of businesses are clearly topics worthy of analytical investigation. This paper has analysed the role of VCs in the IPO part of the SME life cycle and future work needs to add detail to the roles of VCs pre and post the IPOs of SMEs. Potential extension can also be made in studying the impact of different VC and fund characteristics (fund size, portfolio size and the number of prior funds managed/syndicated, etc.) on IPO pricing and market reaction.

## Figures

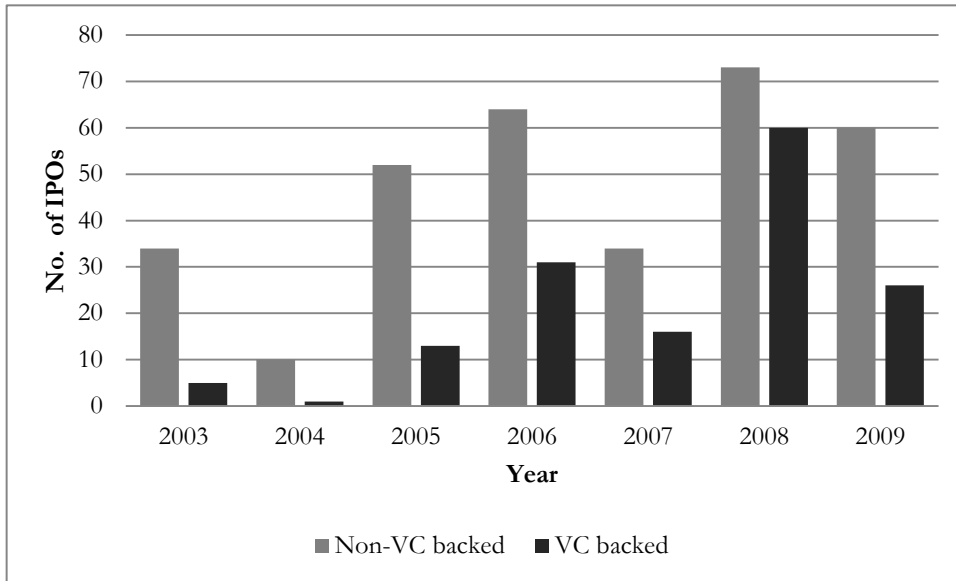
**Figure 1. VC Investments in China**

This figure shows the fast growth of VC investment in China, in terms of the number of investment cases and the investment amount. Data are obtained from ChinaVenture, a professional data vendor providing VC data.



**Figure 2. VC backed vs. Non-VC backed IPOs**

This figure presents the distribution of VC backed IPO vs. Non-VC backed IPOs on the SME Board and ChiNext Board from 2003-2009. Data are obtained from ChinaVenture, a professional data vendor providing VC data.



**Table 1. IPO Characteristics by VC Backing Type**

This table reports the basic statistics of the firm characteristics by VC backing type. Definitions of the variables are given in the Appendix. ‘\*\*’ and ‘\*’ indicates statistical significance at 1% and 5% respectively.

	Non-VC Backed				VC Backed				Test for	
	Mean	Median	Min	Max	Mean	Median	Min	Max	Mean	Median
Firm Age (Year)	5.84	4.97	0.49	26.37	6.00	5.67	0.69	17.96		
Total Asset (Mil)	675.74	426.75	68.52	8169.00	898.20	344.80	90.34	56550.00		*
Leverage	1.39	1.19	0.08	6.84	1.29	0.95	0.09	16.69		*
Sales growth	0.26	0.20	-0.31	2.12	0.37	0.29	-0.32	2.12	**	**
ROA	0.12	0.11	0.02	0.40	0.14	0.12	0.01	0.59	**	*
Auditor Reputation	0.18	0.00	0.00	1.00	0.14	0.00	0.00	1.00		
Underwriter Reputation	0.95	0.58	0.00	3.86	0.99	0.70	0.00	3.68		
DACC	0.02	0.03	-0.66	0.58	0.02	0.04	-0.66	0.58		
Price Earnings Ratio	36.57	29.97	7.78	93.75	45.95	41.07	12.36	93.75	**	**
IPO Fundraised (USM)	74.25	51.79	14.59	498.02	96.85	64.01	8.17	869.30	**	**
CMI	6.04	6.37	0.70	7.94	5.80	6.37	0.70	7.94		
GDI	7.28	7.49	3.16	8.37	7.26	7.52	3.16	8.37		
LEI	6.04	6.24	2.62	7.97	6.28	6.29	2.62	7.97		*
Number of VCs					1.67	1.00	1.00	7.00	N/A	N/A
Average VC age					8.37	7.46	0.92	95.03	N/A	N/A
VC holding					0.14	0.12	0.00	0.71	N/A	N/A
IPO Premium	1.76	1.71	0.18	3.42	2.02	2.02	0.18	3.91	**	**
Initial Underpricing	0.63	0.50	-0.72	4.85	0.36	0.21	-0.57	1.73	**	**
Market Reaction	0.32	0.17	-0.71	3.28	0.69	0.54	-0.45	5.42	**	**
Total Underpricing	0.95	0.71	-0.09	5.38	1.09	0.80	-0.10	4.73		*
Number of IPOs	326				153					

**Table 2. Determinants of VC-backed**

This table reports the estimation of the following model Probit model:

$$VCbacked_i = \alpha_i + \beta_1 * Firmsize_i + \beta_2 * Age_i + \beta_3 * ROA_i + \beta_4 * Leverage_i + \beta_5 * Salesgrowth_i + \beta_6 * CMI_i + \beta_7 * GDI_i + \beta_8 * LEI_i + \sum \lambda_j * Industry_j + \varepsilon_i \quad (1)$$

where VCbacked is a dummy variable taking the value 1 if the IPO is backed by VCs and 0 otherwise. The definitions of the explanatory variables are given in the Appendix. The sample includes 479 IPOs listed from June, 2004 to March, 2010. We obtain IPO data, firm financial statements data, and stock return data from CSMAR. VC backing data and VC characteristics are from ChinaVenture. CMI, GDI and LEI are taken from Fan and Wang (2004). ‘\*\*\*’ and ‘\*\*’ indicates statistical significance at 1% and 5% respectively.

Parameter	Estimate	t Value
Intercept	0.357	0.17
Firmsize	-0.087	-0.87
Age	0.011	0.66
ROA	0.977	0.91
Leverage	0.043	0.71
Salesgrowth	0.553	2.74 **
CMI	-0.050	-1.25
GDI	0.032	0.41
LEI	0.048	0.87
Industry Effect	Yes	

**Table 3. IPO Pricing Regressions – Effect of VC backing**

This table reports the pricing regressions after controlling for the potential endogeneity of VC investment:

$$\begin{aligned}
 Pricing_i = & \alpha_i + \beta_1 * VCbacked_i + \beta_2 * Firmsize_i + \beta_3 * Age_i + \beta_4 * Auditor\_rep_i \\
 & + \beta_5 * Underwriter\_rep_i + \beta_6 * Holding_i + \beta_7 * DACC_i + \beta_8 * PEdummy_i \\
 & + \beta_9 * Pastunderpricing_i + \beta_{10} * Mr\_90_i + \beta_{11} * Turnover_i \\
 & + \beta_{12} * CMI_i + \beta_{13} * GDI_i + \beta_{14} * LEI_i \\
 & + \theta * Mills + \sum \lambda_j * Industry_j + \varepsilon_i \quad (2)
 \end{aligned}$$

where the dependent variables are the four pricing variables (*IPO premium, initial underpricing, subsequent market reaction* and total underpricing). The definitions of the explanatory variables are given in the Appendix. The inverse Mills ratio from Equation (1) is included to control for the non-random selection of firms with VC backing. Heteroscedasticity-consistent t Values are reported. “\*\*” and “\*” indicates statistical significance at 1% and 5% respectively.

Variable	IPO premium		Initial Underpricing		Market Reaction		Total Underpricing	
	Parameter	t Value	Parameter	t Value	Parameter	t Value	Parameter	t Value
Intercept	1.910	3.11 **	0.037	0.04	2.461	3.04 **	1.878	2.66 **
VC Backed	0.095	2.23 *	-0.251	-4.99 **	0.275	4.01 **	0.070	1.06
Firmsize	-0.154	-5.12 **	0.138	3.03 **	-0.203	-4.83 **	-0.101	-2.68 **
Age	-0.007	-1.38	-0.014	-1.84	0.006	0.77	-0.008	-1.05
Auditor_rep	-0.065	-1.17	-0.001	-0.02	0.009	0.14	0.021	0.26
Underwriter_rep	7.807	3.95 **	-6.539	-2.58 *	3.848	1.35	-3.613	-1.32
Holding	6.446	16.44 **	-3.276	-4.70 **	2.031	4.51 **	-0.644	-1.01
DACC	0.039	0.36	0.255	1.77	-0.072	-0.44	0.213	1.46
PEdummy	-0.167	-3.12 **	0.038	0.46	-0.101	-0.85	0.214	1.78
Turnover					1.779	9.56 **	1.846	9.38 **
Pastunderpricing	-0.258	-7.99 **	0.511	8.65 **	0.046	0.54	0.773	9.93 **
Mr_90	0.033	0.33	-0.357	-2.01 *	0.752	5.92 **	0.777	5.96 **
CMI	0.059	4.30 **	0.016	0.78	0.004	0.20	-0.012	-0.56
GDI	-0.081	-3.28 **	0.026	0.90	-0.025	-0.78	-0.004	-0.12
LEI	0.046	2.28 *	-0.040	-1.77	-0.013	-0.40	-0.029	-1.08
Mills_Vcbacked	-1.118	-7.41 **	-0.154	-0.83	-0.261	-1.48	-0.082	-0.39
Industry Effect	Yes		Yes		Yes		Yes	
Adj R-Sq	0.541		0.303		0.312		0.582	

**Table 4. Grandstanding Tests – Summary Statistics**

This table reports a test for the Grandstanding hypothesis. It reports the pricing variables for the VC backed IPOs which are sorted by the backing VC's characteristics which are VC's age (measured by the number of year since estimated, EstYear) and VC's fund source type (foreign and domestic VC). We sort the IPOs by EstYear and divided them into four quartiles. We report the mean and median of the *IPO premium, initial underpricing, subsequent market reaction* and total underpricing for each subgroup. *J-T test* reports the standardized JT statistic. '\*\*', and '\*' indicates statistical significance at 1% and 5% respectively.

<b>EstYear (Mean)</b>	<b>IPO Premium</b>		<b>Initial Underpricing</b>		<b>Subsequent Market Overpricing</b>		<b>Total Underpricing</b>		<b>N</b>
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	
1 (2 Year)	2.17	2.09	0.24	0.05	0.82	0.69	0.96	0.77	63
2 (6 Year)	1.71	1.78	0.65	0.69	0.63	0.43	1.53	1.09	63
3 (9 Year)	2.23	2.26	0.18	-0.05	0.75	0.6	0.88	0.7	62
4 (14 year)	2.18	2.13	0.15	-0.02	0.67	0.54	0.75	0.54	62
J-T test	1.57		-1.91*		-0.14		-2.48**		250
<b>VC type</b>									
Domestic VC	2.04	2.05	0.29	0.08	0.70	0.51	0.98	0.76	198
Foreign VC	2.17	2.09	0.41	0.40	0.79	0.66	1.28	1.00	52
J-T test	0.20		0.95		1.07		2.22**		250

**Table 5. Grandstanding Test – Regression**

This table reports the pricing regressions where the dependent variables are the four pricing variables (*IPO premium*, *initial underpricing*, *subsequent market reaction* and *total underpricing*).

$$\begin{aligned}
 \text{Pricing}_i = & \alpha_i + \beta_1 * \text{EstYear}_i + \beta_2 * \text{FirmSize}_i + \beta_3 * \text{Age}_i \\
 & + \beta_4 * \text{Auditor\_rep}_i + \beta_5 * \text{Underwriter\_rep}_i \\
 & + \beta_6 * \text{Holding}_i + \beta_7 * \text{DACC}_i + \beta_8 * \text{PEdummy}_i + \beta_9 * \text{Mr\_90}_i + \beta_{10} * \text{Turnover}_i \\
 & + \beta_{11} * \text{CMI}_i + \beta_{12} * \text{GDI}_i + \beta_{13} * \text{LEI}_i \\
 & + \theta * \text{Mills} + \sum \lambda_j * \text{Industry}_j + \varepsilon_i \quad (3)
 \end{aligned}$$

The definitions of the explanatory variables are given in the Appendix. Standard error is adjusted for IPO firm level clusters. ‘\*\*’ and ‘\*’ indicates statistical significance at 1% and 5% respectively.

Variable	IPO premium			Initial Underpricing			Market Reaction			Total Underpricing		
	Parameter	Z		Parameter	Z		Parameter	Z		Parameter	Z	
Intercept	-1.579	-1.09		-1.591	-1.04		4.719	2.16	*	3.112	1.78	
EstYear	-0.002	-0.47		-0.008	-2.07	*	0.014	2.25	*	0.004	0.67	
foreignVC	0.058	0.97		0.010	0.15		-0.129	-1.26		-0.092	-1.01	
numVC	0.007	0.39		-0.033	-1.76		0.063	1.28		0.017	0.45	
FirmSize	-0.112	-1.89		0.045	0.78		-0.194	-2.23	*	-0.108	-1.23	
Age	-0.005	-0.57		-0.015	-1.71		-0.011	-0.74		-0.018	-1.09	
Auditor_rep	0.051	0.55		0.073	0.60		-0.078	-0.33		-0.002	-0.01	
Underwriter_rep	8.534	2.11	*	-7.769	-1.73		-2.345	-0.41		-12.040	-2.59	**
Holding	8.442	6.17	**	0.671	0.45		-0.386	-0.19		-0.733	-0.45	
DACC	0.091	0.46		0.223	1.44		-0.187	-0.75		0.068	0.39	
Pedummy	-0.167	-1.67		0.387	2.67	**	-0.730	-2.04	*	-0.059	-0.22	
Turnover							2.596	5.22	**	2.017	4.98	**
Pastunderpricing	-0.224	-3.31	**	0.297	2.95	**	0.497	1.81		1.023	5.92	**
Mr_90	-0.179	-0.90		0.092	0.39		0.160	0.45		0.504	1.58	
CMI	0.015	0.58		-0.010	-0.43		0.044	1.30		0.002	0.05	
GDI	-0.125	-2.75	**	0.061	1.40		-0.185	-2.47	*	-0.140	-2.04	*
LEI	0.108	3.90	**	-0.026	-0.80		-0.065	-1.19		-0.091	-2.24	*
Industry Effect	Yes			Yes			Yes			Yes		



## Appendix 1. Variable Definitions

This table summarizes the definitions of variables used in the analysis. All variables are collected by the authors from the CSMAR database except CMI, GDI and LEI, which are taken from Fan and Wang 2001 (in Chinese) and discussed also in Fan, Wong and Zhang (2012).

<b>Variables</b>	<b>Definitions</b>
<b>Initial Underpricing</b>	Calculated as IV divided by the IPO offer price minus one, where IV equals the median Price/Earnings ratio of the same industry multiplied by the diluted earnings per share at IPO.
<b>Subsequent Market Reaction</b>	Defined as the first day secondary market closing price divided by IV minus one, where IV equals the median Price/Earnings ratio of the same industry multiplied by the diluted earnings per share at IPO.
<b>Total Underpricing</b>	The first-day return of an IPO, defined as first day secondary market closing price divided by IPO offer price minus one.
<b>IPO Premium</b>	The IPO Premium is defined as the log difference between the offer price and the book value per share.
<b>VCbacked</b>	VCbacked is a dummy variable taking the value 1 if the IPO is backed by VCs and 0 otherwise.
<b>Firmsize</b>	Total assets at the latest fiscal year end before the IPO (in billion RMB) which is taken in logarithm form in regression the analysis.
<b>Age</b>	Years since the firm's establishment date.
<b>ROA</b>	Return on assets, defined as net income divided by total assets at the fiscal year end prior to the IPO.
<b>Leverage</b>	Debt/equity at the fiscal year end prior to the IPO.
<b>Salesgrowth</b>	The sales growth rate in the last fiscal year prior to the IPO.
<b>Auditor_rep</b>	Auditor_rep=1 if the auditor is among the top 10 auditors in terms of volume in China.
<b>Underwriter_rep</b>	Underwriter_rep is measured by the relative markets share of IPO underwriting which is calculated as number of IPO underwriting for each investment bank before the focal IPO divided by the total number of IPO in the market before the focal IPO.
<b>Holding</b>	Percentage pre-IPO owners' holding.
<b>DACC</b>	Discretionary accrual estimated using the cross-sectional modification of the Jones (1991) model.
<b>PriceEarnings Ratio</b>	IPO Price divided by earning per share at IPO
<b>IPO Fundraised</b>	Proceedings from an IPO
<b>PEdummy</b>	PEdummy=1 if the Price/Earnings ratio at IPO is set at 30 times.
<b>Pastunderpricing</b>	The average underpricing (measured by the first day's price reaction) of the IPOs in three months before the focal IPO.
<b>Mr_90</b>	90-day market return (Shanghai A share Index) measured before the IPO day.
<b>Turnover</b>	The IPO day's turnover rate which is measured as the percentage trading value over the market capitalization.
<b>Number of VCs</b>	Number of VCs invested in the company pre-IPO.
<b>Average VC age</b>	The average age of the VC firms at the time of IPO expressed in year.
<b>VC Holding</b>	VC holding is equal to the total investment by the VCs in the

	company expressed as a fraction of the book equity before the IPO.
<b>CMI</b>	The credit market index measures the percentage of deposits taken by non-state financial institutions and the percentage of short-term loans to the non-state sector for each province or provincial level region in 2000.
<b>GDI</b>	The government decentralization index is based on government spending as a percentage of GDP, the tax rates in a province, and the amount of government administrative regulations for each province in 2000. A higher index suggests less government involvement.
<b>LEI</b>	The legal environment index measured by the number of lawyers as a percentage of the population, the efficiency of the local courts and protection of property rights, for each province or provincial level region in 2000.
<b>EstYear</b>	For VC-IPO events subsample, EstYear is measured by the number of years since a VC firm's establishment.
<b>Industry<sub><i>i</i></sub></b>	Industry dummy variables created according the primary industry classification letter of the CBRC's industry classification system. There are 13 industry classifications: A Agriculture, forestry, livestock farming, fishery B Mining C Manufacturing D Electric power, gas and water production and supply E Construction F Transport and storage G Information Technology H Wholesale and retail trade I Finance and insurance J Real estate K Social service L Communication and Cultural Industry M Comprehensive

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