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Short-run underpricing and its characteristics in Chinese initial public offering (IPO) markets

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Abstract

Using data on 668 new issues from 1 January 1996 to 31 December 2000 in China, we find that the average underpricing of Chinese IPOs[1] is 129.16 percent. We employ cross-sectional analysis and find that Chinese IPO underpricing is primarily explained by the inequality of supply and demand caused by the quota system and the high proportion of uninformed individual investors. The results also show that during the privatization, the government does not send signals on the quality of the issuers by underpricing, but it does capture the market opportunities to time IPOs to get the best market feedback on offerings.

JEL classification: G32; G15; P21

Keywords: Initial public offerings; Underpricing; China

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[1] This paper studies all IPOs listed in China from 1996 to 2000. In China, over 90% of IPOs are partial privatisation IPOs (PIPOs). In the paper, we use the term IPOs instead of PIPOs for our sample.

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1. Introduction

China's stock markets opened at the beginning of the 1990s[2] and are part of the economic reform that is transforming the economy from a centrally planned system to a socialist-market system. In a socialist-market system, the Chinese government tries to use the market to develop the economy, while still keeping some socialist characteristics. The newness of the markets, the relative lack of investor knowledge and distinct institutional features make China a unique environment in which to conduct research on initial public offering (IPO) markets, and the findings from studies in the USA, UK and elsewhere cannot be automatically extrapolated to China.

IPO underpricing—a large positive gain of a new issue immediately after flotation—is a recurring phenomenon in many markets, and has been noted as one of the 10 puzzles in financial research (Brealey and Myers, 2002). A common perception is that the underpricing of IPOs is a challenge to market efficiency, and that may hurt emerging firms trying to raise capital for expansion (Loughran et al., 1994). A number of theories of IPO underpricing have been put forward and tested against the data of various stock markets. Ibbotson et al. (1988) found that the average first-day IPO return was 16.3 percent in the years 1960–1987 in the US market. Levis (1990) studied a sample of 123 offers for sale on the London Stock Exchange for the period 1985–1988 and found that on average the market-adjusted discount was 8.6 percent on the first day of trading. Loughran et al. (1994) also confirmed that this IPO underpricing phenomenon exists in 25 countries studied by them, with higher IPO underpricing in developing markets than in developed markets.

Research also suggests that, on average, privatization initial public offerings (PIPOs) offer a higher initial premium than their private sector counterparts. Menyah and Paudyal (1996) found that UK PIPOs offered an average initial premium of 38.7 percent as compared to 3.48 percent for private sector issues. Paudyal et al. (1998) confirmed that Malaysian PIPOs offered significantly higher initial returns (103.5 percent) than other IPOs (52.5 percent) by comparing 18 PIPOs with 77 private sector IPOs using data from KLSE main board for the period January 1984 to September 1995.

Although underpricing has been found in both private and privatised IPOs in many countries, in recent years attention has been focussed on China. Some of the previous studies have noted that Chinese IPOs enjoy the world's highest initial returns at around 200–300 percent (Datar and Mao, 1997; Mok and Hui, 1998; Chan et al., 2004). This needs to be explained. Part of the explanation relates to the data and methodologies used in the Chinese studies. Most use pre-1996 data. However, at that time the market was still very immature and volatile. Due to data constraints, some of the initial returns are not market-adjusted. Furthermore, very rarely do they mention the special institutional features—the quota system and the tremendously high proportion of individual investors in the Chinese markets. We plan to address all these issues. The contribution of this paper is to use more

[2] There are two stock exchanges in China, the Shanghai Stock Exchange, founded in 1990, and the Shenzhen Stock Exchange, founded in 1991.

updated data and to present a deeper understanding of the special features in the Chinese IPO market to study and explain the short-run underpricing of Chinese IPOs.

In this paper, first, we discuss the features of China's emerging stock markets and certain unique "Chinese Characteristics" that may affect the underpricing of IPOs. Second, we estimate the extent of the underpricing of 668 A-share IPOs that went public on the Shanghai and Shenzhen Stock Exchanges from 1 January 1996 to 31 December 2000. We find that the average market-adjusted initial returns on the 1st, 5th, 10th, and 20th trading days for the whole sample are 129.16, 126.93, 126.93 and 124.95 percent, which are significantly positive at the 1 percent level, and find that there is no significant difference between the initial returns of the two stock exchanges in China. Third, we use the inequality of demand and supply, the Information Asymmetry Hypothesis and the Signalling Hypothesis to explain why IPO underpricing in China is so severe and what factors make a difference to the degree of underpricing among different companies. We find evidence that the high demand for IPOs caused by the quota system is an important determinant for the high initial returns. We find the Information Asymmetry Hypothesis can explain IPO underpricing in China, while the Signalling Hypothesis does not fit well. In terms of government behaviour, the government does not send signals to the market on the quality of the issuers by underpricing, but it does capture the market opportunities to time IPOs to get best market feedback on offerings.

The rest of the paper is organized as follows: Section 2 introduces the features of China's stock markets and IPO underpricing; Section 3 presents the data and the methodology for calculating the short-run returns; Section 4 offers the results on the short-run returns and a comparison with other studies; Section 5 explains the severe underpricing by the inequality of demand and supply, the Information Asymmetry Hypothesis and the Signalling Hypothesis. The results of the cross-sectional analysis are reported in Section 6. The summary and conclusions appear in Section 7.

2. Features of China's stock market and IPO underpricing

The majority of Chinese IPOs are partial privatisations; therefore, they have certain characteristics in common with privatisation IPOs. In practice, since the government owns all the SOEs, the main beneficiary of privatisations is usually the government rather than the companies themselves, and privatisation IPOs raise many additional concerns, since the government often attempts to achieve multiple objectives via PIPOs. However, the means of going public for Chinese IPOs are more similar to private IPOs, since Chinese IPOs are primary rather than secondary offerings; the capital raised from IPOs flows to the companies rather than the government as the original owner; and the government generally does not give up control rights after IPOs (Huang and Song, 2001). In this case, the behaviour of Chinese IPOs should be a mixture of those of private and privatised IPOs. In addition, as the Chinese stock markets are only 14 years old and they exist under a socialist-market framework, the government plays a crucial role in monitoring and regulating the stock markets. The following characteristics distinguish Chinese IPO markets from those in other countries.

The China Securities Regulatory Commission (CSRC) determines an annual quota[3] for new shares to be issued each year. The quota is allocated among the provinces and state-industrial commissions according to criteria that support regional or industrial development goals, in consideration of the balance among provinces and industries. In theory, business strength is the criterion for enterprises to be chosen. Seasoned equity offerings (SEOs[4]) also need permission from the CSRC.

Until 2000,[5] most offering prices were calculated according to a formula set by the CSRC. The formula is made up of two parts, one is earnings per share, and the other is the P/E ratio. Earnings per share come from companies' annual reports, and the CSRC itself sets P/E ratios for companies. The offering price is chosen by the CSRC days, sometimes months, before market trading starts, and in most cases there is little feedback through market demand to allow adjustment in the offering price (Su and Fleisher, 1999). The CSRC also takes charge of the timing of IPOs according to the market situation and capacity.

When going public, shares not retained by the government, other enterprises or employees are sold to outside investors. In China, stocks are classified by ownership into eight categories: non-negotiable stocks: state-owned stocks, founder stocks (local), founder stocks (foreign), legal-entity stocks, employee stocks;[6] negotiable stocks: A-shares, B-shares, and H-shares (shares of Chinese companies traded in the Hong Kong Stock Exchange). According to the CSRC statistics, at the end of 2000, negotiable (tradable) shares comprised around 35.7 percent of the total shares.

The two types of stocks tradable on the two exchanges in China are "A" shares and "B" shares. The A- and B-share markets are segmented. The "A" shares, traded in domestic currency (Yuan), are exclusively for domestic Chinese investors. The B-shares, traded in US dollars on the Shanghai Stock Exchange and in Hong Kong dollars on the Shenzhen Stock Exchange, are exclusively for foreign investors and allocated primarily by private placements.[7] One company can issue both A- and B-shares. A- and B-shares have equal voting power and dividend rights, although the price of A-shares is usually much higher than that of B-shares.[8] The substantial price difference can be explained by the information problems faced by foreign investors. As Chen et al. (1999) report, overseas investors face language barriers, must cope with different accounting standards, and find it hard to get reliable information about the local economy and companies. Since the B-share market is

[3] This quota system started to change into the verification system in 2001, i.e. investment banks are able to recommend companies to the CSRC for listing. However, it is still the CSRC that makes the final decision of firms going public.

[4] All the SEOs in the paper refer to SEOs to the existing shareholders.

[5] Our sample period ends at the end of 2000.

[6] Companies that went public before November 1998 could issue 10% of the shares out of the total public offerings to their employees. The employee stocks could start trading 6 months after the shares were listed on the stock exchange.

[7] Since February 2001, domestic Chinese have been able to invest in B-shares in foreign currencies.

[8] For example, at the end of 1996, the first 10 B-share companies that also issued A-shares on the Shanghai Stock Exchange had an average closing price of RMB 7.59 for their A-shares, but US$ 0.289 (about RMB 2.4) for their B-shares.

very small and illiquid in comparison with the A-share market,[9] most studies of the Chinese stock markets are based on the A-share market.

As a result of the serious imbalance of supply and demand, the A-shares are distributed through a lottery system, in which there is a fixed price offer with investors bidding for quantities. The odds of winning the lottery depend on how much money joins the lottery. Usually, every 1000 shares purchased, are given a number. Winners are selected via a random number generating scheme and are entitled to purchase one thousand shares at the issue price by winning one number (Gu, 2000). As the demand for the new shares far exceeds the supply, only a small percentage of the subscriptions win the lottery.

It is also noteworthy that SEOs are very frequently observed among Chinese issuers and that SEOs account for a substantial proportion of shares issued. About 91 percent of the Chinese firms that went public before 1 July 1994 issued seasoned equities before 1 January 1996 (Su and Fleisher, 1999), because IPOs and SEOs are the most "cost-efficient" way for Chinese enterprises to raise capital.

In November 2000, the CSRC announced that the Shanghai and Shenzhen boards would be merged, in a move towards a unified stock market in China. This reorganisation includes making the Shanghai Stock Exchange the main board for blue chips and creating a single listing board for high-tech companies in Shenzhen, similar to the NASDAQ board.[10]

3. Data and methodology

The sample used in this study comprises 668 companies, which issued and listed their A-shares on either the Shanghai Stock Exchange or the Shenzhen Stock Exchange from 1 January 1996 to 31 December 2000. The primary source of data is the GTA China's IPOs Database. The prices of the new issues at their launch and their respective prices at the end of 1st, 5th, 10th and 20th day of trading are recorded. The daily prices are obtained from the GTA China's Trading Database.

A total of 750 companies[11] listed A-shares on the Chinese markets during the sample period, with an average of 150 IPOs per year (Table 1). It can be seen that IPO activity peaked in 1997 with a record of 206 IPOs being brought to the markets, and then went down to its lowest of 98 IPOs in the year 1999. The monthly figures reveal a seasonal pattern with the lowest number of listings coming in February since, in China, the markets

[9] Until the end of 1996, the number of firms listing B-shares on the two exchanges was less than one-fourth of the number of firms listing A-shares. B-shares amounted to less than 3% of the A-shares' market capitalisation and 2% of the A-shares' annual trading value.

[10] Since November 2000, all IPOs have only been listed on the Shanghai Stock Exchange. As at July 2004, the Chinese NASDAQ board has not been established, while a Small and Medium Enterprises Board took off in Shenzhen in June 2004. From then on, big companies will be listed on the Shanghai Stock Exchange, while small and medium companies will be listed on the Shenzhen Stock Exchange.

[11] A total of 82 IPOs are excluded from the sample for the study of underpricing as their issue dates are unknown, the value of the index on the issue date is missing or the first day's trading prices are not available. The reason for this is that the time between issuing and listing in China is much longer (a few months) than that in other developed countries (a few days). Since some firms issued IPOs more than one year before the listing, some information on issuing is missing.

Table 1
IPOs in the Chinese markets by the year of listing (1996–2000)

Year	All IPOs			Sample			Sample coverage		
	Total (No.)	SH* (No.)	SZ* (No.)	Total (No.)	SH (No.)	SZ (No.)	Total (percent)	SH (percent)	SZ (percent)
1996	203	103	100	155	77	78	76.36	74.76	78.00
1997	206	85	121	185	79	106	89.81	92.94	87.60
1998	106	53	53	95	50	45	89.62	94.34	84.91
1999	98	46	52	98	46	52	100.00	100.0	100.0
2001	137	88	49	135	86	49	98.54	97.73	100.0
Total	750	375	375	668	338	330	89.07	90.13	88.00
Mean	150.00	75.00	75.00	133.60	67.60	66.00			
S.D.	51.85	24.38	33.28	38.27	18.26	25.84			

There are 750 companies that listed A-shares on the Chinese markets from 1996 to 2000. From the yearly listing numbers, it can be seen that IPO activity peaked in 1997 with a record of 206 firms going public, and then went down to its lowest 98 in 1999. The numbers of listings on the Shanghai and Shenzhen Stock Exchanges are very similar. For the study of short-run underpricing, the sample coverage is 89.07 percent out of the total listing, with higher coverage in the recent years. *Note*: *SH stands for the Shanghai Stock Exchange and SZ stands for the Shenzhen Stock Exchange.

are closed during the two-week Spring Festival Holidays in February (Table 2). The number of average monthly listings then starts to increase dramatically and reaches its peak in June.

When we compare the annual and average monthly issuing numbers (Tables 1 and 2) and the performance and returns of the market indices (Figs. 1–4), we can see a close relationship between the index performance and issuing numbers. In 1996 and 1997, the market index grew rapidly from 554 to 1258 in Shanghai and from 112 to 406 in Shenzhen, since the Chinese government decided to develop the stock markets and reinforce their capital raising function at the end of 1995. During this period of time, IPO activity stayed very high with 203 issues in 1996 and 206 in 1997. In 1998, due to the Asian Financial Crisis, the CSRC enhanced risk control in the stock markets to avoid a market crash. The market index remained quite stable in 1998, and although it increased a lot in the first half of 1999, it fell sharply from July 1999 to December 1999. Comparatively speaking, the number of IPOs fell in 1998 and reached its lowest—98, in 1999. After two years of adjustment, the market started to grow again. The market index began to increase rapidly in January 2000 and the number of IPOs went up to 137 in that year. Turning to the average monthly issues, Table 2 shows that the number of issues in the 2nd quarter is higher than those in the three other quarters, and it keeps growing within the 2nd quarter. Figs. 2 and 4 show that index returns are higher during these months.

Table 1 shows that the total number of listings in Shanghai is the same as that in Shenzhen-375, but the annual figures show that its standard deviation is 24.4, in comparison with 33.3 in Shenzhen. The two stock exchanges are both non-profit membership organisations, rather than limited liability companies. When a company gets permission from the CSRC to issue stocks, it can choose to be listed on either stock exchange. Both stock exchanges are actually like two branches under the supervision of the CSRC. Only in the year 2000, was there a big difference between the number of IPOs in Shanghai and Shenzhen. Eighty-eight companies

Table 2
IPOs in the Chinese markets by the month of listing (1996–2000)

Month	All IPOs			Sample			Sample coverage		
	Total (No.)	SH* (No.)	SZ* (No.)	Total (No.)	SH (No.)	SZ (No.)	Total (percent)	SH (percent)	SZ (percent)
1	45	17	28	44	16	28	97.78	94.12	100.00
2	25	10	15	17	7	10	68.00	70.00	66.67
3	39	17	22	29	14	15	74.36	82.35	68.18
4	59	27	32	55	24	31	93.22	88.89	96.88
5	68	40	28	58	34	24	85.29	85.00	85.71
6	121	57	64	110	52	58	90.91	91.23	90.63
7	86	45	41	81	42	39	94.19	93.33	95.12
8	52	26	26	49	23	26	94.23	88.46	100.00
9	57	29	28	55	27	28	96.49	93.10	100.00
10	47	25	22	41	21	20	87.23	84.00	90.91
11	73	38	35	63	36	27	86.30	94.74	77.14
12	78	44	34	66	42	24	84.62	95.46	70.59
Total	750	375	375	668	338	330	89.07	90.13	88.00
Mean	62.50	31.25	31.25	55.67	28.17	27.50			
S.D.	25.25	13.77	12.37	24.05	13.28	12.14			

The monthly listing figures from 1996 to 2000 reveal a seasonal pattern with the lowest number of listings coming in February, since in China, the markets are closed during the two-week Spring Festival Holidays in February. The number of average monthly listing then starts to increase dramatically and reaches its peak in June. *Note*: *SH stands for the Shanghai Stock Exchange and SZ stands for the Shenzhen Stock Exchange.

were listed in Shanghai, while only 49 were listed in Shenzhen. This is because, in 2000, the CSRC prepared to set up the "Chinese NASDAQ"—a market for high-tech companies on the Shenzhen Stock Exchange, and to transfer the main board to the Shanghai Stock Exchange. The shares originally issued in Shenzhen would continue to be traded there, but all IPOs in the main market would be listed on the Shanghai Stock Exchange.

Consistent with previous studies, we employ the methodology used by Aggarwal et al. (1993) to measure the performance for each IPO and for groups of IPOs. The methodology is described as follows.

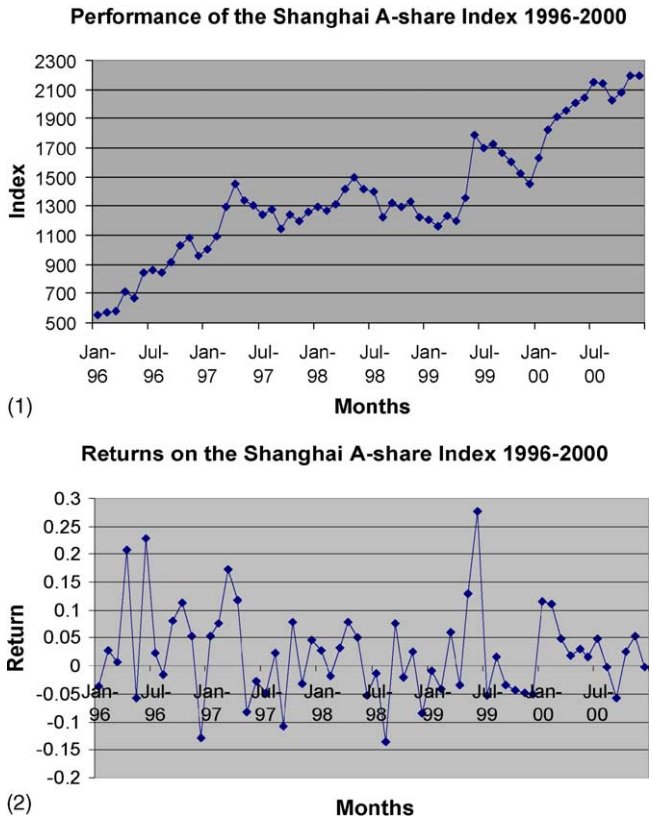
The return of stock "*i*" at the end of the first trading day is calculated as:

$$R_{i1} = \left(\frac{P_{i1}}{P_{i0}}\right) - 1 \tag{1}$$

where P_{i1} is the closing price of the stock "*i*" on the first trading day, and P_{i0} is the offering price and R_{i1} is the total first-day return on the stock.

As in other studies of the Chinese stock markets, we use the Shanghai A-share Index and the Shenzhen A-share Index as corresponding benchmarks. They are capitalisation-weighted indices, using all listed A-shares in the stock exchange.[12]

[12] Shanghai A-share Index and Shenzhen A-share index are the indices consisting of all A-share stocks in these two markets. Since the correlations among different indices and sectors are very high in China (Liu and Li, 2000), most studies choose Shanghai A-share Index and Shenzhen A-share index as the benchmarks, rather than divide the market into small groups.



Figs. 1 and 2. Performance and returns of the Shanghai A-share Index (1996–2000): Shanghai A-share Index increased dramatically from 1996 to 2000. In 1996 and early 1997, the market index grew rapidly, since the Chinese government decided to develop the stock markets and reinforce their capital raising function at the end of 1995. The index remained quite unchanged from late 1997 to 1998 due to some negative impact from the Asian Financial Crisis. After one and a half years' adjustment, the market index started to grow quickly again in 2000.

The return on the market index for the corresponding time period is:

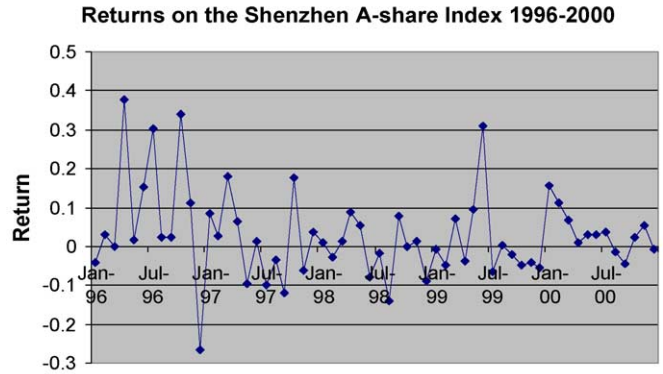
$$R_{m1} = \left(\frac{P_{m1}}{P_{m0}}\right) - 1 \tag{2}$$

where P_{m1} is the closing market index value on first trading day and P_{m0} the closing market index value on the offering day of the appropriate stock, while R_{m1} the first day's comparable market return.

Using these two returns, the market-adjusted abnormal return for each IPO on the first trading day is computed as:

$$\text{MAAR}_{i1} = 100 \times \left\{\left[\frac{1 + R_{i1}}{1 + R_{m1}}\right] - 1\right\} \tag{3}$$

(3)



(4)

Figs. 3 and 4. Performance and Returns of the Shenzhen A-share Index (1996–2000): Shenzhen A-share Index increased dramatically from 1996 to 2000. In 1996 and early 1997, the market index grew rapidly since the Chinese government decided to develop the stock markets and reinforce their capital raising function at the end of 1995. The index remained quite unchanged from late 1997 to 1998 due to some negative impact from the Asian Financial Crisis. After one and a half years' adjustment, the market index started to grow quickly again in 2000.

The value of MAAR_{it}, i.e. the market-adjusted abnormal return for IPO "i" on the tth trading day can be calculated in an analogous manner.

When MAAR_{i1} is interpreted as an abnormal return, the assumption is that the systematic risk of the IPOs is the same as that of the market index. A number of studies (Ibbotson, 1975; Affleck-Graves et al., 1996) demonstrate that the average beta of newly listed firms is higher than one. Thus, the abnormal return MAAR_{i1} calculated in (3) provides a somehow upwardly biased estimate on the initial performance of the IPO relative to the market.

The wealth relative is used to measure the performance for a group of IPOs, defined as:

$$\mathrm{WR}_1 = \frac{1 + (1/N)\sum_{i=1}^{N} R_{i1}}{1 + (1/N)\sum_{m=1}^{N} R_{m1}} \tag{4}$$

where WR_1 is the wealth relative for the first trading day and N is the total number of IPOs in the sample. A wealth relative above one implies that the IPOs outperform the market in that period. A wealth relative below one indicates under-performance.

The sample mean abnormal return for the first trading day, $\overline{MAAR_1}$, is calculated as:

$$\overline{MAAR_1} = \frac{1}{N}\sum_{i=1}^{N} MAAR_{i1} \tag{5}$$

To test the hypothesis that $\overline{MAAR_1}$ equals zero, we compute the associated t-statistic:

$$t = \frac{\overline{MAAR_1}}{S/\sqrt{N}} \tag{6}$$

where S is the standard deviation of $MAAR_{i1}$ across the companies.

Note that WR_t and $\overline{MAAR_t}$, respectively, the wealth relative and sample mean abnormal return for the tth trading day are computed in an analogous manner. These measures have been used by Ritter (1991), Levis (1993) and Ljungqvist (1997).

4. Short-run underpricing

We now proceed to apply the methodology outlined above to estimate the returns on the IPOs in our sample. We compute $\overline{MAAR_t}$, WR_t and the associated t-statistic. We choose to look for underpricing at the end of the first trading day ($t = 1$). To try to capture the trend of the short-run returns, we also examine the situation at the end of the fifth, tenth and twentieth trading days ($t = 5$, 10, 20).

The results of our analysis using the corresponding Shanghai and Shenzhen A-share Index as the market benchmarks are presented in Table 3. We report our results for the entire sample of 668 IPOs and also separately for IPOs on the Shanghai and Shenzhen Stock Exchanges.

The average market-adjusted initial return of 668 IPOs on the first trading day is 129.16 percent for the entire sample and is highly statistically significant at the 1 percent level. The wealth relative for the first day's trading is 2.28, which shows that on average the IPOs outperform the market from 1996 to 2000. The average initial abnormal returns from the 1st trading day to the 5th, 10th and 20th trading days slightly decrease from 129.16 percent to 126.93, 126.93 and 124.95 percent, respectively, with the wealth relative decreasing from 2.28 to 2.26, 2.25 and 2.22.

When comparing the market-adjusted initial returns on the Shanghai and Shenzhen Stock Exchanges (Table 3, Fig. 5), we can see that the returns on the Shenzhen Stock Exchange for the 1st, 5th, 10th, and 20th trading days are all higher than those on the Shanghai Stock Exchange, but so is the standard deviation. A t-test for the equality of means shows that the excess short-run returns on these two stock exchanges are not significantly different from each other (Table 4). The Shanghai Stock Exchange and the Shenzhen Stock Exchange are both non-profit membership organisations under the supervision of the CSRC. After getting permission to go public, issuers can choose to be listed on the either stock exchange. Since these two stock exchanges offer the same to listed companies except the location and listed

Table 3
Market-adjusted returns on IPOs (1996–2000)

	Full sample ($n = 668$)	IPOs in Shanghai ($n = 338$)	IPOs in Shenzhen ($n = 330$)
1st Trading day			
$\overline{MAAR_1}$ (percent)	129.16	127.70	130.66
Standard deviation	81.24	75.08	87.18
t-Statistic	41.09	31.27	27.22
Median (percent)	118.66	117.86	176.60
WR_1	2.28	2.27	2.30
5th Trading day			
$\overline{MAAR_5}$ (percent)	126.93	124.38	129.54
Standard deviation	80.06	73.70	86.13
t-Statistic	40.98	31.03	27.32
Median (percent)	114.8	113.91	152.71
WR_5	2.26	2.24	2.28
10th Trading day			
$\overline{MAAR_{10}}$ (percent)	126.93	125.90	128.00
Standard deviation	82.94	76.98	88.73
t-Statistic	39.56	30.07	26.21
Median (percent)	113.58	113.42	161.44
WR_{10}	2.25	2.24	2.26
20th Trading day			
$\overline{MAAR_{20}}$ (percent)	124.95	124.33	125.59
Standard deviation	83.88	77.86	89.75
t-Statistic	38.50	29.36	25.42
Median (percent)	110.86	112.44	155.91
WR_{20}	2.22	2.22	2.21

The average market-adjusted initial returns of 668 IPOs on the 1st, 5th, 10th, and 20th trading days are 129.16, 126.93, 126.93 and 124.95 percent, with the wealth relative of 2.28, 2.26, 2.25, 2.22, which shows that on average the IPOs significantly outperformed the market from 1996 to 2000.

companies that go into these two stock exchanges are random, it is understandable that there is not much difference between the initial returns of IPOs in these two stock exchanges.

In comparison with the average initial returns in other studies of the Chinese IPO markets, which are around 200–300 percent (Datar and Mao, 1997; Gu, 2000), the returns obtained here are much lower. There are three reasons for this difference. First, the time periods of other research are earlier than ours, most being before 1996. Before 1996 the Chinese IPO markets were very immature and volatile, and the supply of IPOs was very limited. With the huge demand, the initial returns were tremendously high. Liu and Li (2000) document that the first day's initial and abnormal returns of IPOs in China were much higher in 1991, 1992 and 1993 than those in other years. In addition, with less experience in pricing IPOs in the early years, the CSRC tended to underprice to a greater degree in order to encourage the growth of the primary market. Chan et al. (2004) mention that, up to 1998, the P/E ratio that the CSRC set was capped around 15, while after 1999, the P/E ratio was increased over 20. The increased P/E ratio would decrease the underpricing of IPOs in China. Therefore, the average underpricing they find based on IPOs listed from 1993 to 1998 is 175.4 percent, while the underpricing in our study focused on IPOs from 1996 to 2000 is 129.16 percent.

Table 4
Testing for differences in the market-adjusted returns on IPOs of the Shanghai and Shenzhen Stock Exchanges (1996–2000)

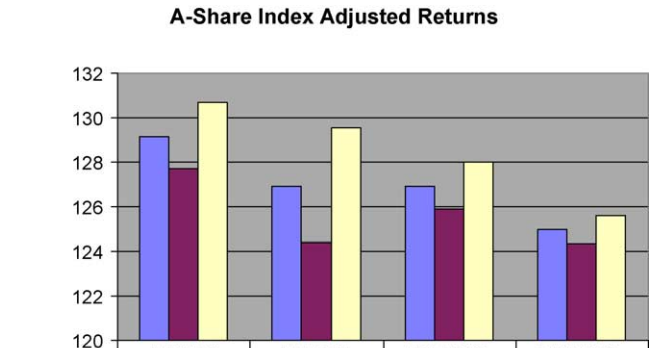
	Listing in Shanghai ($n = 338$)	Listing in Shenzhen ($n = 330$)
1st Trading day		
$\overline{MAAR_1}$ (percent)	127.70	130.66
t-Statistic*	−0.469	
5th Trading day		
$\overline{MAAR_5}$ (percent)	124.38	129.54
t-Statistic	−0.831	
10th Trading day		
$\overline{MAAR_{10}}$ (percent)	125.90	128.00
t-Statistic	−0.327	
20th Trading day		
$\overline{MAAR_{20}}$ (percent)	124.33	125.59
t-Statistic	−0.194	

When comparing the average market-adjusted initial returns on the Shanghai and Shenzhen Stock Exchanges, we can see that the returns on the Shenzhen Stock Exchange for the 1st, 5th, 10th, and 20th trading days are all higher than those on the Shanghai Stock Exchange, but so is the standard deviation. The *t*-test for the equality of means shows that the excess short-run returns on these two stock exchanges are not significantly different from each other. *Note*: *Difference-of-means *t*-statistics.

Third, due to the shortage of data, some researchers calculate the initial returns without consideration of the growth of the whole market, while in our study the initial returns are market-adjusted. Since we can see from Figs. 1–4 that the market index grew dramatically from 1996 to 2000, and the average time difference of issuing and listing in China is much longer (a few months) than that in other countries (a few days), unadjusted initial returns that do not consider market impact would be higher than real returns, while only market-adjusted returns can give us accurate pictures of the degree of underpricing in the Chinese IPO markets.

5. Explaining the short-run underpricing

As for the reasons for the abnormally high degree of underpricing of IPOs in China, one potentially important factor is the inequality between the supply of and demand for IPOs, which is mainly caused by the quota system. In our study, we hypothesise that the initial returns of IPOs are a function of the demand and define the odds of winning a lottery as the proxy for the demand. In our opinion, information asymmetry is another important factor that causes the severe underpricing of IPOs in the Chinese markets. Moreover, since the vast majority of IPOs in China are partial privatizations, and the CSRC not only prices IPOs, but also times IPOs, looking at government behaviour in the Chinese IPO markets and testing whether the government tries to give the markets certain signals are also meaningful in this case.



	MAAR1	MAAR5	MAAR10	MAAR20
All	129.16	126.93	126.93	124.95
Shanghai	127.7	124.38	125.9	124.33
Shenzhen	130.66	129.54	128	125.59

Fig. 5. Cross-sectional A-share market-adjusted returns on IPOs (1996–2000, percent figures): the average market-adjusted initial returns of 668 IPOs (1996–2000) from the 1st trading day to the 5th, 10th, and 20th trading days slightly decrease from 129.16 to 126.93, 126.93 and 124.95 percent, which, however, are all significantly positively different from zero. The average market-adjusted initial returns on the Shenzhen Stock Exchange for the 1st, 5th, 10th, and 20th trading days are all higher than those on the Shanghai Stock Exchange.

5.1. Inequality of demand and supply and underpricing

For the Chinese government, the stock market is an important channel to raise capital for SOEs. To keep it growing and to raise more money in the future, the government has to control the "supply", that is the quota of new issues. In privatisation, the success of any IPO not only affects the individual company's reputation, but also the government's credibility. The government cannot afford any possible failure in the IPO markets. That is why the government has to make the supply much less than the demand, even at the cost of underpricing.

Rock's condition of rationing (Rock, 1986) also explains this phenomenon. Rationing will result if demand is unexpectedly strong. Rationing in itself does not lead to underpricing, but to keep uninformed investors in the market requires an additional premium—the average underpricing of all IPOs. In the Chinese stock market, more than 90 percent of investors are individual investors who do not have access to sufficient information on SOEs or do not have sufficient knowledge or experience of investment. To keep these uninformed individual investors in the market, the government has to control the supply, which causes underpricing of IPOs.

Besides the controlled supply of IPOs by the government, underpricing is also caused by the high demand due to the lack of attractive investment opportunities. In China, apart from stocks, the only investment instruments available to investors are bank deposits and Treasury Bonds. In order to stimulate consumption, the Chinese government reduced the interest rate five times during the sample period, which made investors look for investment opportunities other than bank deposits.

Chau et al. (1999) and Gu (2000) both mention that the inequality of supply and demand causes the high initial returns of IPOs in the Chinese market. However, neither of them tested this hypothesis using market data. In our research, we use the odds of winning the lottery to quantify the demand for IPOs, since it shows how much money has been invested to buy the newly issued shares and the chance of getting the shares. The lower are the odds of winning a lottery, the higher is demand for IPOs, and thus, the higher are the initial returns.

Hypothesis 1. H_0: There is no relationship between the odds of winning the lottery and the market-adjusted initial returns of IPOs.
H_1: There is a negative relationship between the odds of winning the lottery and the market-adjusted initial returns of IPOs.

5.2. Information asymmetry and underpricing

Myers and Majluf (1984) argue that when managers have superior information to investors, a share issue provides negative information to investors. In this case, to attract investors, managers will underprice IPOs. In China, the issuing companies are mainly SOEs. To keep the country socialist, the government must own a certain number of shares following IPOs. Until 2000, the government, through the CSRC, also took the responsibility to price IPOs. The majority of IPO investors, however, are individuals, who have little information about SOEs. Therefore, there are two parties involved in the event, one is the government that actually owns the companies, fully before and partially after the IPOs and prices all the IPOs, and the other is outside investors who lack either investment experience or knowledge of the quality of SOEs. To issue IPOs successfully, the government has to underprice IPOs and leave sufficient money on the table to further attract investors and develop the IPO markets.

To test this hypothesis, we include the percentage of shares owned by the government and the government-owned companies at issuing as the explanatory variable. The fewer the shares owned by the government after issuing, i.e. the more shares sold to the outside investors, the higher would be the underpricing of IPOs.

Hypothesis 2. H_0: There is no relationship between the percentage of shares owned by the government and government-owned companies at issuing and the market-adjusted initial returns of IPOs.
H_1: There is a negative relationship between the percentage of shares owned by the government and government-owned companies at issuing and the market-adjusted initial returns of IPOs.

Beatty and Ritter (1986) extend Rock's model and show that the expected underpricing is an increasing function of the uncertainty about the market price of an IPO. The theory implies that the risk of smaller firms is higher than that of larger firms, and hence they should experience higher market-adjusted initial returns. In our study, we use the offering size as the proxy. When looking at the market performance of IPOs, we think offering size makes more sense, since the Chinese stock markets are not well regulated, and insider trading and

price manipulation are rife. The size of the offering will directly affect the feasibility of price control of a certain stock and the degree of the speculation on this stock. The smaller the floatation size, the easier it is for some institutional investors to control the share price, and thus, the riskier the stocks will be. Therefore, we expect that the lower the market value of the floatation, the higher will be the risk and market-adjusted initial returns.

Hypothesis 3. H_0: There is no relationship between the floatation size of IPOs and the market-adjusted initial returns of IPOs.
H_1: There is a negative relationship between the floatation size of IPOs and the market-adjusted initial returns of IPOs.

Another proxy for the uncertainty of listed companies is whether or not the company produces high-tech products as defined by the Science and Technology Ministry. High-tech products can offer companies much potential for development in the future. However, they also have much risk and uncertainty. In comparison with companies in conservative industries, companies with high-tech features are more risky, and thus, should enjoy higher initial returns on IPOs.

Hypothesis 4. H_0: There is no relationship between the feature of belonging to a high-tech industry and the market-adjusted initial returns of IPOs.
H_1: There is a positive relationship between the feature of belonging to a high-tech industry and the market-adjusted initial returns of IPOs.

5.3. Government behaviour, signalling and underpricing

Most researchers try to study the underpricing of IPOs in China by observing market situations, as in the studies of western IPO markets. However, since the vast majority of IPOs in China are partial privatisation, the government is the real issuer of IPOs and gains the benefit of no longer directly funding these companies. In addition, the CSRC not only prices IPOs, but also times IPOs. Therefore, looking at the government behaviour in the Chinese IPO markets to see whether the government tries to send some signals to the markets is very meaningful in this case.

The Signalling Hypothesis argues that underpricing is a deliberate attempt by the issuer to signal its quality to the market. In Allen and Faulhaber (1989) and Welch (1989), "good" firms try to distinguish themselves from "bad" firms by incurring a cost that less successful firms cannot profitably sustain. This cost is the underpricing of the new issue. Allen and Faulhaber's model implies that the better firms will underprice more, and will have higher earnings. Welch's model explicitly accounts for the possibility of subsequent issuance of equity in the secondary market. In his model, a high-quality firm will be underpriced more and will be rewarded at the time of the seasoned issue.

Following these two models, we test the relationship between the profitability of listed companies, the number of SEOs within two years after IPOs and the market-adjusted initial returns. The number of SEOs is used because data on SEO sizes were not available. If the government tries to give the market some signals of the quality of the companies when pricing IPOs, we expect that firms with higher underpricing should have higher profitability and raise more funds through SEOs after listing.

Hypothesis 5. H_0: There is no relationship between the earnings per share in the listing year and the market-adjusted initial returns of IPOs.
H_1: There is a positive relationship between the earnings per share in the listing year and the market-adjusted initial returns of IPOs.

Hypothesis 6. H_0: There is no relationship between the number of SEOs within two years after IPOs and the market-adjusted initial returns of IPOs.
H_1: There is a positive relationship between the number of SEOs within two years after IPOs and the market-adjusted initial returns of IPOs.

Secondly, as the CSRC is also responsible for timing IPOs, we want to test whether there is any relationship between the degree of underpricing and the numbers of new issues by using year and quarter dummies.

The estimation method is Ordinary Least Squares (OLS). We use the market-adjusted initial return as the dependent variable in the regression analysis.

The empirical models are presented below. The inclusion of the SEO variable necessitates a reduction in the sample size so that IPOs after 1998 are excluded. To enjoy the full benefits of the data set, two versions of the model are tested. Model 1 tests the relationship between the market-adjusted initial returns and all variables except the number of SEOs on all IPOs that went public from 1996 to 2000. While model 2 tests the regression on all independent variables, including the number of SEOs for IPOs that went public from 1996 to 1998.

Model 1:

$$\begin{aligned}\mathrm{MAAR}_{i1} &= \alpha + \beta_1\,\mathrm{Lotrate}_i + \beta_2\,\mathrm{Govshare}_i + \beta_3\,\mathrm{Ln(Offersize)}_i \\ &\quad + \beta_4\,\mathrm{Hightech\,Dummy}_i + \beta_5\,\mathrm{EPS}_i + \beta_6\,\mathrm{Year\,1996}_i + \beta_7\,\mathrm{Year\,1997}_i \\ &\quad + \beta_8\,\mathrm{Year\,1999}_i + \beta_9\,\mathrm{Year\,2000}_i + \beta_{10}\,\mathrm{Quarter\,1}_i + \beta_{11}\,\mathrm{Quarter\,2}_i \\ &\quad + \beta_{12}\,\mathrm{Quarter\,4}_i + u_i\end{aligned}$$

Model 2:

$$\begin{aligned}\mathrm{MAAR}_{i1} &= \alpha + \beta_1\,\mathrm{Lotrate}_i + \beta_2\,\mathrm{Govshare}_i + \beta_3\,\mathrm{Ln(Offersize)}_i \\ &\quad + \beta_4\,\mathrm{Hightech\,Dummy}_i + \beta_5\,\mathrm{EPS}_i + \beta_6\,\mathrm{SEOtimes}_i + \beta_7\,\mathrm{Year\,1996}_i \\ &\quad + \beta_8\,\mathrm{Year\,1997}_i + \beta_9\,\mathrm{Quarter\,1}_i + \beta_{10}\,\mathrm{Quarter\,2}_i \\ &\quad + \beta_{11}\,\mathrm{Quarter\,4}_i + u_i\end{aligned}$$

The independent variables include the odds of winning the lottery (Lotrate), government ownership at issuing (Govshare), offering sizes (Offersize), high-tech features (Hightech Dummy), earnings per share in the listing year (EPS), numbers of SEOs within two years after listing (SEOtimes) and year and quarter dummies. Table 5 gives the description of the variables used in the study. Table 6 reports the characteristic values of the variables in the study.

Table 5
Description of the variables used in the study of short-run underpricing

Dependent variable	Market-adjusted initial returns of IPOs that went public from 1996–2000
Independent variables	
Proxy for demand	
Lotrate	The odds of winning the lottery, the percentage to show the chance of winning the IPO lottery
Proxies to test the Information Asymmetry Hypothesis	
Govshare	Percentage of shares owned by the government and government-owned companies at issuing
Offersize	The number of offering shares multiplied by the offering price
High-tech Dummy	The dummy to show whether a company has certain high-tech products defined by the Science and Technology Ministry; 1-yes, 0-no
Proxies to test the Signalling Hypothesis	
EPS	The earnings per share of the issuer in the year of listing
SEOtimes	The number of SEOs the issuer has within the two years after IPOs (tested only for IPOs from 1996–1998)
Year dummies	These are based on the five different years of the IPOs (1996–2000)
Quarter dummies	These are based on the four different quarters of the IPOs

The two regressions we use to explain the short-run underpricing of IPOs are as follows:

Model 1: $\text{MAAR}_{i1} = \alpha + \beta_1 \text{Lotrate}_i + \beta_2 \text{Govshare}_i + \beta_3 \text{Ln(Offersize)}_i + \beta_4 \text{Hightech Dummy}_i + \beta_5 \text{EPS}_i + \beta_6 \text{Year 1996}_i + \beta_7 \text{Year 1997}_i + \beta_8 \text{Year 1999}_i + \beta_9 \text{Year 2000}_i + \beta_{10} \text{Quarter 1}_i + \beta_{11} \text{Quarter 2}_i + \beta_{12} \text{Quarter 4}_i + u_i$.

Model 2: $\text{MAAR}_{i1} = \alpha + \beta_1 \text{Lotrate}_i + \beta_2 \text{Govshare}_i + \beta_3 \text{Ln(Offersize)}_i + \beta_4 \text{Hightech Dummy}_i + \beta_5 \text{EPS}_i + \beta_6 \text{SEOtimes}_i + \beta_7 \text{Year 1996}_i + \beta_8 \text{Year 1997}_i + \beta_9 \text{Quarter 1}_i + \beta_{10} \text{Quarter 2}_i + \beta_{11} \text{Quarter 4}_i + u_i$.

6. Results of the cross-sectional analysis

The results of the regressions on the market-adjusted initial returns, which have been corrected for heteroskedasticity are presented in Tables 7 and 8. Table 7 shows the estimation results for all variables except the number of SEOs on all IPOs that went public from 1996 to 2000. Table 8 offers the results of the regression on all independent variables, including the number of SEOs for IPOs that went public from 1996 to 1998. The correlations between independent variables are presented in Table 9. These estimates do not reveal any correlations that are sufficiently high, thus warranting concern.

We find an extremely significantly negative relationship between the odds of winning the lottery and the market-adjusted initial returns. When more people want to invest in a certain IPO, the huge demand causes severe underpricing. This also validates the notion that there are bandwagon effects in the Chinese IPO markets, as in Gu (2000). Chinese people are very group-oriented. When they find that others are interested in a certain initial stock issue, they may decide to buy even when there is no favourable information about the issue. In addition, during the lottery process, when more people want to buy the newly issued shares, more funds will be deposited in the lottery accounts. With higher investment and opportunity costs, investors will expect higher initial returns in the secondary market.

Table 6
Characteristics of sample variables

Variable	Mean	Median	Min	Max
Market-adjusted initial returns	1.2916	1.1889	−0.1433	7.4711
Lotrate	0.0197	0.0060	0.0001	0.9540
Govshare	0.7070	0.7143	0.4161	0.8492
Offersize (million Yuan)	372.1792	261.7500	12.2100	7845.860
EPS (Yuan)	0.3809	0.3590	0.1075	1.2098

	0	Once	Twice or more
SEOtimes (for IPOs in 1996–1998)	156	279	0

	Yes	No
High-tech Dummy	114	554

	1996	1997	1998	1999	2000
Year dummy	155	185	95	98	135

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Quarter dummy	90	223	185	170

The dependent variable is the market-adjusted initial returns. The independent variables include the odds of winning the lottery (Lotrate), government ownership at issuing (Govshare), offering sizes (Offersize), earnings per share in the listing year (EPS), numbers of SEOs within two years after listing (SEOtimes), high-tech features (Hightech Dummy) and year and quarter dummies.

The result for the lottery rate variable suggests that null Hypothesis 1 can be rejected and the lottery rate has a negative impact on the underpricing of IPOs.

As for the test of the Information Asymmetry Hypothesis, coefficients on all three variables show significance with the expected signs. Like Jones et al. (1999), we find that for listed firms, the fewer the shares owned by the government and government-owned companies after issuing (as a percentage of ownership of the government and government-owned companies, i.e. the more shares sold to the outside investors), the higher are market-adjusted initial returns. This lends support to our earlier proposition that since the government knows more than investors about the quality of all issuing companies and the level of risk involved in initial issues, to convince and attract investors to invest in the IPO market, the government has to underprice IPOs. This finding permits the rejection of the null of Hypothesis 2.

Regarding the offering size of IPOs, we find a significantly negative relationship with the market-adjusted initial returns, which is in line with Ritter (1984), Beatty (1989), Levis (1993) and Liu and Li (2000). As we expected, the smaller the offering size of the company, the lower will be the marketability of the stock post-floatation, so the higher the risk investors will face. In addition, price manipulation by institutional investors is quite common in China. The smaller the floatation size, the easier it is for institutional investors to control a company's stock price, and thus, higher speculation and uncertainty of the future price performance of the stocks. Therefore, as one of the proxies of risk and uncertainty, the offering size has a negative effect on the initial returns. This result allows the rejection of null Hypothesis 3.

Table 7
Estimating underpricing of IPOs (1996–2000)

Variable	Coefficient	*t*-Statistic	*P*-value	Expected sign
Intercept	4.114	10.586	0.000	
Lotrate	−1.042	−4.117	0.000	−
Govshare	−0.725	−2.257	0.024	−
Ln(Offersize)	−0.445	−8.729	0.000	−
Hightech	0.290	3.670	0.000	+
EPS	−0.158	−0.718	0.473	+
SEOtimes				+
Year 1996	−0.536	−5.181	0.000	
Year 1997	0.210	2.396	0.017	
Year 1999	0.020	0.164	0.870	
Year 2000	0.396	3.937	0.000	
Quarter 1	−0.051	−0.737	0.461	
Quarter 2	0.228	3.450	0.001	
Quarter 4	0.371	5.403	0.000	
R-squared				0.315
Adjusted *R*-squared				0.302
F-statistic				25.080
P-value (*F*-statistic)				0.000

This table presents the estimation results of Model 1: $\text{MAAR}_{i1} = \alpha + \beta_1 \text{Lotrate}_i + \beta_2 \text{Govshare}_i + \beta_3 \text{Ln(Offersize)}_i + \beta_4 \text{Hightech Dummy}_i + \beta_5 \text{EPS}_i + \beta_6 \text{Year 1996}_i + \beta_7 \text{Year 1997}_i + \beta_8 \text{Year 1999}_i + \beta_9 \text{Year 2000}_i + \beta_{10} \text{Quarter 1}_i + \beta_{11} \text{Quarter 2}_i + \beta_{12} \text{Quarter 4}_i + u_i$.

The dependent variable is the market-adjusted initial returns of 668 IPOs listed from 1996 to 2000. The independent variables include the odds of winning the lottery (Lotrate), government ownership at issuing (Govshare), offering sizes (Offersize), high-tech features (Hightech Dummy), earnings per share in the listing year (EPS), and year and quarter dummies. The estimation method is Ordinary Least Squares. The results have been corrected for heteroskedasticity.

The third proxy employed to test the Information Asymmetry Hypothesis is the high-tech feature of the issuers. The estimation result also shows significance with a positive sign on the coefficient as predicted. When an issuer produces some high-tech products, investors expect the company to have good potential for future development and price performance, while at the same time, the risk of the company increases. In this case, to compensate for the extra risk investors take, IPOs with high-tech features would be more underpriced. Thus, the null of Hypothesis 4 can be rejected.

The inequality of demand and supply and the Information Asymmetry Hypothesis work very well to explain the high market-adjusted initial returns in the Chinese IPO markets. However, when we test the Signalling Hypothesis to see whether the government tries to give the markets some signals when pricing IPOs, the results are different from our expectations.

We find that the earnings per share of the listed companies in the listing year are not significantly related to the market-adjusted initial returns of IPOs. In addition, when we run regression 2, including the number of SEOs within two years of IPOs, the coefficient on the number of SEOs is not statistically significant, with the results on all other variables

Table 8
Estimating underpricing of IPOs from 1996 to 1998 with the number of SEOs

Variable	Coefficient	*t*-Statistic	*P*-value	Expected Sign
Intercept	3.845	9.070	0.000	
Lotrate	−1.120	−4.408	0.000	–
Govshare	−0.776	−2.124	0.034	–
Ln(Offersize)	−0.381	−7.851	0.000	–
Hightech	0.164	1.771	0.077	+
EPS	−0.275	−1.129	0.260	+
SEOtimes	−0.056	−0.847	0.397	+
Year 1996	−0.468	−4.293	0.000	
Year 1997	0.215	2.355	0.019	
Year 1999				
Year 2000				
Quarter 1	0.043	0.514	0.608	
Quarter 2	0.326	4.064	0.000	
Quarter 4	0.413	4.951	0.000	
R-squared				0.331
Adjusted *R*-squared				0.313
F-statistic				19.006
P-value (*F*-statistic)				0.000

This table presents the estimation results of Model 2: $\mathrm{MAAR}_{i1} = \alpha + \beta_1\,\mathrm{Lotrate}_i + \beta_2\,\mathrm{Govshare}_i + \beta_3\,\mathrm{Ln(Offersize)}_i + \beta_4\,\mathrm{Hightech\,Dummy}_i + \beta_5\,\mathrm{EPS}_i + \beta_6\,\mathrm{SEOtimes}_i + \beta_7\,\mathrm{Year\,1996}_i + \beta_8\,\mathrm{Year\,1997}_i + \beta_9\,\mathrm{Quarter\,1}_i + \beta_{10}\,\mathrm{Quarter\,2}_i + \beta_{11}\,\mathrm{Quarter\,4}_i + u_i$.

The dependent variable is the market-adjusted initial returns of 435 IPOs listed from 1996 to 1998. The independent variables include the odds of winning the lottery (Lotrate), government ownership at issuing (Govshare), offering sizes (Offersize), high-tech features (Hightech Dummy), earnings per share in the listing year (EPS), numbers of SEOs within two years after listing (SEOtimes) and year and quarter dummies. The estimation method is Ordinary Least Squares. The results have been corrected for heteroskedasticity.

Table 9
Correlation coefficients of the independent variables in the cross-sectional analysis of Underpricing

	Lotrate	Govshare	Offersize
For all samples from 1996 to 2000			
Govshare	0.040		
Offersize	−0.021	−0.026	
EPS	0.125	0.112	0.038

	Lotrate	Govshare	Offersize	EPS
For IPOs from 1996 to 1998				
Govshare	−0.012			
Offersize	−0.010	−0.131		
EPS	0.089	−0.006	0.218	
SEOtimes	0.038	−0.175	−0.087	0.060

The estimates do not reveal any correlations between independent variables that are sufficiently high, thus warranting concern for the regression analysis. The independent variables included in this test are the odds of winning the lottery (Lotrate), government ownership at issuing (Govshare), offering sizes (Offersize), earnings per share in the listing year (EPS) and numbers of SEOs within two years after listing (SEOtimes).

remaining almost the same.[13] As Allen and Faulhaber (1989) and Welch (1989) suggest, if the government wants to give signals of the quality of the issuers, the underpricing should reflect the quality of the firms, and issuers would be rewarded by seasoned issues afterwards. In this case, both variables should be positively related to the market-adjusted initial returns. However, the results are both insignificant. Therefore, we can conclude that when pricing IPOs, the government does not send out signals to the markets to distinguish companies. There may be two reasons for this result. First, it is possible that the government is not very good at pricing IPOs. Even if it tries to signal using prices, it fails. Second, the government is intentionally averaging the prices of IPOs, since all the issuers belong to the government, and it cannot give certain companies preference over others. Therefore, the null of Hypotheses 5 and 6 cannot be rejected.

Among the coefficients of the four year dummies and three quarter dummies, those for years 1996, 1997, 2000, quarters 2 and 4 are significant. When comparing with the degree of underpricing of IPOs and the issuing numbers in these different years and quarters (Tables 1 and 2, Figs. 1–4), we find similar trends to Ritter (1984) that higher initial return periods (the hot issue markets) are followed by a large and increasing volume of IPOs. In 1997, the market index grew rapidly, and the coefficient of the year 1997 dummy is significantly positive, which shows that IPOs in 1997 gain higher initial abnormal returns. In this case, the CSRC delivered 206 IPOs which is the highest issuing number in the sample period. After the market adjustment for the Asian Financial Crisis, the market index started to rally in 2000. With the significantly positive coefficient on the year 2000 dummy, the IPOs in 2000 enjoy higher abnormal returns than the average. The issuing number, therefore went from 98 in 1999 to 137 in 2000. As for the quarter dummies, the coefficients of both quarters 2 and 4 are positively significant. When looking at the quarterly issuing, we can see that the issuing numbers in quarters 2 and 4 are higher than those in quarters 1 and 3 and within quarters 2 and 4, the numbers keep on growing. The higher issuing numbers match with the higher initial returns in quarters 2 and 4. In China, the CSRC is responsible for timing IPOs. We can find from the results that the CSRC did a good job in timing IPOs to catch the windows of opportunity. When there is an increase in the market index and market initial returns on IPOs, the CSRC launches more IPOs to the market, since in the hot issue periods, the market can absorb more issues and the development of the primary market can continue.

7. Conclusions

In this paper, we study the short-run performance of Chinese initial public offerings, using data on 668 new issues on the both Shanghai and Shenzhen Stock Exchanges from 1 January 1996 to 31 December 2000. We find that the average market-adjusted initial returns on the 1st, 5th, 10th, and 20th trading days are 129.16, 126.93, 126.93 and 124.95 percent, and also find that there is little difference between the initial returns of the two stock exchanges in China. Then we use a cross-sectional analysis to explain the extraordinarily

[13] The only difference is that the significance level on “Hightech” variable changes from 1% to 7.7%.

severe underpricing of Chinese IPOs, and find that IPO underpricing is primarily explained by the high demand caused by the quota system and the high proportion of uninformed individual investors. Estimation results show that the Information Asymmetry Hypothesis explains the underpricing in the Chinese IPO markets well, while the Signalling Hypothesis does not. In terms of government behaviour, the government does not send signals to the market on the quality of individual issuers by underpricing, but it does capture the market opportunities to time IPOs in the hot issue periods to get the best market feedback on new offerings.

The results obtained from this study provide important information for prospective investors in new issues to understand better the Chinese IPO markets and the government's policy on privatisation. To maintain the success of privatisation, the government intentionally controls the supply of IPOs, which is the main reason for the severe underpricing. Among different issuing companies, underpricing varies due to the degree of risk investors take. However, investors should be aware that the degree of underpricing is not a good signal of the quality of issuing companies, since almost all companies belong to the government and the government tries not to give preference to particular companies. To further develop the IPO market and its capital raising function, the government will still control the supply of IPOs. Therefore, the underpricing will not disappear. However, as individual investors in China become more knowledgeable and experienced, the degree of underpricing is expected to go down.

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