

Underpricing in China Stock Market: An Investigation of A and H Share

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Abstract

Underpricing of initial public offerings is a very pervasive phenomenon in stock markets all over the world. A and H shares are common stocks with same voting and dividend rights issued by companies incorporate and operate in Mainland China. A share and H share have different target investors and are listed in Mainland China and Hong Kong stock markets respectively. An investigation of underpricing for A and H share, and the underpricing difference between A and H share in China stock market has practical implications to facilitate the integration of China capital market. This paper investigates A and H share listed on both Mainland China and Hong Kong stock market. It is reported that the average underpricing for A share in Shanghai Stock Exchange and Shenzhen Stock Exchange is 100.60% and 70.27% respectively. However, for H share in Hong Kong Stock Exchange, the average underpricing is just 16.08%. Multiple regression approach is used to examine the underpricing phenomenon in China stock market. Empirical results suggest that investors' enthusiasm to invest in new shares, a series of regulatory changes during the selected sample period, ex-ante uncertainty faced by investors and whether a company has sequential SEOs are highly related to IPOs underpricing for A share. As for IPOs underpricing for H share, it is found that investors' enthusiasm to invest in new shares matters but cannot be compared with the scale of Mainland stock market. Moreover, different from Mainland China, the shorter time gap between offering and listing date in Hong Kong stock market has negative effects on underpricing. Relevant results are of economic significance. Further study also finds that investors' enthusiasm to invest in new shares, regulatory changes, ex-ante uncertainty faced by investors, and issuers' incentive to have SEOs are key determinants for underpricing difference between A and H share. The results from this study also provide practical implication to policy-makers in China.

Key Words: IPOs underpricing, A and H share, enthusiasm to invest in new shares, ex-ante uncertainty, seasoned equity offerings

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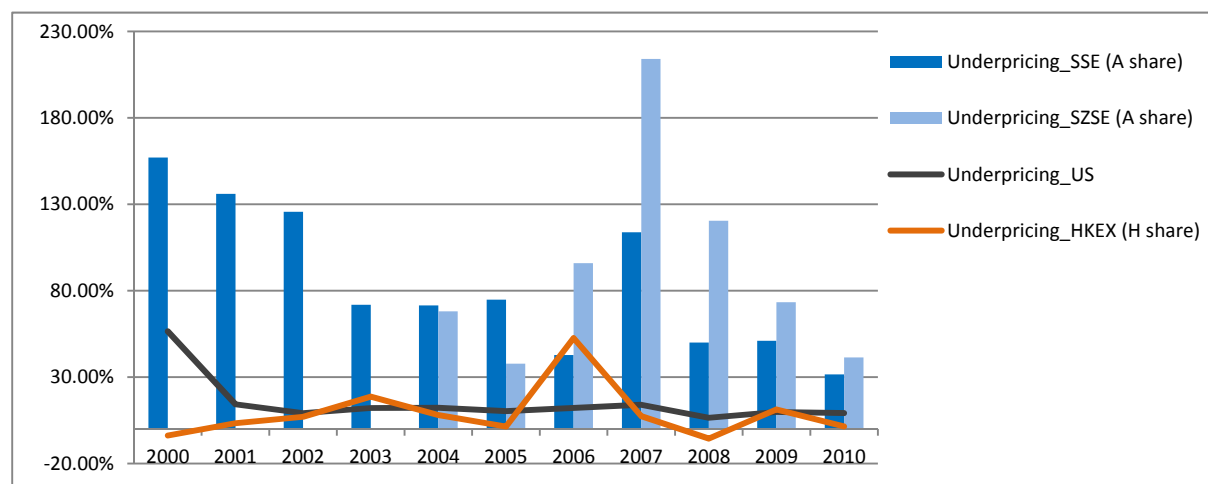
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1. Introduction

Underpricing of initial public offerings (IPOs) is a very pervasive phenomenon in stock markets all over the world. It, together with long run underperformance and hot issue markets, is one of the three puzzles in new issue markets. It is also known as the initial return or first-day return of the IPOs. The study of IPOs underpricing can be traced back to 1960s and 1970s (Reilly and Hatfield (1969); Stoll and Curley (1970); Ibbotson (1975)), and it is documented and studied almost in every country where stock market exists. Previous studies also show that the extent of underpricing varies a lot across countries. For example, Loughran et al. (2011) report that the average underpricing ranges from 4.2% in Russia to 264.5% in Saudi Arabia. Most of previous studies mainly focus on underpricing in single market within a country. However, in this paper, the emphasis is on the underpricing difference between A and H share in China stock market, together with the reasons behind it. To the best of author's knowledge, this paper could be the first one to investigate the underpricing difference between A and H share in China stock market using most recent data. A and H shares are common stocks with same voting and dividend rights issued by companies incorporate and operate in Mainland China. A share and H share have different target investors and are listed in Mainland China and Hong Kong stock markets respectively. This paper refers China stock market as a general term which includes both Mainland stock market and Hong Kong stock market. One direct reason for studying this difference is because both A and H share companies are incorporated and operated in Mainland China, and therefore, in general, should share similar company characteristics. To illustrate intuitively why this paper studies the underpricing difference between A and H share in China stock market, Table 1 provides a big picture of the IPOs underpricing comparison among US, Mainland China and Hong Kong stock markets from 2000 to 2010. It is reported that the equal-weighted average underpricing in US is 23.79%. For Mainland stock markets, namely Shanghai Stock Exchange (SSE) and Shenzhen Stock Exchange (SZSE), the average underpricing are 100.60% and 70.27% (data from 2004 to 2010) respectively. However, H shares in Hong Kong Stock Exchange (HKEX) have a relative normal average underpricing of 16.08%, which is even lower than that of US.

Table 1 IPOs Underpricing Comparison among US, Mainland China (A Share) and Hong Kong (H Share) Stock Markets



Note: US data source: Prof. Jay Ritter, University of Florida, May 2011

Table 1 reveals that the underpricing difference between US and Mainland stock market is huge. However, although A share and H share are all issued by companies incorporated and operated in Mainland China and thus share some similar company characteristics, their underpricing degree differs a lot. It is interesting that H share companies' underpricing degree is similar to that of US. However, by comparing it with A share, they are not in the same scale at all. Therefore there must be some unique reasons for this difference except company characteristics. Why is the underpricing degree so different between A and H shares? What kinds of reasons may explain this difference? This paper tries to investigate the main determinants of underpricing of the two different shares in Mainland and Hong Kong stock market and answer the above questions.

Mainland stock market has only about 20 years' history. The major players in Mainland stock market are domestic institutional and household investors¹. Therefore Mainland stock market is regarded as semi-domestic market. In contrast, Hong Kong stock market has about 120 years' history, and it is different from Mainland stock market that lots of foreign investors are involved in both primary market and secondary market. So Hong Kong stock market is regarded as a relatively mature and semi-foreign market. However, with the rapid economy development of China, a fully developed capital market becomes a very important requirement to facilitate the fast growing economy. An investigation of the underpricing for A

¹ Household investors are defined as private and non-professional investors.

and H share and underpricing difference between A and H share in China stock market provides practical implication for the integration of China capital market. From investors' point of view, it is also helpful to better understand both Mainland and Hong Kong stock markets. For private equity/strategic investors, they also need to think which stock exchange they would like their invested companies to list on and thus should know more about the indirect cost (mainly comprises of underpricing) and benefit of IPO in both markets.

In the following study, there are two major objectives for this paper. First of all, to better understand the underpricing difference between A and H share and possible explanations for this phenomenon, the unique institutional features of China stock market will be described. Secondly, detailed underpricing difference between A and H share will be examined, and hypotheses regarding possible main explanations of underpricing in China stock market will also be discussed. After investigation, empirical results suggest that investors' enthusiasm to invest in new shares, a series of regulatory changes during the selected sample period, ex-ante uncertainty faced by investors and whether a company has sequential SEOs are highly related to IPOs underpricing for A share. As for IPOs underpricing for H share, it is found that investors' enthusiasm to invest in new shares matters but cannot be compared with the scale of Mainland stock market. Moreover, different from Mainland China, the shorter time gap between offering and listing date in Hong Kong stock market has negative effects on underpricing. Relevant results are of economic significance. Further study also finds that investors' enthusiasm to invest in new shares, regulatory changes, ex-ante uncertainty faced by investors, and issuers' incentive to have SEOs are key determinants for underpricing difference between A and H share.

Section 2 provides the unique institutional background of China stock market, including different share types, namely A/B/H share, in Mainland stock market (Shanghai/Shenzhen Stock Exchange) and Hong Kong stock market (Hong Kong Stock Exchange). The regulatory change and a series of reforms are also described. Section 3 derives the hypotheses regarding underpricing phenomenon in China stock market, details about possible reasons for underpricing difference would be explained. Moreover, relevant previous research and theories regarding underpricing phenomenon are also reviewed. Section 4 and section 5 describe the research methodology used to analyze the underpricing phenomenon in China

stock market and the data needed for this topic respectively. In section 6, empirical results and possible explanations are discussed, followed by conclusion and possible future research and limitations in the last two sections of this paper. References and appendix are also provided at the end.

2. Institutional Background of China Stock Market

2.1 China Stock Market Overview

From 1978, the Chinese government launched a long-term economic development program to revitalize national economy. At the heart of that were twin strategies of reform and opening-up the economy (China Capital Markets Development Report (The Report, 2008)). Since then, a series of reforms and regulatory changes have been initiated. Among those reforms, one major step is the establishment of Stock Exchanges in Mainland China. Shanghai Stock Exchange and Shenzhen Stock Exchange were established in 1990 and 1991 respectively. After the establishment of Stock Exchanges, China stock market experiences huge and rapid growth with an increasing number of listed companies and market capitalization during the past decades. By the end of September 2011, there are 2294 companies listed in A share market with a capitalization of RMB 23,159.61 billion. Table 2.1 provides a brief summary of market capitalization of listed companies in China stock market as of September 30, 2011.

Since 2000, China Securities Regulatory Commission (CSRC) had planned to launch a Growth Enterprise Market in SZSE and hence basically ceased IPOs in SZSE with few special exceptions. However, till 2004, considering the situation at that moment, CSRC decided to delay the establishment of a Growth Enterprise Market, instead, a Small & Medium Enterprise (SME) Board was launched. SME Board is to provide a direct financing channel for relatively small and medium sized growing companies with well-defined core business and hi-tech contents. It is a sub group between Main Board and Growth Enterprise Market Board. If it has to be classified, SME Board is more like Main Board. From October 30 2009, a real Growth Enterprise Market called ChiNext was also launched in SZSE. ChiNext, similar to NASDAQ in US, offers a new capital platform tailor-made for the needs

of enterprises engaged in independent innovation and other growing venture enterprises. The difference between ChiNext and the Main Board lies in their mechanisms of financing, investment and risk management for issuers at various stages of development, rather than simply the sizes. Since then China stock market has its current structure that big companies are listed on Main Board of SSE, relatively smaller and new ventures are listed on SME and ChiNext of SZSE. To simply understanding these three Boards, one can see them as different groups with difference regarding size, listing requirements etc.

Table 2.1 Number and Market Capitalization of Listed Companies in China Stock Market

	SZSE_A	SSE_A	HKEX_H
Number of Listed Companies	1,369	925	1,467
-Main Board	484	925	1,301
-Small & Medium Enterprise Board (SZSE)	618		
-ChiNext Board (SZSE)/Growth Enterprise Market (HKEX)	267		166
-H shares ²			164
Market Capitalization	74,967	156,629	162,250
-Main Board	36,706	156,629	161,477
-Small & Medium Enterprise Board (SZSE)	30,455		
-ChiNext Board (SZSE)/Growth Enterprise Market (HKEX)	7,806		773
-H shares			36,014
Weighted Average P/E Ratio			
-Main Board	21.44	14.19	9.02
-Small & Medium Enterprise Board (SZSE)	32.20		
-ChiNext Board (SZSE)/Growth Enterprise Market (HKEX)	40.93		20.23

Note: (1) Market Capitalization is in 100 million RMB for SZSE and SSE, 100 million HKD for HKEX. All numbers are as of September 30 2011.

(2) Exchange rates: 635.49 RMB=100 USD, 779.36 HKD=100 USD at September 30 2011; source: Bank of China.

Data Source: Shenzhen Stock Exchange, Shanghai Stock Exchange, Hong Kong Stock Exchange

In China, there are three types of tradable shares³ listed in stock market, namely A share, B share and H share. The key differences between these share types are the stock exchange company listed on and what kinds of investors can invest in the company's issue. Table 2.2

² Number includes 134 H shares in Main Board and 30 H shares in Growth Enterprise Market. Companies suspended to trade more than 1 year are not included.

³ After a State Owned Enterprise (SOE) went public, usually a significant proportion of share was still held by government. These shares are non-tradable shares. After Non-tradable Share Reform launched in April 2005, most of shares held by government become tradable.

briefly illustrates differences regarding target investors between A and H share. All the companies of these shares are incorporated and operate in Mainland China.

Table 2.2 Summary of Target Investors for A and H Share in China Stock Market

	Stock Exchange	Qualified Investors	Trading Currency
A Share	Shanghai Stock Exchange	Domestic Institutional and household Investors (excluding individual investors from Taiwan, Hong Kong and Macao),	RMB
	Shenzhen Stock Exchange	Qualified Foreign Institutional Investors (QFII) with Quota limit of 19.72 billion USD ⁴	
H Share	Hong Kong Stock Exchange	All Institutional and household Investors (Mainland Individual Investors from 2007)	HKD

Cited from China Securities Investor Protection Fund Corporation⁵: The official name of A share is Renminbi (RMB) common stock. It is a common stock issued by companies incorporated and operate in Mainland China for institutions, organizations and individuals in China (excluding investors from Taiwan, Hong Kong and Macao) to subscribe for and trade in RMB. The official name of B share is Renminbi special share. In early 1990s, China was short in foreign exchange reserve and exercised foreign exchange control. Against this backdrop, China allowed domestic enterprises to issue B shares on a trial basis at the end of 1991, in order to absorb international capital. Denominated in RMB, B shares could be subscribed for and traded in US dollar or Hong Kong dollar only by foreign investors before 2001 and also by Chinese individual investors after 2001. H shares refer to the shares of

⁴ Cited from China Securities Investor Protection Fund Corporation, QFII is the abbreviation of Qualified Foreign Institutional Investors. The QFII system is a mechanism used to qualify foreign institutional investors to make investment in China. When a country cannot fully realize free currency conversion and liberalize its capital account, it will use QFII as a transitional arrangement to limit the introduction of foreign investment and the opening of the domestic capital market. By this arrangement, foreign investors intending to enter the country's securities market must meet certain qualifications for getting the approval from the country's competent authorities, transfer in a required amount of foreign currency and convert it into local currency, and invest in local securities market through a special account under strict oversight. China has implemented the QFII system since 2002. China Securities Regulatory Commission (CSRC) officially issued the Measures for the Administration of Securities Investment within the Borders of China by Qualified Foreign Institutional Investors. QFII is allowed to invest, with a total amount limitation set by DSRC, in the shares (excluding B shares), treasury bonds, convertible bonds and corporate debentures listed on China's stock exchanges and other financial instruments approved by CSRC. Reuters: Till the end of May 2011, the total amount of foreign funds through the QFII scheme is 19.72 billion USD.

⁵ China Securities Investor Protection Fund Corporation.

<http://www.sipf.com.cn/en/chinassecuritiesmarketoverview/securitiesmarket/index.shtml>. Accessed on September 28, 2011.

companies incorporated and operate in Mainland China and traded on the Hong Kong Stock Exchange. Similarly the shares traded on the New York Stock Exchange are named as N shares and those traded on the Singapore Stock Exchange named as S shares.

In general, Both A and B shares are listed in Mainland stock market, namely Shanghai Stock Exchange (SSE) and Shenzhen Stock Exchange (SZSE). H shares are listed on Hong Kong Stock Exchange (HKEX). Only domestic household and institutional investors, together with Qualified Foreign Institutional Investors (QFII) can invest in A share; local institutions still cannot invest in B share. With regard to H shares, from 2007, domestic household investors are allowed to open account in Bank of China, Tianjin Branch, in order to invest H shares directly. Domestic household investors can also go to Hong Kong personally and open account directly in Hong Kong to invest in H Shares. However, geographically speaking, it is relatively hard and costly for household investors to go to Hong Kong or Tianjin to open an account for buying H share directly.

Moreover it is relatively convenient for domestic household investors to buy shares from mutual funds who invest in H share and consequently it is not necessary for them to open account by themselves. However, since A share market is relatively big and domestic institutions have more experience of investing in A share and thus prefer A share rather than H share, the percentage of H share investment owned by institutional investors is also small. On the other hand, household investors in Hong Kong are not allowed to invest in A share. Moreover, there are lots of H shares and Red Chips⁶ shares listed on HKEX, together representing 45.44% of total market capitalization for Main Board in HKEX, which means household investors in Hong Kong can invest in these shares and do not need to buy B shares listed on Mainland stock market in order to share the benefit from the growth of China economy. For institutional investors from Hong Kong, since QFII program grants quota for each qualified investors, their capital is still under control and therefore cannot freely move into Mainland stock market. In conclusion, capitals still do not flow completely free between Mainland China and Hong Kong capital markets, i.e. the China stock market is

⁶ Red chips shares are the stocks of Mainland companies incorporated outside Mainland China and listed in Hong Kong. The actual business is based in Mainland China and controlled, either directly or indirectly, by organizations or enterprises that are owned by the state, provinces or municipalities of Mainland China. The word "red" represents the Peoples' Republic of China and the Chinese Communist Party. The Hang Seng China-Affiliated Corporations Index covers prices of Red Chips.

semi-segmented. Therefore the current circumstance provides unique trial field for the China capital market, and it is very interesting to investigate underpricing across the two markets.

This paper excludes study for B share for the following reasons: First of all, B share only represents a very small part of China stock market, being 0.49% of total market capitalization for SSE and 1.00% for SZSE as of September 30, 2011. Secondly, after 2001 domestic household investors in Mainland China can also invest in B share. Since then there is no restrictions for them to choose between A and B shares. Thirdly, B share is just an intermediate product against shortage in foreign exchange reserve in early 1990s. Compare with A share, B share is another type of common share listed on Mainland stock exchanges denominated in foreign currency. For H shares, however, they represent entity companies listed on HKEX. So it is reasonable to focus on comparison between A and H share and excludes B share out of the scope of this study.

2.2 Listing Rules for A and H Share in China Stock Market

To better understand the difference between A and H share and provide more footstones before digging into underpricing difference, Table 2.3 provides a brief comparative summary of listing rules for A and H share. Regarding listing rules, because there is no big difference between A and B share from company's characteristics perspective and also B share is not the focus of this study, details for B share are not listed. Moreover because H shares in Growth Enterprise Market (GEM) only represent a small proportion of all H shares⁷, details for Growth Enterprise Market are also not given.

Table 2.3 reveals that the major differences regarding listing rules between A and H share focus on revenue and cash flow, company size, ownership structure and listing fees. For revenue and cash flow, the requirement for H share has higher standard. It is reported that the cash flow requirement is almost doubled for H share. Alternatively one year revenue requirement for H share is higher than 3 years' cumulative revenue requirement for A share. In regard to company size, the gauge is not the same. A share focuses on total stock capital which is shown as book value. In contrast, H share focuses on market capitalization at listing

⁷ H shares in GEM only represent a small proportion of total H shares, there are only 5 companies in selected sample are listed on GEM in HKEX.

date, which is shown as market value. To facilitate comparison, the following rough method is used: the total stock capital is timed by market capitalization/stock capital ratio, being 8.52, which is calculated from current total market capitalization and total stock capital in both SSE and SZSE weighted by market capitalization. Then total stock capital is transferred into market capitalization 426 million RMB and 256 million RMB for Main Board and ChiNext Board respectively, which is higher than that of H share. For ownership structure, although the percentage requirements are same for both A and H share, namely minimum shares in public hands is more than 25% of total issued shares, the loosened requirements for company with bigger size are different, with H share has stringent standard. With respect to listing fees, H share has higher fees, however, due to the fact that listing fees is just a very small part of total listing related fees, e.g. underwriting fee, lawyer fee, auditor fee etc., it can be ignored.

Table 2.3 Comparative Summary of Listing Rules for A and H Share

	A Share	H Share
Profit Requirement	Net profits for last 3 financial years are positive and last 3 financial years' cumulative net profit is at least 30 million RMB; For ChiNext Board, Net profits for last 2 financial years are positive and growing, and last 2 financial years' cumulative net profit is at least 10 million RMB; or Net profit for last financial year is positive and at least 5 million RMB, and last year Revenue is at least 50 million RMB with growth rate at least 30%.	Last 3 financial years' cumulative net profit is at least 50 million HKD (Net profit for last financial year is at least 20 million HKD, and first two financial years' cumulative net profit is at least 30 million HKD).
Revenue and Cash Flow	Cumulative net cash flow from operating activities for last 3 financial years is more than 50 million RMB; or cumulative revenue for last 3 financial years is more than 300 million RMB.	Cumulative net cash flow from operating activities for last 3 financial years is at least 100 million HKD; or audited cumulative revenue for last financial year is more than 500 million HKD.
Financial and Operational Record	At least 3 years.	At least 3 years.
Management and Controlling Shareholder	There is no big change for management for last 3 financial years and actual controlling shareholder of the company is not changed.	There is no big change for management for last 3 financial years and actual controlling shareholder of

		the company is not changed for last financial year.
Company Size Measurement	Total stock capital is at least 50 million RMB; For ChiNext Board, Total stock capital is at least 30 million RMB.	Listing market capitalization is at least 200 million HKD.
Ownership Structure/Minimum Shares in Public Hands	Minimum shares in public hands is more than 25% of total issued shares; If total stock capital is more than 400 million RMB, minimum shares in public hands is more than 10% of total issued shares.	At least 50 million HKD. Minimum shares in public hands is more than 25% of total issued shares; If total market capitalization is more than 10 billion HKD, minimum shares in public hands can be a percentage ranged between 15% and 25% of total issued shares.
Number of Shareholders	For Main Board, there is no specific requirement. For ChiNext Board, number of shareholders is at least 200.	Number of shareholders is at least 300.
Listing Fees	First-time listing fee: 30 thousand HKD. Listing annual fee: 6 thousand HKD-30 thousand HKD.	First-time listing fee: 150 thousand HKD-650 thousand HKD. Listing annual fee: 145 thousand HKD-1188 thousand HKD.

Source: China Securities Regulatory Commission; Hong Kong Stock Exchange.

Note: Exchange rates: 635.49 RMB=100 USD, 779.36 HKD=100 USD at September 30 2011; source: Bank of China.

2.3 Stock Industry Distribution among Three Exchanges in China Stock Market

In order to better understand the stock industry distribution difference among all the three exchanges, Chart 2.1, 2.2 and 2.3 provide more information regarding the stock distribution by sector. One can see from the pie charts that the biggest three sectors for SSE are Financials, Manufacturing and Mining which together represent 77.93% of total market capitalization. For SZSE, Manufacturing is the biggest and represents 63.95% of total market capitalization. For HKEX, the distribution among different sectors is more even compared with SSE and SZSE, the biggest three sectors are Financials, Telecommunications industry and Real Estate & Construction which together represent 54.15% of total market capitalization.

Chart 2.1 Distribution by Sector SSE (A Share)

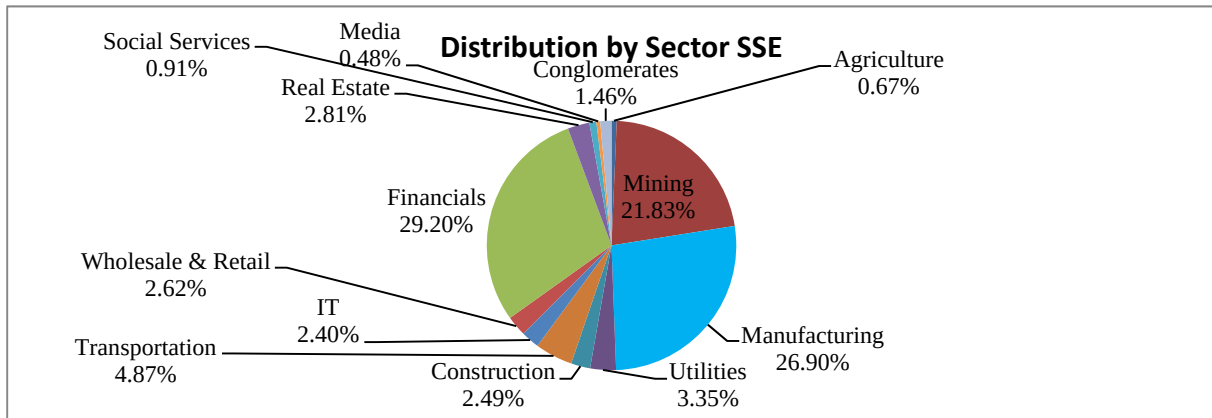


Chart 2.2 Distribution by Sector SZSE (A Share)

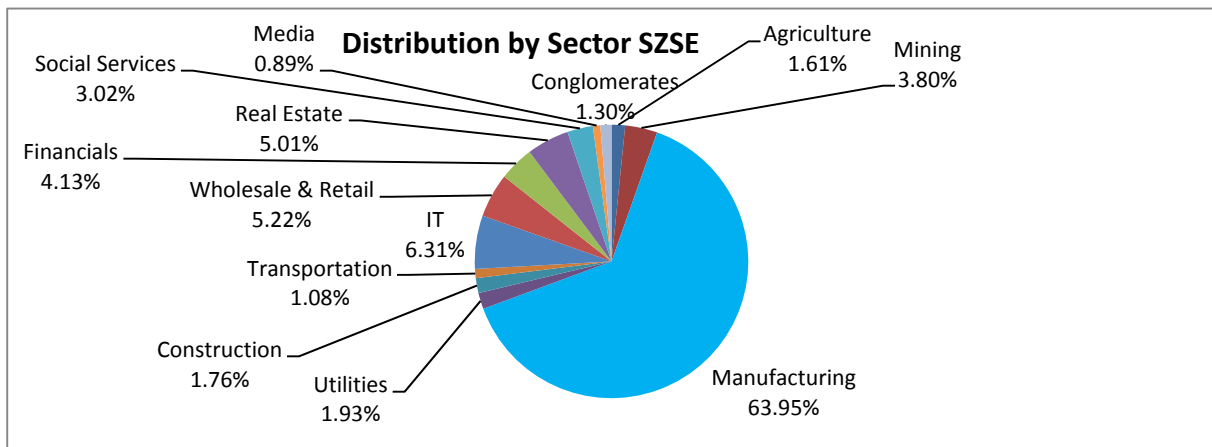
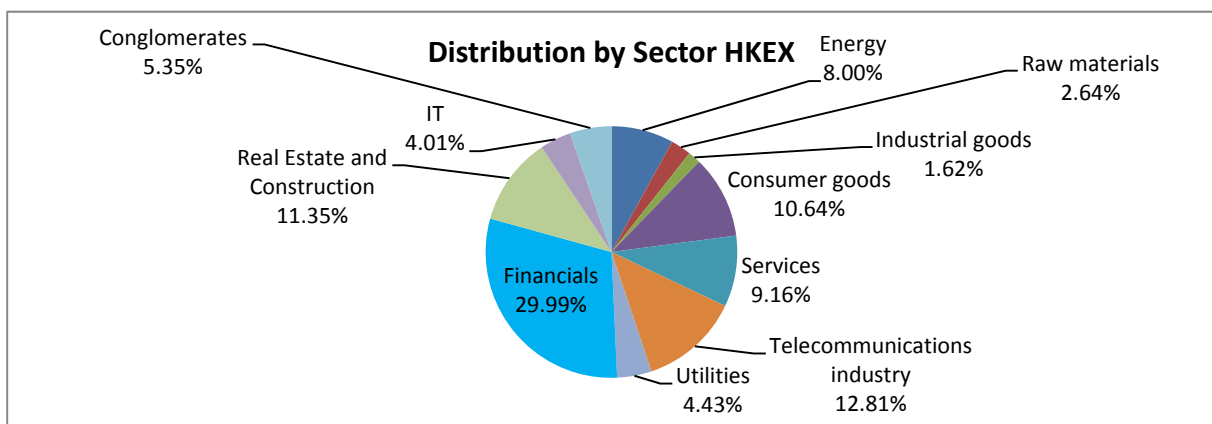


Chart 2.3 Distribution by Sector HKEX (H Share)



Data source: Monthly fact books from SSE and SZSE, Seasonal fact book from HKEX. Percentage is calculated by market capitalization.

2.4 Unique Institutional Features of Mainland Stock Market

Mainland stock market in China also has lots of unique institutional features. For example,

after a State Owned Enterprise (SOE) went public, usually a significant proportion of share was still held by government. These shares are non-tradable shares. By the end of 2004, the total shares of listed Chinese companies were 714.9 billion, of which 64% of total were non-tradable. Of the non-tradable shares, 74% were state-owned (The Report, 2008). As stock market develops and more companies listed on stock exchange, the problem that the same shares have different initial acquiring price⁸ became severe. To solve this problem, Non-tradable Share Reform was launched by CSRC in April 2005. By the end of September 2011, the total tradable shares in SZSE have already increased to 436.7 billion, a proportion of 71.03% of the total issued shares in SZSE. For SSE, the total tradable shares are 1772.0 billion, a proportion of 76.47% as of September 31 2011.

With respect to the backgrounds for companies listed on Mainland stock market, most of the state-owned companies are listed on SSE. The total numbers of state-owned companies or companies with government background represent more than 1/3 of all companies listed on SSE. As for SZSE, after 2004, when the SME Board was launched, most of the companies are private-owned. For H shares in HKEX, most of them are also state-owned companies or companies with government background.

2.4.1 Pricing Method in Mainland Stock Market

In regard to the Method to price IPOs, it also experiences a series of trial and reform as the China stock market matures. Generally speaking, pricing method experiences four stages: from non-marketization to marketization, from marketization to non-marketization and again back to marketization.

Stage 1: *“Before July 1999: The problem is not which company one should buy, but how to buy shares of a company.”*

Before July 1999, the whole IPO process was controlled by Chinese authorities for both which companies should be listed and how the offering price should be set. Initially, a pre-set fixed P/E ratio approach was used. The offering price was determined by its earnings after tax

⁸ For those shares held by government, the initial acquiring price for one share is usually 1 RMB. However, the offering price is usually much higher than 1 RMB. Before April 2005, those shares are non-tradable. In order to let all shares become tradable in stock exchange and balance the interests of tradable and non-tradable shareholders, non-tradable shareholders usually compensate tradable shareholders by paying cash or shares etc.

and a pre-set P/E ratio, which was usually between 12 and 15, and could not exceed 15. This method creates problems such as: issuing P/E ratio is substantially lower than the average market P/E ratio and thus lots of institutional and household investors preferred to participate in IPOs rather than putting their money into secondary market. To some extent, this method distorted both new issues' intrinsic and relative value. Together with the huge enthusiasm of investors in early 1990s, it resulted that whatever the offering price was, people just participated in IPOs very actively. For those who did not get shares in IPOs, they bought from secondary market and hence pushed the price to a high level on the first trading day. Therefore during that period, underpricing was huge⁹. At that time, the problem was not which company one should buy, but how to buy shares of a company. Almost every day the price went up and more and more people want to buy stocks. Among those household investors, lots of people did not actually know what a stock is, and not even mention to understand the companies behind the shares. They just knew that they can sell this thing out with a pretty higher price later.

Stage 2: *“July 1999 to July 2001: Turn to marketization but lead to extremely high offering price, high issuing P/E ratio and high raised capital size out of plan.”*

Securities Law of the People's Republic of China was launched on July 1 1999. Following immediately the Securities Law, “Notice on the Further Regulation of Initial Public Offering” was also launched by CSRC on July 28 1999. After that, pre-set fixed P/E ratio method was replaced with cumulative auction method which, in essence, is a book building method. The results following this new method are some overheated IPOs with extremely high issuing P/E ratio¹⁰.

Stage 3: *“July 2001 to August 2004: Marketization with control to cool down irrational investment behavior.”*

To cool down this irrational market behavior, CSRC launched “the Guide on the Online Price Inquiry Method of Initial Public Offering” on July 1 2001. This method built an upper limit of

⁹ An interesting story is worth to tell during this earlier period of the establishment of stock exchange. At the beginning, less than 10 companies were listed on SSE. This created a huge gap between demand and supply. For example, two days before the offering date of Shanghai Xingye Resources Holdings Co. Ltd., there were long queues to apply their shares. Not only for this company, every time an IPO was issued, there were thousands of people and police were needed to maintain order.

¹⁰ For example, in 2000 Fujian Mindong Electric Power Ltd. Co. (stock code 000993) was listed on the SZSE with an issuing P/E ratio of 88.69 times. The actual capital raised was more than twice the size of the company planned.

20 issuing P/E ratio. However, it ignored different characteristics across different industries. Since the beginning, China stock market develops and matures with different kinds of obstacles. In order to direct China stock market towards a more mature and internationalized market, till August 31 2004, all IPOs were suspended by CSRC.

Stage 4: *“After January 2005: Deeper marketization: book building method with high involvement of institutional investors.”*

On December 4 2004, CSRC released “Several Issues concerning the Trial Implementation of the Price Inquiry System for Initial Public Offerings”, which became effective on January 1 2005. From then “the cumulative price inquiry by institutional investors method” was used. This is a book building method with high involvement of institutional investors and has a final settled price also for household investors. Cheung et al. (2009) describe the regulatory changes in China in more details and demonstrate the regulatory effects on IPO underpricing.

2.4.2 Pricing Method in Hong Kong Stock Market

In Hong Kong Stock Exchange, one method for pricing new issues is fixed price method, which is the traditional offering method used in Hong Kong. Similar to many British Commonwealth countries, usually major international investment bankers and financial institutions underwrite new issues and determine the offering price, which is published in prospectus. Another method with common usage for recent decades is book building method, which is similar to that of US. This method has become quite common since 1990s, and until now there is no big change regarding pricing method for stocks listed on HKEX.

2.5 Time Gap between Offering and Listing Date and Raised Capital from IPOs

Back to 1990s, the time gap between offering and listing date (time gap) in Mainland stock market can be longer than 200 days (Mok and Hui 1998). Because of the information asymmetry between issuers, underwriters and investors (Baron 1982; Rock 1986), this long time gap increases investors’ risk and uncertainty regarding new issues’ true value. Although during recent decade the time gap for A share shrinks, however, it is still relatively longer than that of H shares. For example, in 2000 the average time gap for A share in SSE was still 24.56 days. However, this time gap for H share in HKEX has been being stable around 7 days since

2000.

In regard to raised capital size, the average size for SSE from 2000 to the end of September 2011 is 2, 653.50 million RMB, and the average size for SZSE from 2004 to the end of September 2011 is 693.21 million RMB. With respect to H shares in HKEX, the average size from 2000 to the end of September 2011 is 9, 595.26 million RMB (use recent lower exchange rate, 117, 67.69 million HKD=9, 595.26 million RMB). This suggests that H share companies are usually big compared with A share companies. Within Mainland China, companies listed on SZSE usually are smaller than that of SSE. This is also consistent with the companies' backgrounds discussed in the beginning of this section that most of the companies listed on SZSE after 2004 are private-owned and most of the companies in SSE and H share companies in HKEX are state-owned companies or companies with government backgrounds and therefore bigger and less riskier.

2.6 Household Investors' Participation in China IPOs Market

With respect to the US household investors' participation in IPOs, Loughran and Ritter (2004) mention that in the 1990s, underwriters set up personal brokerage accounts for venture capitalists and the executives of issuing firms in order to allocate hot IPOs to them and thus provide these rich people with side payments. Issuers are willing to accept underpricing because: One can view issuers as seeking to maximize a weighted average of IPO proceeds, the proceeds from subsequent SEOs, and side payments from underwriters to the people who will choose the lead underwriter. However, for household investors with little fund, it is relatively hard to participate in IPOs. At least, the proportion of household investors in IPOs is small. In contrast to US, household investors who usually have relatively small fund can also participate in IPOs in both Mainland and Hong Kong stock markets. For example, even an investor only have one thousand USD, she/he can also participate in IPOs. For the above mentioned spinning in US, it is also not possible in China since there are very strict rules who can participate and how to participate in IPOs.

For Mainland China IPOs market, both household investors and institutional investors can apply for new issues. However, **it is required by CSRC that shares for institutional placement cannot exceed 20% of the total issued shares**, if the total stock capital is less

than 400 million shares. For companies with total stock capital more than 400 million shares, after share allocation for strategic investors¹¹, shares for institutional placement cannot exceed 50% of the left issued shares and shares without lock-up restrictions should be more than 25% of total issued shares. For strategic investors, there is a lock-up period¹² for at least 12 months, and for all institutional placements, the lock-up period is 3 months. The difference between household investors and institutional investors are not only focused on the application size and the lock-up requirement, but also household investors need to make advance payment for shares they apply for. For those who do not get shares, money is refunded without interest for deposit period. The earned interest belongs to China Securities Investor Protection Fund Corporation, which is a wholly state-owned non-profit organization for the purpose of protecting the legitimate rights and interests of securities investors. Especially, China Securities Investor Protection Fund is designed to protect the interest of household investors, e.g. when a listed company goes through debt restructure or bankruptcy, this fund will be involved to protect the legitimate rights and interests of household investors.

With respect to Hong Kong IPOs market, new issues are also divided into two parts: One part is exclusive for institutional investors with placing method. Different from Mainland China, total shares for institutional placement are usually 85% to 90% of total issued shares. The other part is for household investors' subscription with a percentage of 10% to 15% of total issued shares¹³. Among institutional placements, for strategic investors, there is a lock-up period for at least 6 months, and for institutional placement with placement contract, the lock-up period is usually 12 months. For those household investors who do not get shares, money is also refunded without interest for deposit period. However, different from Mainland China, the earned interest belongs to the issuer.

From the above description, one can notice that difference between US and China IPOs market are focused on: first of all, whether household investors with relatively small fund are highly involved in IPOs; secondly, the lock-up restrictions for institutional investors. Within

¹¹ Strategic investors are corporate or individual investors that add value to their investment through contacts, experience, and knowledge of markets thus brightening the investees' prospects for additional investment and success. Shares placed to strategic investors cannot exceed 30% of total issued shares. "Notice on related issues of strategic placement". CSRC 2007 No. 92

¹² During lock-up period, strategic investors and institutional investors cannot sell their shares from IPOs.

¹³ Institutional investors, although not very often, can also apply shares in this part, but same rules for household investors apply to all institutional investors applying shares in this part.

China IPOs market, Mainland China market has much higher household investors' involvement than that of Hong Kong IPOs market. Moreover, there exists a lock-up period for all institutional placements in Mainland market. Therefore this unique feature of Mainland IPOs market determines that household investors play a very important role in influencing the market price of a new issue.

To sum up, Table 2.4 provides a brief summary of key characteristics of China stock market, which facilitates understanding for the following Hypotheses in section 3.

Table 2.4 Summary of Key Characteristics of China Stock Market

	Mainland China Stock Market/ A Share	Hong Kong Stock Market/ H Share
Stock Exchanges	SSE and SZSE	HKEX
Exchanges' History	20 years	120 years
Qualified Investors	Domestic institutional, household investors and QFII with Quota limit	All institutional and household investors
Trading Currency	RMB	HKD
Listing Rules	Less stringent	More stringent
Industry	Top three industry: Financials,	Top three industry: Financials,
Distribution	Manufacturing, Mining	Telecommunications, Real Estate
Company Backgrounds	A share in SSE: state-owned companies or companies with government background; A share in SZSE: most of the companies are private-owned	H share: state-owned companies or companies with government background
Pricing Method	Pre-set P/E ratio→Book building→Upper limit of 20 issuing P/E ratio→Book building (after 2005)	Fixed price method (before 1990s)→Book building (since 1990s)
Time Gap	Longer	Shorter
Raised Capital Size	A share in SSE: middle; A share in SZSE: small	H share in HKEX: large

Household	Approximately 80% subscription from	Approximately 15% subscription from
Investors'	household investors	household investors
Participation in IPO		

3. Hypotheses and Previous Theories

3.1 Hypotheses and Related Theories

Before entering into hypothesis 1, two definitions of the variables used in the following hypothesis need to be cleared. Firstly, *subscription rate* is defined as the total subscribed shares divided by the total shares issued by a firm. In Mainland China, this is expressed as *lottery winning rate*, which is the reverse of subscription rate. To simplify and be consistent, all lottery winning rates are transferred to subscription rates. Secondly, *first-day turnover rate* is defined as the trading volume on the first trading day of a new issue divided by the total outstanding tradable shares.

By definition, underpricing is determined by offering price and first trading day's closing price (see section 4). So a high level of underpricing results from either lower offering price or higher first trading day's closing price. **This paper assumes that first trading day's closing price plays an important role in determining the level of underpricing in China stock market, especially in Mainland stock market.** A relatively high level of first trading day's closing price is pushed by investors' enthusiasm to invest in new shares. This can be seen from both oversubscription and high turnover rate on the first trading day. As described in section 2.6, household investors in Mainland China play a very important role in influencing the market price of first trading day. The reasons behind the enthusiasm of household investors' participation in IPOs and why issuers accept huge amount of money left on the table may be as following: Firstly, **In Mainland China, at least before 2010, investors learned from history that all IPOs make money** (see overpriced IPOs' percentage in Table 5.1 and Table 5.2). **However, investors in Hong Kong also learned from history that not all IPOs can make money** (see Table 5.3). This experience reduces the motion to push stock price to a very high level in Hong Kong market. Secondly, in Mainland China, when a state-owned company goes public, most of their shares are subscribed by household

investors. **From the government's point of view, this is similar to take money from left pocket to right pocket, and thus issuers usually accept the huge amount of money left on the table.** For private-owned companies, they also have to accept higher underpricing if they want to raise capital. In contrast, institutional investors (most of them are foreign institutional investors) in Hong Kong stock market are the main force to participate in IPOs, which means it is not about taking money from left pocket to right pocket anymore. Although usually 10% to 15% shares are in the hands of household investors, the power to influence market price is in the hands of institutional investors. When institutional investors subscribe new issues, they believe that the offering price is relatively fair and usually they will not acquire more shares with a higher price than offering price. Therefore investors' enthusiasm to invest in new shares in Hong Kong cannot compare with that of Mainland China, and thus the underpricing degree is also lower in Hong Kong than that in Mainland China.

This is quite different from situations in US where most of IPOs participants are professional institutional investors or high net worth individuals. Moreover, there is no specific restriction for institutional investors to sell shares in US. In Mainland China, however, on the first trading day, institutional investors who get shares from placement (not more than 20% of the total issued shares) cannot sell these shares due to the 3 months lock-up restriction. **This leaves more trading power into household investors who are more enthusiastic, speculative and have a very higher percentage (e.g. 80%) of total issued shares.** Of course, except for those subscribed shares with lock-up restriction during IPO, institutional investors can also buy new shares on the first trading day due to different portfolio strategies. However, when stock price goes high, institutional investors need to pay much higher than offering price to acquire new shares. Consequently, in such a circumstance, institutional investors are usually hesitant to buy more shares. What they usually do is: after 3 months, when the price goes very high, they sell their subscribed shares to earn a decent profit. For household investors with good expectations on new issues, those who do not get shares from IPOs would also like to buy shares on the first trading day. Household investors who get shares from IPOs would also like to sell their shares at higher price (usually much higher than offering price due

to high demands) on the first trading day. Due to “T+1” trading principle¹⁴, investors who do not get shares from IPOs can only buy new shares on the first trading day. The consequence is that the first day’s closing price is pushed to a very high level. This paper assumes that this unique mechanism discussed above explains most of the IPOs underpricing in Mainland stock market.

Among theories regarding underpricing phenomenon, lots of previous researches also mention oversubscription. For example, Booth and Chua (1996) argue that issuer’s demand for ownership dispersion creates an incentive to underprice. They further illustrate that promoting oversubscription facilitates broad initial ownership, which in turn improves secondary-market liquidity. Brennan and Franks (1997) also show that underpricing is used to ensure oversubscription, which facilitates a broaden ownership base and is followed by discrimination against large block applicants and in favor of smaller applicants. However, given the unique institutional features in Mainland China discussed above and in section 2, different from previous theories, **this paper regards the oversubscription as a result of investors’ enthusiasm to invest in new shares, which also leads to very higher first-day turnover rate.** To sum up, the following hypothesis is raised.

Hypothesis 1: In Mainland stock market, underpricing is mainly explained by investors’ enthusiasm to invest in new shares. In Hong Kong stock market, this effect may also exist but cannot be compared with the scale in Mainland stock market.

Beatty and Ritter (1986) investigate the information asymmetry between issuing firms and investors. They define “ex-ante uncertainty” as the uncertainty of an offering’s true value before it starts trading publicly. They argue that there exist positive relationship between the expected underpricing and the ex-ante uncertainty. They also demonstrate that investment bankers enforce the underpricing equilibrium. **Since neither the issuers nor underwriters can know exactly what the market value of newly issued share will be, investors require compensation to take the ex-ante uncertainty risk.** In this paper, the above ex-ante uncertainty theory will also be tested using China IPOs data. Linking back to section 2, the current structure of Mainland stock market is that: big companies are listed on Main Board of

¹⁴ T+1 trading principle: shares bought in Day 1 can only be sold one day after Day 1.

SSE, relatively smaller and new ventures are listed on SME and ChiNext of SZSE. As for A shares in SSE and SZSE, companies with different sizes, backgrounds are listed. Especially for SZSE, lots of Small and Medium Enterprises are listed on SME Board and ChiNext. Therefore the ex-ante uncertainty among companies in Mainland stock market should also varies a lot. So it is expected that ex-ante uncertainty can be one reason to underprice new issues. For Hong Kong stock market, there are two groups, namely Main Board and Growth Enterprise Market. Since most of H shares are listed on Main Board and the selected sample in this research also mainly focuses on H shares on Main Board (sample details will be discussed in section 5), this hypothesis is thus based on characteristics of H shares on Main Board in HKEX. According to Beatty and Ritter (1986), companies with relatively bigger size are usually more mature and hence less risky than companies with smaller size. This is true for H shares because most of H shares are state-owned companies or companies with government backgrounds, thus have relatively bigger size and are also less risky due to their monopoly positions in China's economy. Therefore it is possible that ex-ante uncertainty is not among the reasons to underprice new issues for H shares, at least not a sensitive one. To conclude, the following hypothesis is raised.

Hypothesis 2: In Mainland stock market, there exists ex-ante uncertainty for investors regarding the issuing firm's true value. In order to let investors to participate in IPOs, on average, new issues need to be underpriced to compensate investors. For H share in Hong Kong stock market, ex-ante uncertainty may be not one of the reasons to underprice new issues.

Under the previous theoretical framework of information asymmetry, information is not distributed equally between issuers, underwriters and investors (Baron 1982; Rock 1986). Mok and Hui (1998) examine data from 1990 to 1993 in Mainland stock market and use regression approach suggesting that a long time-lag between offering and listing date, which increases investor's risk, was one of the key determinants of market-adjusted IPO underpricing. To better understand this, it is appropriate to link back what is discussed in section 2. As mentioned before, household investors in both Mainland and Hong Kong stock markets need to make advance payment in order to apply shares from IPOs. So their funds are

tied up during the gap period. **The longer the gap period is, the higher the uncertainty of new issues' true value is. Investors require compensation for uncertainty during this relatively longer time gap.** Chan et al. (2004) investigate IPO samples from 1993 to 1998 for both A and B shares in Mainland stock market, and show that underpricing has a positive relationship with the number of days between offering and listing. However, this characteristic has no significant relationship with B shares' underpricing. The sample they used mainly composed historical data covers first decade since the establishment of Mainland stock exchanges. At that moment, regulations and pricing methodology differ a lot from now. So a test with recent new data is useful to better understand underpricing phenomenon in China stock market. In Hong Kong stock market, however, the time gap between offering and listing date is relatively short. Moreover, because investors in Hong Kong market take disclosed information before IPOs into their investment decision more than Mainland domestic investors do, a significant relationship between time gap and underpricing is not expected. In short, the following hypothesis is raised.

Hypothesis 3: In Mainland stock market, due to administration procedures, the time gap between offering date and listing date of a new issue are relatively longer and increases the risk of investors due to uncertainties during this period. However, in Hong Kong stock market, the gap is relatively shorter and hence no such relationship is expected.

Linking back to pricing methods change discussed in section 2.4, January 1 2005 will be used as a watershed to test its effect on underpricing in Mainland stock market, especially for SSE. January 1 2005 is used as watershed because on that day an important document from CSRC "Several Issues concerning the Trial Implementation of the Price Inquiry System for Initial Public Offerings" became effective. This regulation directs Mainland stock market towards a more open and liberalized market, and has a big impact on IPOs' pricing method, which means after 2005 P/E Ratio limit was completely removed and again a book building method becomes popular. Cheung et al. (2009), using data from 1992 to 2006, provide an explanation for underpricing phenomenon in Mainland stock market. They argue that regulatory change, which is discussed briefly in section 2.4, is one of the main reasons affects IPO underpricing. The size of underpricing decreases during their sample period and after

2005 the regulatory underpricing component which is mainly due to the P/E Ratio restriction vanishes. To conclude, the following hypothesis is raised.

Hypothesis 4: In Mainland stock market, due to a series of regulatory changes on IPOs pricing methodology, the degrees of underpricing should be lower after January 1 2005. In Hong Kong stock market, no such watershed exists.

Allen and Faulhaber (1989) suggest that issuing firms possess most information regarding its own prospects. Issuers with good quality will use underpricing to signal their type and recoup this cost from subsequent seasoned equity offerings (SEOs). Welch (1989) also develops a model which suggests that high quality firms can use underpricing to signal their type and compensate themselves with higher price at seasoned equity offerings. However, Michaely and Shaw (1994) find contradictory evidence against Allen and Faulhaber's and Welch's signaling model. Su and Fleisher (1999) use IPO data in China from 1987 to 1995 to show that underpricing phenomenon in China can be well explained by issuing firms' strategy to signaling their value to investors. And these firms can recoup the underpricing cost from SEOs. Yu and Tse (2006) also examine IPO sample from 1995 to 1998, however, their study does not support Allen and Faulhaber's (1989) signaling model. Since some previous studies give contradictory results, it is also interesting to test the signaling hypothesis with recent decade data in China stock market. To sum up, the following hypothesis is raised.

Hypothesis 5: In both Mainland China and Hong Kong stock markets, companies that have sequential seasoned equity offerings (SEOs) underprice their new issues more than companies that do not have sequential SEOs. No difference is expected between Mainland and Hong Kong stock markets.

3.2 Other Theories Related to IPOs Underpricing

After Ibbotson (Ibbotson 1975) using relatively long period data to confirm the mean initial performance of unseasoned new issues is positive, lots of studies have been performed regarding the reasons of underpricing phenomenon. Except theories already mentioned in section 3.1, to show a relatively complete theories framework, other theories related to IPOs underpricing are also briefly listed in this section. Among them, lots of studies focus on

asymmetric information. Baron (1982) explores the information asymmetry between issuing firms and underwriters. In most cases, underwriters possess more knowledge about the capital market. When underwriters are better informed, they have incentives to underprice in order to ensure all the shares will sell out, and in the mean well, underpricing reduces their distribution efforts and makes their job less risky. Since there is no data regarding information asymmetry between issuing firms and underwriters, no empirical test will be performed for Baron's model in this paper. Rock (1986) explores the information asymmetry between informed investors and uninformed investors. In his paper, Rock argues that there exists a group of investors whose information is superior to that of other investors. Under such a circumstance, the result is winner's curse. Since uninformed investors know this problem, they are hesitant to participate the offering unless issuing firms would compensate them. Therefore the issuing firms must underprice the shares in order to let the uninformed investors to also participate their offering. There are some direct tests of Rock's model. For example, Koh and Walter (1989) investigate IPOs in Singapore, they show that considering the rationing, uninformed investors earn risk-free rate of return. Keloharju's (1993) study of IPOs in Finland also confirms the existence of the winner's curse in IPOs process. Because it is hard to define and classify who are informed and who are uninformed investors and also there is no data regarding information asymmetry between informed and uninformed investors in China stock market, Rock's model is also excluded from further test. Moreover, even if institutional investors are regarded as informed investors and household investors are regarded as uninformed investors, there is no such real case in China that all institutional investors do not buy shares and only household investors get all the new shares. This is another reason why this paper will not perform any test on Rock's model. Benveniste and Spindt (1989) argue that investors are hesitant to truthfully reveal positive information before the stock is offered. Hence stock price has to be set low to compensate investors for revealing their private information. They also show that an underwriter can use leverage of expected future profit to reduce required underpricing by selling IPOs repeatedly to the same regular investors and thus increase the efficiency of the capital acquisition process. Consistent with the pricing and allocation schedule proposed by Benveniste and Spindt (1989), Hanley (1993) demonstrate that issues with final offer prices exceed the limits of the offer range have greater

underpricing than all other IPOs, and are also more likely to increase the number of shares issued. He also suggests that underwriters and issuers prefer to substitute underpricing for increased allocation. Since it is relatively hard to find data or proxy regarding investors' information reveal in China and it is also hard to collect data that whether a new issue's final offer price exceeds the limits of offer range, this theory is also out of the focus of this paper, and no further test and analysis will be performed.

Except for information asymmetry theories, Tinic (1988) uses samples of IPOs before and after the Securities Act of 1933 to develop and test the hypothesis that underpricing serves as a form of insurance against potential legal liabilities of underwriters and issuing firms. He demonstrates that the Act had a significant impact on the magnitude of underpricing before and after 1933. However, Drake and Vetsuypens (1993) provide evidence against Tinic's theory. They investigate 93 firms that were sued after their IPOs, and these firms were as underpriced as other IPOs. In China the possibility that a firm will be sued after IPOs is very small. Therefore Tinic's theory is not applicable for China stock market and will not be tested. Except for time-lag between offering and listing date, Mok and Hui (1998) also suggest that the 'Chinese characteristic' of high equity retention by the state and ex-ante risk of new issues were key determinants of market-adjusted IPO underpricing. As for argument about equity retention by the state, due to the data availability and the fact that this paper cannot cover all aspects of IPOs underpricing phenomenon in China stock market, it is also excluded from this paper's study scope.

4. Methodology

4.1 Estimate the Extent of Underpricing

In order to answer the research questions raised in section 1, the first step is to estimate the extent of underpricing for both A and H shares. In this paper underpricing is defined as:

$$\text{Underpricing} = \frac{P_{fc} - P_o}{P_o}$$

P_o : Offering price of a new issue.

P_{fc} : First-day closing price of a new listed issue.

Mok and Hui (1998) consider the overall market effect when measuring underpricing. Similar to them, the market-adjusted underpricing is also measured, which is defined as:

$$\text{Market adjusted underpricing} = \frac{P_{fc} - P_o}{P_o} - \frac{P_{mi1} - P_{mio}}{P_{mio}}$$

P_{mi1} : Closing price of corresponding market index in Shanghai, Shenzhen or Hong Kong on the issue's listing day.

P_{mio} : Closing price of corresponding market index on the issue's offering day.

However, the result shows that (not reported) the market adjusted underpricing for all three exchanges is very close to original underpricing calculated above. So it is not necessary to use market adjusted underpricing at all and it is excluded from the following analysis.

4.2 Underpricing Explanation in China Stock Market

In order to answer the questions in section 1 and study the different reasons behind the underpricing for both A and H shares, the second step is to use regression approach to investigate the relationship between the estimated underpricing and independent variables related to Hypotheses in section 3. Multiple regressions are used to illustrate the effects on underpricing.

The purpose of this research is not to build a model in such a way that the independent variables can forecast the degree of underpricing, instead, all the regression models are aimed to find out whether significant relationship exists between the specific variables and underpricing in China stock market.

4.2.1 Multiple Regressions by Market

In order to test the hypothesis raised in section 3, first, this research investigates the joint effects of different variables on underpricing by market. The following model is established:

$$\text{Underpricing}_i = \alpha_0 + \beta_0 \text{Sub}_i + \beta_1 \text{Tur}_i + \beta_2 \text{Siz}_i + \beta_3 \text{Gap}_i + \beta_4 \text{Yrd}_i + \beta_5 \text{SEO}_i + \varepsilon_0$$

Where

Sub_i : Subscription rate (Hypothesis 1).

Tur_i : First-day turnover rate (Hypothesis 1).

Siz_i : Raised capital size (Hypothesis 2).

Gap_i : Time gap between offering date and listing date (Hypothesis 3).

Yrd_i : Year 2005 dummy variable (Hypothesis 4)¹⁵.

SEO_i : SEOs dummy variable (Hypothesis 5)¹⁶.

This paper uses the above model to test IPOs underpricing for A share in SSE, SZSE and H share in HKEX respectively. Following the discussion in Hypothesis 1, subscription rate is used to proxy the degree of investors' enthusiasm to invest in new shares. **It is expected that in both Mainland China and Hong Kong stock markets, the higher the subscription rate is, the higher the IPOs underpricing is.** This paper also regards first-day turnover rate as a result of investors' enthusiasm to invest in new shares. In Mainland stock market, lots of people expect the price continually goes up after listing without considering the company behind the shares and trade a lot during the first trading day. Thus first-day turnover rate is also a good proxy for investors' enthusiasm to invest in new shares. **It is expected that the higher the first-day turnover rate is, the higher the IPOs underpricing is.** Of course, the degree and scale of enthusiasm to invest in new shares could be different for Mainland China and Hong Kong stock market due to the difference discussed in section 2 and section 3.1.

Beatty and Ritter (1986) argue that companies with relatively bigger size are usually more mature and less risky than companies with smaller size. Therefore they use raised capital size as one of the proxy for the ex-ante uncertainty. To test Hypothesis 2, following Beatty and Ritter (1986)'s spirit, this paper will also use raised capital size as proxy of ex-ante uncertainty to test the situation in China stock market. **It is expected that the larger the raised capital size of firm from its IPO is, the lower the ex-ante uncertainty is, and the lower the IPOs underpricing is.** Linking back to section 2.3, due to the fact that different industries usually have different risk, industry allocation may also become proxy of ex-ante uncertainty and possibly related to IPOs underpricing. However, due to the availability of data and different classification of industry for Mainland and Hong Kong stock markets, this paper does not take industry allocation into account. As for time gap between offering date and listing date, it is denoted as days and is defined by the space between listing date and offering

¹⁵ Year dummy equals 1 if the share is issued after 1 January 2005 and 0 otherwise.

¹⁶ This paper examines dummy variable SEO 5. SEO 5 is 1 if a company has seasoned equity offering within 5 years and 0 otherwise. This paper only considers SEOs within 5 years because 5 years are a relatively long period during which a company has already had a plan to raise money in the near future when it has IPO. It is assumed that a company does not have a plan to raise money in the near future if the company has SEOs after 5 years.

date. **It is expected that the longer the time gap is, the higher the underpricing is.**

Considering the regulatory effects discussed in above sections, in the following analysis, this paper uses a year dummy variable, before or after 2005, to test the effects of the regulatory change on underpricing degree in SSE. **It is expected that after 2005 the underpricing degree is significantly reduced.** Year dummy 2005 is not applied for SZSE due to the fact that only 38 companies in SZSE are listed before 2005, which represents a very small proportion (4.29%) of its total sample. As for HKEX, there is no big change regarding regulations and pricing methods in Hong Kong stock market during the selected sample period, namely from 2000 to the end of September 2011, this dummy variable will also not be included in the analysis for Hong Kong stock market.

With respect to signaling hypothesis developed by Allen and Faulhaber (1989) and Welch (1989), the relationship between the underpricing degree and whether issuing firms subsequently follows with a seasoned equity offering is also tested for China stock market. **It is expected that companies have SEOs underprice their new issues more than companies do not have SEOs.**

4.2.2 Multiple Regressions for Combined Sample in China Stock Market

After running multiple regressions for each market and getting some feelings about the reasons behind the underpricing for both A and H share, the following model is designed to further investigate whether a factor could be among the key determinants for the underpricing difference between A and H share.

$$\begin{aligned} Underpricing_i = & \alpha_0 + \beta_0 D1_i + \beta_1 Sub_i + \beta_2 D1_i Sub_i + \beta_3 Tur_i + \beta_4 D1_i Tur_i + \beta_5 Siz_i + \beta_6 D1_i Siz_i \\ & + \beta_7 Gap_i + \beta_8 D1_i Gap_i + \beta_9 Yrd_i + \beta_{10} D1_i Yrd_i + \beta_{11} SEO_i + \beta_{12} D1_i SEO_i + \varepsilon_0 \end{aligned}$$

Where

$D1_i$: Dummy variable, equals to 1 if a new issue is A share, otherwise 0.

The focus of this model is whether or not the coefficient difference is statistically and economically significant. Take variable Tur_i for example, when a new issue is H share, the coefficient for first-day turnover rate is β_3 . However, when a new issue is A share, the coefficient becomes $\beta_3 + \beta_4$. If β_4 is positive and strongly significant, which means compared with H share, first-day turnover rate has bigger impact on A share's underpricing

and could be one of the key determinants to explain the underpricing difference between A and H share.

5. Data

5.1 Data Collection

In order to test the hypotheses in section 3, IPOs data from SSE, SZSE and HKEX are manually collected. The original dataset for SSE, which covers all the IPOs in SSE during sample period, consists of 471 companies from January 1, 2000 to the end of September 2011. The original dataset for SZSE, which also covers all the IPOs in SZSE during sample period, contains 886 companies from June 25, 2004 to the end of September 2011. Among 886 companies, there are 267 companies listed on ChiNext Board, which means all the companies listed on ChiNext are included in selected sample. There are 618 companies listed on SME Board, and only one company is listed on Main Board, which is a special case since it is listed by exchanging shares¹⁷. This means all the companies listed on SME Board are included in selected sample as well. The original dataset for H share listed on HKEX contains 127 companies from January 1 2000 to the end of September 2011. Among 127 companies there are 34 companies listed on Growth Enterprise Market and 93 companies listed on Main Board.

Offering price and the first-day closing price of new listed issues are collected to calculate the extent of underpricing. Additionally, Shanghai Securities Composite Index (SSE Index), Shenzhen Component Index (SZSE Index) and Hang Seng China Enterprises Index (HSCE Index), which are used to calculate the market-adjusted underpricing for each market¹⁸, are used to represent the movement of Shanghai, Shenzhen and Hong Kong stock markets respectively. In regard to data source, offering price, the first-day closing price, subscription rate, raised capital size, offering date, listing date and the dummy data for whether a company has SEOs within 5 years after listing are manually collected from Shanghai Stock Exchange,

¹⁷ Listing by exchanging share: Company A issues new shares or uses existing shares to exchange shares of Company B, who is already listed on stock exchange. This process usually accompanies M&A that Company A acquires Company B. After this shares exchange, Company A is listed on stock exchange and Company B is delisted.

¹⁸ Details for market-adjusted underpricing are not reported due to the fact that it is very close to raw underpricing and thus it is not necessary to analyze it separately.

Shenzhen Stock Exchange's official websites¹⁹. With regard to first-day turnover rate, SSE's data are obtained from SSE's official website, and SZSE's data are calculated by using first-day trading volume divided by total tradable shares which are also manually collected from SZSE's official website. As for data source for HKEX, offering price, subscription rate, raised capital size, offering date, listing date and the dummy data for whether a company has SEOs within 5 years after listing are manually collected from Hong Kong Stock Exchange's official website and exchange's annual fact books. The first-day closing price and first-day trading volume are collected from yahoo finance. With regard to first-day turnover rate, HKEX's data are calculated by using first-day trading volume divided by total tradable shares which are also collected from Hong Kong Stock Exchange's official website. SSE Index, SZSE Index and HSCE Index time series are also collected from yahoo finance²⁰.

5.2 Sample Selection

Even though most of the datasets are collected from SSE, SZSE and HKEX's official websites, it is hard to get all the data points for all the companies newly listed during the above period. The final sample for SSE consists of 467 companies (2000-2011). Four companies are taken out of the original data because they are listed by exchanging shares (see footnote 13). Thus there is no subscription rate for them. Moreover, there are about 21 companies with missing data point for subscription rate. Those data are manually collected from Eastmoney's data center²¹. This paper excludes data for SSE before year 2000 with two reasons: First of all, before year 2000 lots of listed companies used the pre-set fixed P/E ratio approach to price their issues, therefore the underpricing during that period is abnormally high (see Cheung et al. 2009). Secondly this paper uses more recent decade's data to perform the analysis in order to demonstrate a recent picture of Shanghai stock market.

For SZSE, The final sample consists of 885 companies (2004-2011). One company (code 000338) is taken out of the original data because it is listed by exchanging shares and thus there is no subscription rate for it as well. Moreover, there are about 37 companies with

¹⁹ SEOs data for SZSE are collected from Eastmoney's data center. <http://data.eastmoney.com/center/> accessed on October 12, 2011

²⁰ Yahoo Finance <http://finance.cn.yahoo.com/mark/history.php?code=sh000001&type=history> accessed on October 10, 2011.

²¹ Eastmoney data center <http://data.eastmoney.com/center/> accessed on October 12, 2011

missing data point for subscription rate. Those data are also manually collected from Eastmoney's data center. In conclusion, the selected sample for SZSE includes all the companies listed on SZSE's SME Board and ChiNext Board, which represents a recent picture of Shenzhen stock market.

The final sample for HKEX consists of 82 companies from 2000 to 2011. Among 127 companies, there are 4 companies which have already delisted from HKEX and thus lack the data needed to perform relevant analysis. One company was switched from Growth Enterprise Market to Main Board and consequently with missing data points. What's more, there are 40 companies listed on GEM that are offered only by institutional placement and thus do not have subscription rate²². After selection, 82 companies consist of 77 companies listed on Main Board and 5 companies listed on Growth Enterprise Market.

5.3 Descriptive Statistics

In order to illustrate the underpricing degree and its relationship with specific independent variables discussed in section 4, Table 5.1, Table 5.2 and Table 5.3 are given to capture intuitively a full picture of underpricing phenomenon in China stock market during the past decade. Charts for SSE, SZSE and HKEX illustrate intuitively the relationship between underpricing and different single variable, which are also provided in Appendix 2 (see Appendix 2.1 to Appendix 2.15).

The average underpricing for SSE, SZSE and HKEX are reported in Table 5.1, Table 5.2 and Table 5.3 respectively. The average underpricing of selected 467 A share IPOs in SSE from 2000 to 2011 is 100.60%. For SZSE, the average underpricing of selected 885 A share IPOs from 2004 to 2011 is a relatively smaller number of 70.27% compared with that of SSE. By looking such data, one can imagine the enthusiasm of Chinese investors to participate in IPOs. By simply participating IPOs, an investor would approximately double her/his money on the first trading day in Shanghai stock market and has 70% gain in Shenzhen stock market, if the investor wins the right to buy newly issued shares. However, for HKEX, it is a different

²² IPOs in HKEX can be issued via a pure placement or a public offering combined with placement. Lots of companies listed on Growth Enterprise Market use pure placement and thus there is no share can be subscribed by public investors, most of which are household investors; for mechanism with public offering combined with placement, household investors subscribe through the public offering only, other professional investors, however, are allowed to subscribe either through the placement or public offering. Therefore, only IPOs issued using a public offering combined with placement are studied.

scenario that the average underpricing is just 16.08% for 82 H shares listed from 2000 to 2011, which means the underpricing degree of A share in SSE and SZSE are 6.26 and 4.37 times of the number of H share in HKEX.

Table 5.1 also shows that there exists a decreasing trend for underpricing degree from 2000 to 2011 for SSE. For recent two years, the underpricing is just 31.52% for 2010 and 13.65% for 2011, which is relatively normal compare with other countries (see Table 1, Loughran et al. 2011). This trend is consistent with hypothesis 4, and demonstrates that the continuing reforms and regulation changes, especially IPOs pricing methodology change after January 1, 2005 direct China stock market towards a more open and liberalized market. For SZSE, this trend is not that obvious since SME was launch in 2004 and ChiNext was just launched in 2009. However, for the recent two years, comparing with SSE, Table 5.2 provides a similar situation with underpricing of 41.39% and 21.21% for 2010 and 2011 respectively. SZSE, on average, has a relatively smaller degree of underpricing because new listed companies in SME and ChiNext have higher issuing P/E ratio and their offering prices are also relatively higher. Investors know that these companies are risky than companies listed on Main Board in SSE. Therefore it results a relatively smaller degree of underpricing in SZSE. When look into HKEX's data in Table 5.3, it is quite interesting to see that in 2000, 2008 and 2011 the average underpricing is negative, and only in 2006 the average underpricing is a little bit higher and reaches 52.51%. However, it is still a lower number, if compares 52.51% with that of SSE or SZSE.

Table 5.1 Summary of Average Data from Year 2000 to Year 2011 (SSE_A Share)

Year	Underpricing	Number	Overpriced	Subscription	First-day	Raised capital	Offering	Time gap
		of IPOs	IPOs/Total IPOs	Rate	turnover rate	(mil.)	price	
2000	157.00%	95	0.00%	356.76	61.18%	631.37	8.02	24.56
2001	136.01%	67	0.00%	481.53	64.65%	843.79	9.46	27.81
2002	125.63%	69	0.00%	1,325.15	61.00%	749.22	7.17	15.81
2003	71.84%	66	0.00%	1,483.20	51.80%	687.13	7.42	15.91
2004	71.43%	59	1.69%	1,758.06	51.99%	402.11	7.82	16.49

2005	74.75%	3	0.00%	700.46	63.16%	951.51	4.52	14.67
2006	42.78%	14	0.00%	99.97	60.94%	10018.51	6.71	12.79
2007	113.73%	22	0.00%	287.67	58.51%	18621.47	11.86	12.09
2008	49.94%	5	0.00%	249.28	71.46%	14670.80	10.36	10.00
2009	50.94%	10	0.00%	167.45	71.89%	13181.99	10.24	11.80
2010	31.52%	26	19.23%	85.21	68.31%	6747.53	12.54	11.46
2011	13.65%	31	48.39%	63.69	55.29%	2209.81	21.69	9.68
Total	100.60%	467	4.50%	805.45	59.39%	2653.50	9.34	18.34

Table 5.2 Summary of Average Data from Year 2004 to Year 2011 (SZSE_A Share)

Year	Underpricing	Number of IPOs	Overpriced IPOs/Total IPOs	Subscription Rate	First-day turnover rate	Raised capital (mil.)	Offering price	Time gap
2004	68.02%	38	5.26%	2,598.95	59.05%	239.69	9.80	16.24
2005	37.72%	12	0.00%	1,395.24	55.64%	242.38	7.18	19.50
2006	95.92%	56	0.00%	235.93	72.35%	319.88	8.81	14.84
2007	214.01%	96	0.00%	498.43	67.68%	388.79	11.38	13.56
2008	120.46%	71	0.00%	738.45	81.39%	423.72	12.16	12.17
2009	73.30%	101	0.00%	208.62	79.02%	696.80	24.79	14.12
2010	41.39%	319	7.21%	154.19	72.45%	941.64	31.77	12.26
2011	21.21%	192	28.13%	115.55	67.66%	757.26	27.82	9.85
Total	70.27%	885	8.93%	363.21	71.55%	693.21	23.60	12.51

Table 5.3 Summary of Average Data from Year 2000 to Year 2011 (HKEX_H Share)

Year	Underpricing	Number of IPOs	Overpriced IPOs/Total IPOs	Subscription Rate	First-day turnover rate	Raised capital (mil.)	Offering price	Time gap
2000	-3.84%	3	100.00%	1.77	211.69%	17250.27	1.58	7.00
2001	3.30%	4	25.00%	45.25	244.64%	1417.73	2.39	7.50
2002	6.95%	4	25.00%	7.48	179.02%	4218.40	4.47	7.00
2003	18.63%	12	8.33%	180.76	171.09%	3870.84	3.49	7.25

2004	7.98%	8	25.00%	225.09	151.02%	4790.53	8.76	7.00
2005	1.36%	10	20.00%	38.34	194.13%	13723.94	3.61	7.50
2006	52.51%	17	5.88%	316.18	232.05%	17006.82	3.59	7.82
2007	7.36%	6	33.33%	286.16	133.49%	12462.21	5.87	8.50
2008	-5.60%	4	50.00%	78.15	349.54%	7372.09	5.90	8.25
2009	11.30%	6	33.33%	328.65	174.86%	19029.40	12.33	7.83
2010	1.43%	6	50.00%	50.44	246.23%	23076.01	7.73	7.83
2011	-1.40%	2	50.00%	8.36	149.32%	11315.70	12.75	8.00
Total	16.08%	82	25.61%	173.97	201.24%	11767.69	5.44	7.61

In this sub section, summaries of sample data statistics are also provided for A shares in SSE (see Table 5.4), SZSE (see Table 5.5) and H shares in HKEX (see Table 5.6). More detailed data descriptive statistics for each year of the three exchanges are provided in Appendix 3 (see Appendix 3.1, 3.2 and 3.3).

From Table 5.4, it is reported that the underpricing at SSE ranges from -23.16% to 476.77% with standard deviation of 81.97%. For SZSE, it is reported from Table 5.5 that the underpricing ranges from -16.68% to 538.12% with standard deviation of 81.92%. Such a huge range also reflects big risk for participating IPOs. Among 467 companies in SSE, there are 21 companies (percentage of overpriced companies is reported in Table 5.1) that have negative underpricing, and among 885 companies in SZSE, there are 79 companies (percentage of overpriced companies is reported in Table 5.2) that have negative underpricing, which means those shares are overpriced. The average overpricing are 7.47% and 6.13% for SSE and SZSE respectively. In scale, these numbers are relatively small compared with the overall average underpricing 100.60% (SSE) and 70.27% (SZSE). For SSE, among those 21 companies, only one company (code 600978) is listed in 2004 with overpricing 5.24%. Other 20 companies are all listed in 2010 and 2011, representing 35.09% of all the companies listed during the past two years. For SZSE, among those 79 companies, there are only two companies (code 002032 and 002034) are listed in 2004 with overpricing 8.64%. Other 77 companies are also listed in 2010 and 2011, representing 15.07% of all the companies listed during that past two years. So it seems that by simply participating IPOs and selling the stock on the first trading day before 2010, one can make money for sure. However, this had already

become a history due to recent observed fact from both SSE and SZSE. Of course, this phenomenon may also due to the market condition which can be affected by various economic reasons. For example, in 2010 and 2011, lots of investors have negative view about the market and hence cause lots of overpricing IPOs. In contrast, in 2007 the market index shot its historical highest point, all the people were talking about buying stocks every day, which may affect the extreme underpricing during that year for IPOs in both SSE and SZSE.

As for HKEX, Table 5.6 suggests that the underpricing ranges from -86.15% to 292.04% with standard deviation of 40.14%. Compared with Mainland markets, both the degree of underpricing and the standard deviation are much lower. Among 82 companies, there are 21 companies are overpriced, represents 25.61% of the whole sample, and the average overpricing is 11.44%. These overpriced companies are also even distributed across years: from 2000 to 2011, there are always several companies overpriced for each year. By comparing the percentage of overpriced new issues and the overall underpricing degree between Hong Kong stock market and Mainland stock market, one can see that it is relatively harder for an investor to earn profit in IPOs for sure in Hong Kong stock market than in Mainland stock market. As discussed in section 3.1, this may be one reason why investors in Mainland stock market have more enthusiasm to invest in new shares than the ones in Hong Kong stock market since they both learned from history.

Table 5.4 Summary of Sample Data Descriptive Statistics from 2000 to 2011 (SSE_A Share)

Variable	Observation	Mean	Std. Dev.	Min	Max
underpricing	467	100.60%	81.97%	-23.16%	476.77%
subscription rate	467	805.45	815.73	4.05	3333.33
first-day turnover rate	467	59.39%	15.27%	12.11%	94.11%
raised capital size (mil.)	467	2653.50	7701.24	100.00	66800.00
offering price	467	9.34	7.14	2.18	90.00
time gap	467	18.34	10.81	7.00	120.00

Table 5.5 Summary of Sample Data Descriptive Statistics from 2004 to 2011 (SZSE_A Share)

Variable	Observation	Mean	Std. Dev.	Min	Max
underpricing	885	70.27%	81.92%	-16.68%	538.12%
subscription rate	885	363.21	588.05	1.53	3815.34
first-day turnover rate	885	71.55%	16.69%	17.99%	95.92%
raised capital size (mil.)	885	693.21	574.80	90.45	5934.80
offering price	885	23.60	15.68	2.88	148.00
time gap	885	12.51	4.33	7.00	50.00

Table 5.6 Summary of Sample Data Descriptive Statistics from 2000 to 2011 (HKEX_H Share)

Variable	Observation	Mean	Std. Dev.	Min	Max
underpricing	82	16.08%	40.14%	-86.15%	292.04%
subscription rate	82	173.97	231.32	0.20	928.00
first-day turnover rate	82	201.24%	141.11%	0.01%	946.15%
raised capital size (mil.)	82	11767.69	21048.40	30.00	124947.90
offering price	82	5.44	5.59	0.50	28.00
time gap	82	7.61	1.11	6.00	11.00

In regard to correlation among all independent variables, pairwise correlation tables with significance value for SSE, SZSE and HKEX are also given in Table 5.7 and Table 5.8 and Table 5.9. First of all, the correlation coefficient between subscription rate and year dummy 2005 is significantly negative for both SSE and SZSE. This indicates that the regulatory difference before and after 2005 does have impacts on investors' enthusiasm to invest in new shares in China IPOs market. This is also illustrated in appendix 2.1 and 2.2 that the subscription rate decreases a lot after 2005. Secondly, correlation coefficient between year dummy 2005 and time gap are slightly negative for SSE, being -0.3638. It indicates that time gap shrinks after 2005. With regard to HKEX, all the correlation coefficients are insignificant and therefore are close to zero.

Table 5.7 Pairwise Correlation Table with Significance Value (SSE_A Share)

Full sample (observation=467)						
	Sub	Tur	Siz (mil.)	Gap	Yrd	SEO 5
Sub	1					
Tur	-0.1828*	1				
	0.0001					
Siz (mil.)	-0.2663*	-0.1175	1			
	0	0.011				
Gap	-0.072	0.0618	-0.1836*	1		
	0.1203	0.1827	0.0001			
Yrd	-0.4474*	0.1002	0.4626*	-0.3638*	1	
	0	0.0303	0	0		
SEO 5	0.0826	-0.1154	0.0359	-0.0884	-0.0489	1
	0.0745	0.0126	0.4396	0.0562	0.2915	

Table 5.8 Pairwise Correlation Table with Significance Value (SZSE_A Share)

Full sample (observation=885)						
	Sub	Tur	Siz (mil.)	Gap	Yrd	SEO 5
Sub	1					
Tur	-0.0558	1				
	0.0969					
Siz (mil.)	-0.3087*	-0.2063*	1			
	0	0				
Gap	0.1948*	0.0151	-0.1339*	1		
	0	0.6545	0.0001			
Yrd	-0.8058*	0.1588*	0.1672*	-0.1824*	1	
	0	0	0	0		
SEO 5	0.2503*	-0.0055	-0.2177*	0.1079*	-0.0942*	1
	0	0.8709	0	0.0013	0.005	

Table 5.9 Pairwise Correlation Table with Significance Value (HKEX_H Share)

Full sample (observation=82)					
	Sub	Tur	Siz (mil.)	Gap	SEO 5
Sub	1				
Tur	-0.2322 0.0358	1			
Siz (mil.)	-0.1426 0.2012	-0.0911 0.4156	1		
Gap	0.0368 0.7428	0.1465 0.1891	0.2709 0.0138	1	
SEO 5	0.0382 0.7332	-0.1478 0.185	0.1565 0.1603	-0.0528 0.6373	1

Note: (1) *p*-value is given below each correlation coefficient in the above Tables.

(2) *1% significance level.

6. Empirical Results and Interpretations

6.1 Results from Multiple Regressions by Market and Economic Significance

By using methodology described in section 4, multiple regression results by market and for full sample in China stock market are discussed in this section. First, multiple regression approach is used to test different variables' joint effects on IPOs underpricing by market. Moreover, variance inflation factor (VIF) is used to check the degree of multicollinearity for all the multiple regression models²³. Regression and multicollinearity results for A share in SSE, SZSE and H share in HKEX are listed from Table 6.1 to Table 6.3. All the results demonstrate that multicollinearity is not a big problem in the following regression models.

First of all, with respect to SSE, coefficients for first-day turnover rate, time gap and year

²³ As a rule of thumb, a variable with VIF values being greater than 10 may merit further investigation. It means that the variable could be considered as a linear combination of other independent variables.

dummy 2005 are significant and the results are of economic significance. It is reported that coefficient for first-day turnover rate is highly positive and strongly significant. Therefore it is considered the first key determinant of IPOs underpricing in SSE. Regression results suggest that holding other factors constant, **1% increase in first-day turnover rate accompanies 2.60% increase in IPOs underpricing**. This result supports Hypothesis 1, i.e. the higher first-day turnover rate demonstrates household investors' enthusiasm to invest on newly issued stocks, which further pushes the stock market price to a higher level. It also reflects household investors' positive expectation towards the new issues and thus results higher IPOs underpricing. The second key determinant is year dummy 2005, the coefficient for year dummy 2005 in SSE is negative and strongly significant. Table 6.1 suggests that **for IPOs after 2005, the average underpricing reduces 69.29%**. Supporting Hypothesis 4, IPOs underpricing in SSE differs before and after 2005, which is also consistent with Cheung et al. (2009)'s argument. The third key factor is time gap, and it is reported that **1 day increase for the time gap increases IPOs underpricing by 1.03%**. This means although the average time gap is 18.34 for SSE, which shrinks a lot compared with that of 1990s, it still has positive impact on IPOs underpricing. That is to say, the longer the time gap, the higher the investors' risk regarding the true value of new issues and therefore underpricing is expected (required).

In regard to other variables, the coefficient for SEOs is negative and significant at 10% significance level. This is contradictory evidence against Allen and Faulhaber's (1989) and Welch's (1989) signaling model. What's more, this is also different from what Su and Fleisher (1999) found out regarding signaling model since this paper covers different sample period. One possible explanation is that **most companies listed on SSE are relatively big companies with good quality**. They are usually state-owned or have government backgrounds. So **there is no need for them to use underpricing to signal their type at all**. In the contrary, due to their confidence regarding their reputation and strengths, they can still raise money from sequential SEOs with even less underpricing in IPOs compare with companies in SZSE. When looking at the coefficient for raised capital size, it is slightly positive and significant at 5% significance level, which is contradictory against Beatty and Ritter (1986)'s argument that there exists positive relationship between the expected underpricing and the ex-ante uncertainty. This may also because most companies listed on

SSE are state-owned big companies or have government backgrounds. The bigger raised capital size usually indicates a new issue's good quality, **which further induces investors' enthusiasm to invest in it and then push the market price even higher.** In regard to coefficient for subscription rate, it is slightly positive and significant at 5% significance level, which is consistent with Hypothesis 1.

Table 6.1 Multiple Regression Estimates for the Correlation among IPOs Underpricing and Different Independent Variables (SSE_A Share)

Sub sample for SSE, No. of observations=467					
Dependent variable	underpricing	coefficient	standard error	t statistics	p value
Independent variable	subscription rate	0.0000935	0.0000436	2.14	0.032
	first-day turnover rate	2.6037750*	0.2054630	12.67	0.000
	raised capital size (mil.)	0.0000094	0.0000045	2.09	0.038
	time gap	0.0103449*	0.0031326	3.30	0.001
	year dummy	-0.6929424*	0.0947077	-7.32	0.000
	SEO 5	-0.1346837	0.0765679	-1.76	0.079
	constant	-0.6391501*	0.1578289	-4.05	0.000
Adjusted R-squared	0.3737				
		VIF	1/VIF		
Variable	year dummy	1.8	0.55448		
	subscription rate	1.4	0.714161		
	raised capital size (mil.)	1.34	0.747765		
	time gap	1.27	0.787911		
	first-day turnover rate	1.09	0.917529		
	SEO 5	1.03	0.971666		
	Mean VIF	1.32			

Note: *1% significance level.

Secondly, results from Table 6.2 for SZSE show that all the coefficients are significant. The first key determinant is whether a company has seasoned equity offerings within 5 years.

It is reported that **for companies have seasoned equity offerings within 5 years, the average underpricing is 67.80% higher than those do not have seasoned equity offerings within 5 years.** This is consistent with Hypothesis 5. Compare with SSE, all A share companies are listed on SME Board and ChiNext Board and consequently they are relatively smaller and riskier than those A shares in SSE and H shares in HKEX. In order to make their IPOs successful and raise money, issuers are motivated to use underpricing as a signaling and leave a good taste in investors' mouth. Second, although the impact is a little bit less than that of SSE, first-day turnover rate is also one of the most important determinants of IPOs underpricing in SZSE. It is reported that **1% increase in first-day turnover rate accompanies 1.23% increase in IPOs underpricing.** As for the third key determinant, it is reported that **for 1 million raised capital increase, the associated IPOs underpricing decreases 0.025%,** which is consistent with Hypothesis 2. Linking back to section 2, most of companies listed on SZSE after 2004 are private-owned. The result is different from that of SSE because companies listed on SZSE are usually smaller and riskier and thus causes this factor more sensitive.

With regard to other variables, the coefficient for subscription rate, similar to that of SSE, is also slightly positive and significant, which also supports Hypothesis 1. For time gap, similar to that of SSE, it is reported that **1 day increase for the time gap increases IPOs underpricing by 1.48%.**

Table 6.2 Multiple Regression Estimates for the Correlation among IPOs Underpricing and Different Independent Variables (SZSE_A Share)

Sub sample for SZSE, No. of observations=885					
Dependent variable	underpricing	coefficient	standard error	t statistics	p value
Independent variable	subscription rate	0.0001320*	0.0000442	2.99	0.003
	first-day turnover rate	1.2277620*	0.1468278	8.36	0.000
	raised capital size (mil.)	-0.0002478*	0.0000454	-5.46	0.000
	time gap	0.0147691*	0.0056256	2.63	0.009
	SEO 5	0.6779954*	0.0723708	9.37	0.000

	constant	-0.3294621	0.1413410	-2.33	0.020
Adjusted R-squared	0.2562				
	Variable	VIF	1/VIF		
	raised capital size (mil.)	1.2	0.830459		
	subscription rate	1.19	0.837502		
	SEO 5	1.1	0.912427		
	first-day turnover rate	1.06	0.940817		
	time gap	1.05	0.953458		
	Mean VIF	1.12			

Note: *1% significance level.

Finally, it arrives to check the results for HKEX. Table 6.3 suggests that coefficients for subscription rate, first-day turnover rate and time gap are significant. Results suggest that for **1% increase of first-day turnover rate the IPOs underpricing increases 0.17%**, which is much less compared with those of SSE or SZSE. This seems to suggest that the degree of investors' enthusiasm to invest in IPOs is much higher in Mainland China than that in Hong Kong stock market. Moreover, holding all other factors constant, **1 times increase of subscription rate accompanies 0.078% increase of IPOs underpricing for H shares in HKEX**. This result suggests that for all the three exchanges, the subscription rate is positively related to IPOs underpricing but the impact for HKEX seems bigger than that for SSE or SZSE. In regard to time gap, **the average time gap is just 7.61 and the coefficient for time gap is negative and significant at 1% significance level, being -0.0904352**. This is not a surprise since 7.61 days is a very short gap, which reduces investors' risk. Moreover, investors in Hong Kong stock market usually collect more information and know more details about the company before submitting their application for IPOs than Mainland China domestic investors do, which also reduces uncertainty during the gap period. Therefore a slightly negative coefficient is expected. With regard to the other two variables, both of them are insignificant and there is no evidence supports corresponding hypotheses.

Table 6.3 Multiple Regression Estimates for the Correlation among IPOs Underpricing and Different Independent Variables (HKEX_H Share)

Sub sample for HKEX, No. of observations=82					
Dependent variable	underpricing	coefficient	standard error	t statistics	p value
Independent variable	subscription rate	0.0007764*	0.0001616	4.81	0.000
	first-day turnover rate	0.1660212*	0.0268018	6.19	0.000
	raised capital size (mil.)	0.00000163	0.00000183	0.89	0.377
	time gap	-0.0904352*	0.0342206	-2.64	0.010
	SEO 5	0.067118	0.0874478	0.77	0.445
	constant	0.3459589	0.2548127	1.36	0.179
Adjusted R-squared	0.3665				
		VIF	1/VIF		
Variable	raised capital size (mil.)	1.18	0.848951		
	time gap	1.14	0.875982		
	first-day turnover rate	1.13	0.881138		
	subscription rate	1.11	0.902134		
	SEO 5	1.05	0.950188		
	Mean VIF	1.12			

Note: *1% significance level.

6.2 Results from Multiple Regressions for Full Sample in China Stock Market

After analysis in section 6.1 and getting some feelings about the reasons behind underpricing for both A and H share, analysis in this section aims to further investigate whether a factor could be among the key determinants for the underpricing difference between A and H share. As discussed in section 4, dummy variable $D1_i$ is introduced into the analysis of A share vs. H share. Moreover, all data for H share denominated in HKD are converted to RMB using exchange rates²⁴ at corresponding listing dates.

Results from Table 6.4 show that the coefficient for $Tur \cdot D1$ is highly positive and strongly significant. **It suggests that in term of impact on underpricing, first-day turnover rate seems to be one of the most important reasons to explain the underpricing**

²⁴ All corresponding exchange rates are manually collected from official website of State Administration of Foreign Exchange in China. <http://www.safe.gov.cn> accessed on November 1, 2011.

difference between A and H share. This result provides economic intuition that first-day turnover rate has much bigger positive impact on A share's underpricing compared with that on H share. It is also consistent with results from section 6.1 that first-day turnover rate is highly positive related to IPOs underpricing in Mainland stock market. It further supports the argument that the degree of investors' enthusiasm to invest in IPOs is much higher in Mainland China than that in Hong Kong stock market.

The coefficient for Yrd*D1 is negative and significant at 5% significance level but the coefficient for year dummy is not significant. **It means that the regulatory change in 2005 has big impact on IPO underpricing in Mainland stock market but not for H share.** Consistent with Hypothesis 4, it shows that the underpricing degree for A share after 2005 is significantly reduced. However, for H share, no such watershed exists.

With regard to subscription rate, the coefficient for Sub*D1 is slightly negative and significant at 10% significance level. It is consistent with analysis in section 6.1 in such a way that **subscription rate's impact on IPOs underpricing in Hong Kong seems bigger than that in Mainland stock market.** Of course, this impact is offset by other factors that cause higher underpricing in Mainland stock market.

For raised capital size, time gap and SEOs, it seems that although raised capital size and longer time gap matters for underpricing in Mainland stock market and SEOs matter for underpricing in SZSE, they are not among the determinant factors that affect the underpricing difference between A and H share. It is also worth to mention that in this section, multicollinearity is not a major concern in the following models with D1 or D2²⁵. That is because, for example, when β_3Tur_i and $\beta_4D1_iTur_i$ are included in a model, this two variables are correlated for sure. Therefore the focus of models in this section is whether the coefficient difference is significant rather than to concern the multicollinearity.

Table 6.4 Multiple Regression Estimates for Testing Determinant Reasons for Underpricing Difference between A and H Share

²⁵ D2_i: Dummy variable, equals to 1 if a new issue is listed on SZSE, otherwise 0.

Full Sample, No. of Observations=1434					
Dependent variable	underpricing	coefficient	standard error	t statistics	p value
Independent variable	D1	-0.8995786	0.5794943	-1.55	0.121
	subscription rate	0.0007584	0.0003669	2.07	0.039
	Sub*D1	-0.000611	0.0003686	-1.66	0.098
	first-day turnover rate	0.1640859*	0.0603361	2.72	0.007
	Tur*D1	1.588593*	0.1356713	11.71	0.000
	raised capital size (mil.)	0.00000149	0.00000423	0.35	0.724
	Siz*D1	-0.00000107	0.00000603	-0.18	0.859
	time gap	-0.095678	0.0779075	-1.23	0.220
	Gap*D1	0.1144891	0.0779609	1.47	0.142
	year dummy	0.0503198	0.1780496	0.28	0.778
	Yrd*D1	-0.3981919	0.1886867	-2.11	0.035
	SEO5	0.0698857	0.1961388	0.36	0.722
	SEO5*D1	0.3128434	0.2034763	1.54	0.124
	constant	0.3628964	0.5690771	0.64	0.524
Adjusted R-squared = 0.2601		F (13, 1420) = 39.74		Prob > F = 0.0000	

Note: *1% significance level.

One can see from section 6.1 that not only A and H share have different explanations for underpricing, but also within A shares, SSE and SZSE also have difference regarding reasons behind underpricing. Therefore further studies comparing SSE with HKEX, SZSE with HKEX and SSE with SZSE are also performed in this section. Multiple regression results are given in Table 6.5, Table 6.6 and Table 6.7, which are included in Appendix 4.

The result for comparing A share in SSE and H share in HKEX is similar with that of A vs. H share in Table 6.4. However, **when comparing A share in SZSE and H share in HKEX, it is reported that except for similar findings on subscription rate and first-day turnover rate, raised capital size and whether a company has SEOs within 5 years are also key determinants that affect the underpricing difference between SZSE and HKEX.** As discussed in above sections, companies listed in SZSE are usually smaller and riskier than

those in SSE and HKEX, it is not a surprise that the coefficient for Siz*D1 is negative, which is consistent with Hypothesis 2. Coefficient for SEO5*D1 is positive and significant. This is also consistent with results from section 6.1 and partially supports Hypothesis 5. Finally, when comparing SSE and SZSE, a more detailed picture of underpricing difference within A share markets is given. Coefficient for Sub*D2 is slightly positive and significant. This suggests that subscription rate's impact on IPOs underpricing in SZSE is bigger than that in SSE. In the contrary, first-day turnover rate's impact on IPOs underpricing in SZSE is smaller than that in SSE. In regard to raised capital size and SEOs, underpricing for companies listed on SZSE are again more sensitive to these factors, which are consistent with analysis in section 6.1.

6.3 Empirical Results Conclusion

Table 6.8 provides a snapshot for the results of above analysis. In conclusion, the IPOs underpricing in Mainland China and Hong Kong stock markets cannot be explained by exactly the same reasons. Even within A share for SSE and SZSE in Mainland China, the factors related to underpricing are also different from each other. Detailed result for underpricing difference within A share is only included in Appendix 4.

Table 6.8 Snapshot for Empirical Results

By Market	Variables	Effect on Underpricing	Significance Level	Related Hypotheses	Accepted or Rejected
SSE	1 First-day Turnover Rate	+	1%	Hypothesis 1	Accepted
	2 Year Dummy	–	1%	Hypothesis 4	Accepted
	3 Time Gap	+	1%	Hypothesis 3	Accepted
	4 Subscription Rate	+	5%	Hypothesis 1	Accepted
	5 Raised Capital Size	+	5%	Hypothesis 2	Rejected
	6 SEOs	–	10%	Hypothesis 5	Rejected
SZSE	1 SEOs	+	1%	Hypothesis 5	Accepted
	2 First-day Turnover Rate	+	1%	Hypothesis 1	Accepted

	3 Raised Capital Size	–	1%	Hypothesis 2	Accepted
	4 Subscription Rate	+	1%	Hypothesis 1	Accepted
	5 Time Gap	+	1%	Hypothesis 3	Accepted
	1 First-day Turnover Rate	+	1%	Hypothesis 1	Accepted
HKEX	2 Subscription Rate	+	1%	Hypothesis 1	Accepted
	3 Time Gap	–	1%	Hypothesis 3	Partially Accepted
Full Sample (Difference)	Variables*D1	Effect on Underpricing	Significance Level	Related Hypotheses	Accepted or Rejected
A Share vs. H	1 First-day Turnover Rate	+	1% / 1%	Hypothesis 1	Accepted
Share/ SSE	2 Year Dummy	–	5% / 1%	Hypothesis 4	Accepted
vs. HKEX	3 Subscription Rate	–	10% / 5%	Hypothesis 1	Rejected
	1 First-day Turnover Rate	+	1%	Hypothesis 1	Accepted
SZSE vs.	2 Raised Capital Size	–	1%	Hypothesis 2	Accepted
HKEX	3 SEOs	+	1%	Hypothesis 5	Partially Accepted
	4 Subscription Rate	–	10%	Hypothesis 1	Rejected

7. Conclusion

This paper investigates IPOs data for A shares in SSE, SZSE and H shares in HKEX from 2000 to the end of September 2011. In China stock market, the average underpricing for selected IPOs sample of Mainland stock market, namely 467 listed companies in SSE and 885 listed companies in SZSE, are 100.60% and 70.27% respectively. Compare with Mainland stock market, the average underpricing for selected 82 H shares in HKEX is just 16.08%, which is relatively normal compared with findings in other stock markets.

Empirical results suggest that investors' enthusiasm to invest in new shares is among the key determinants for Mainland stock market's high IPOs underpricing. Relatively high first-day turnover rate, a good proxy of investors' enthusiasm to invest in new shares, is the first key factor responsible for high underpricing in Mainland stock market. For A share in SSE, regulatory change, especially pricing method change on January 1 2005, is also one of the important factors affects IPOs underpricing. After 2005, the underpricing degree is

significantly reduced. Moreover, the time gap between offering and listing date is also positive related to underpricing, which supports Mok and Hui (1998)'s argument that longer time gap would increase investors' risk. With regard to SZSE, whether a company has sequential SEOs and the raised capital size from IPOs are also highly related to IPOs underpricing. This means evidence from SZSE is consistent with Beatty and Ritter (1986)'s argument that in order to compensate investors for ex-ante uncertainty regarding the issuing firm's true value, new issues have to be underpriced. In addition, companies have sequential SEOs underprice their new issues more than companies do not have sequential SEOs. In contrast, Evidence from H shares in HKEX tells fewer stories. The empirical results suggest that subscription rate and first-day turnover rate matter for IPOs underpricing, but with a less degree. This supports Hypothesis 1 that investors' enthusiasm to invest in new shares also exists in Hong Kong stock market but cannot be compared with the scale in Mainland stock market. Different from Mainland stock market, relatively shorter time gap has negative effect on underpricing and reduces investors' risk. There is no evidence found from the selected sample of H shares to support neither ex-ante uncertainty hypothesis nor SEOs signaling model.

Further study suggests that investors' enthusiasm to invest in new shares, regulatory changes, ex-ante uncertainty faced by investors, and issuers' incentive to have SEOs are key determinants for underpricing difference between A and H share. This also gives some practical implications for Chinese policy-makers. For example, to facilitate the integration of China capital market and direct China stock market towards a more mature and internationalized market, the lock-up restrictions for institutional placement may be loosened, which balances the power to influence market price towards more reasonable. Government should also provide more capital market education to household investors in order to reduce the irrational part of investment behavior. Legislation and regulation can also be made to shorten the time gap between offering and listing date which further reduces the ex-ante uncertainty for investors.

8. Future Research and Limitations

This paper examines IPOs data for A share in SSE, SZSE and H share in HKEX for the most

recent decade. One key hypothesis for enthusiasm to invest in new shares in China stock market is proposed and several previous theories regarding IPOs underpricing are also tested. However, due to the limit of the scope of this paper and data availability, there is still a lot of space left for future research.

One possible way to do this is to test Baron (1982)'s model. If one can collect detailed data regarding issuers and underwriter, it is possible to give a direct test for this model using China's data. Similarly, Rock's model about informed investors and uninformed investors can also be tested if one can collect relevant data.

There is another factor that this paper does not take into account. That is the earned interest during the time between new issues' offering and listing. As mentioned in section 2.6, in China stock market, when household investors apply for IPOs shares, they have to make advance payment. Funds deposited during this time period generate interest. In Mainland stock market, this interest goes into China Securities Investor Protection Fund, in Hong Kong stock market, this interest goes into issuer's pockets. Taken this factor into account, the average adjusted IPOs underpricing should take out the interest and thus be less than what is found in this paper. Because the earned interest is accrued to issuers' account in Hong Kong; it is reasonable to argue that underpricing should take this factor into account. However, in Mainland stock market, this interest goes into China Securities Investor Protection Fund, and hence underpricing should not be adjusted by earned interest, or at least, the impact is relatively small.

Moreover, several delisted companies are excluded from analysis due to the data availability. This may also create a little bias. However, since the number of delisted companies is very small compared with the sample size in this paper, this bias can be ignored. The selected sample for HKEX is relatively small comparing to that of SSE and SZSE. This is due to the fact that the number of listed H shares in HKEX is only 164 at the end of September 2011. As time passes, more IPOs sample can be included into analysis and therefore results more robust conclusion.

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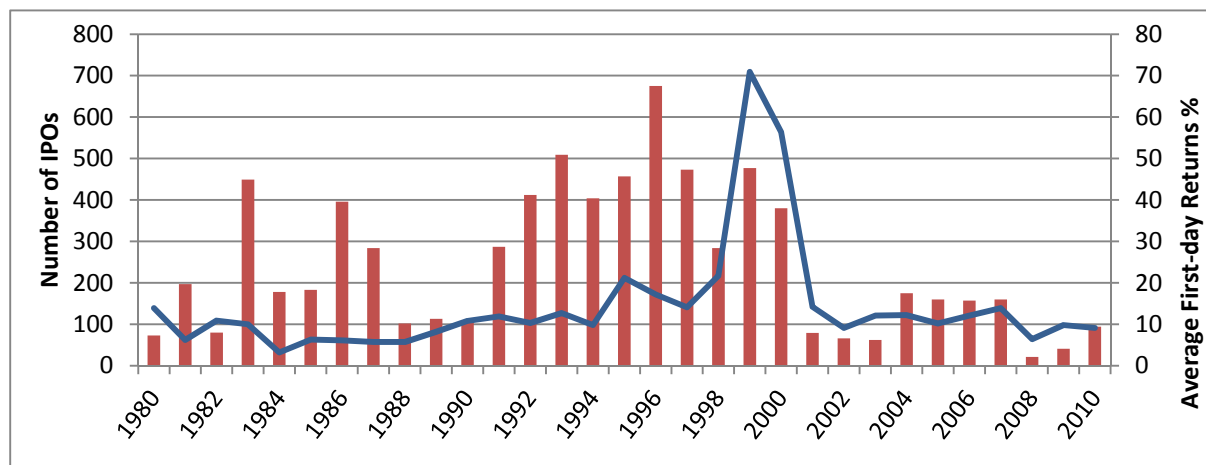
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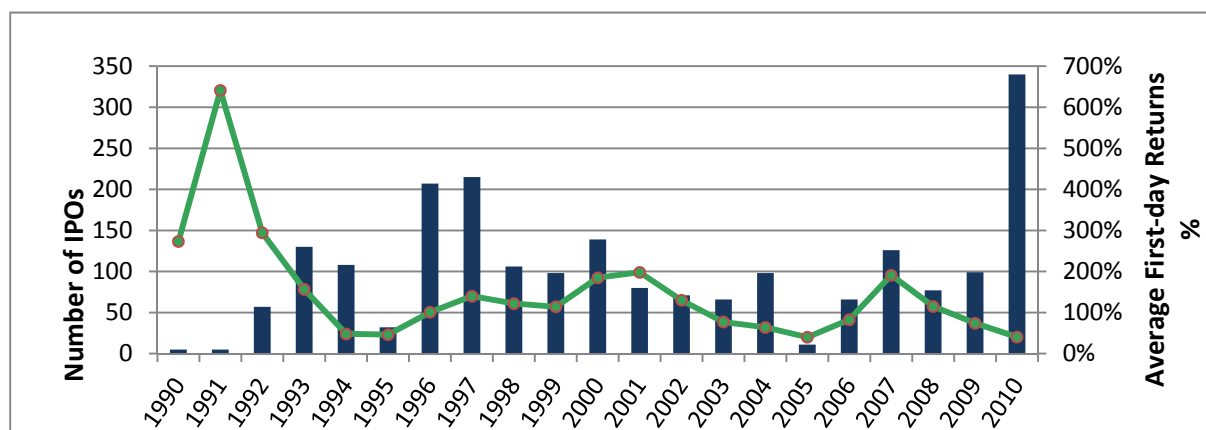
Appendix

1. Comparison among US, Mainland China and Hong Kong Stock Markets

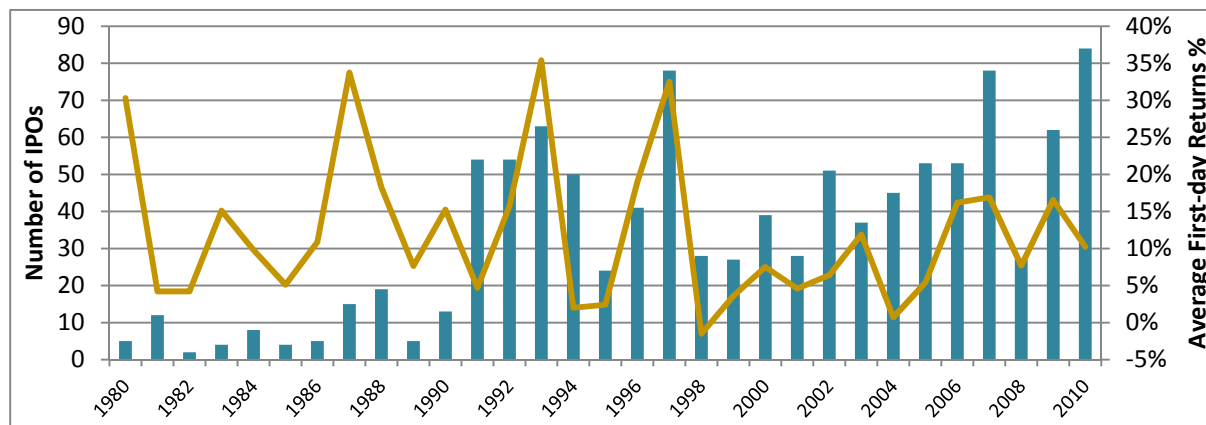
Number of Offerings and Average First-day Returns on US IPOs, 1980-2010



Number of Offerings and Average First-day Returns on Chinese IPOs, 1990-2010



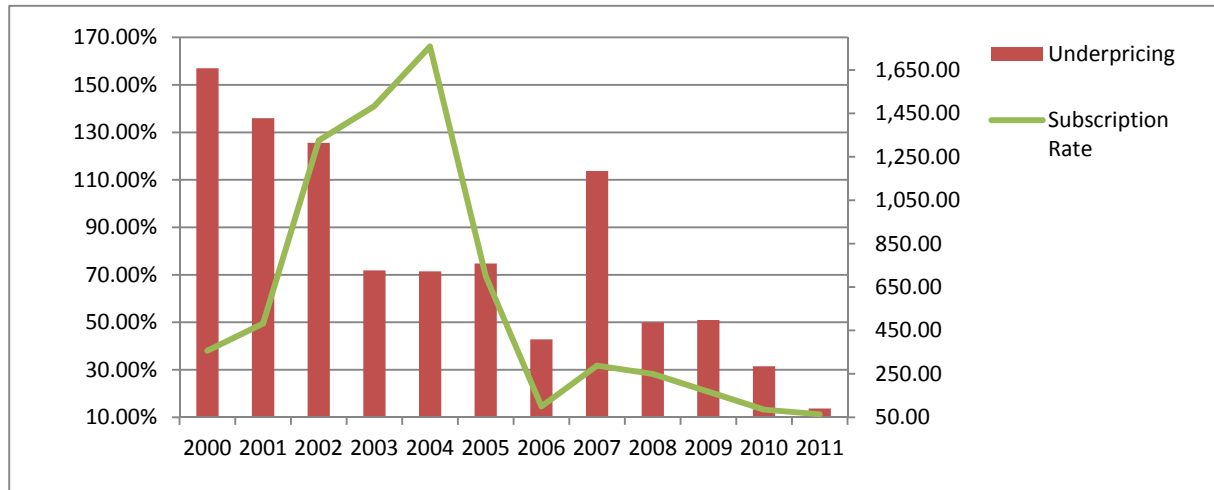
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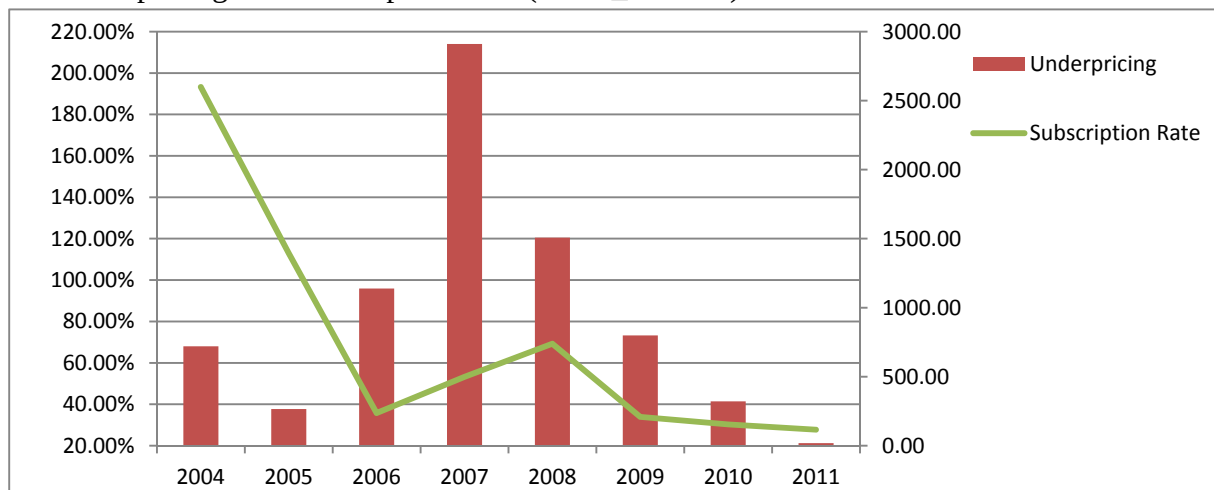
Source: Prof. Jay Ritter, University of Florida, May 2011

2. Underpricing and Different Single Variable

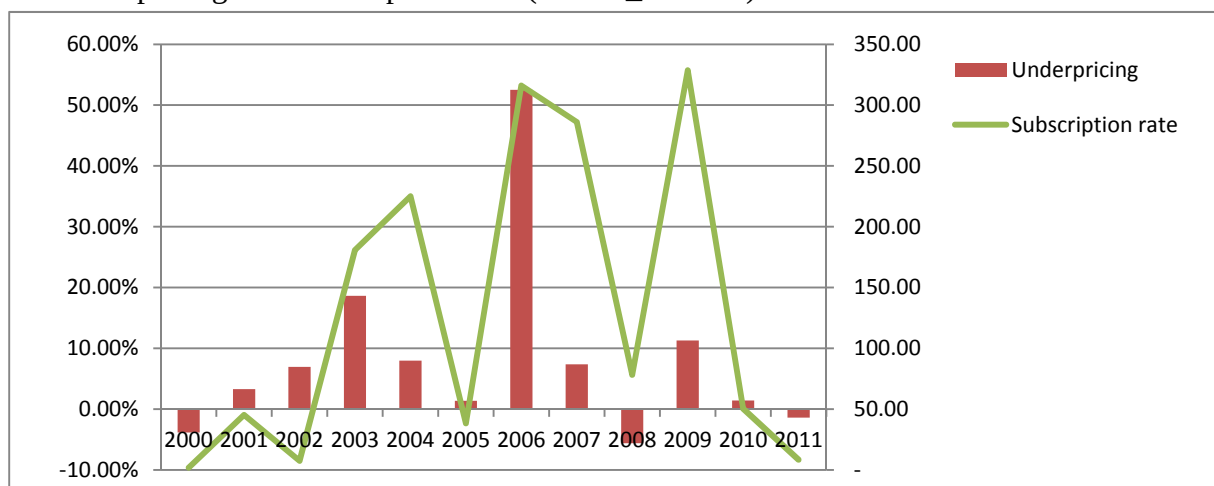
2.1 Underpricing and Subscription Rate (SSE_A Share)



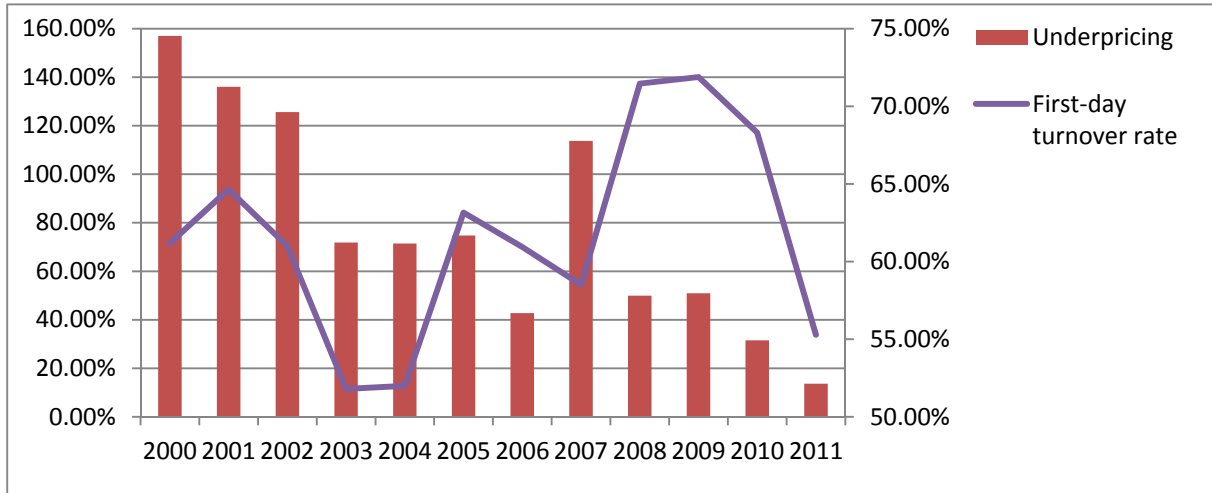
2.2 Underpricing and Subscription Rate (SZSE_A Share)



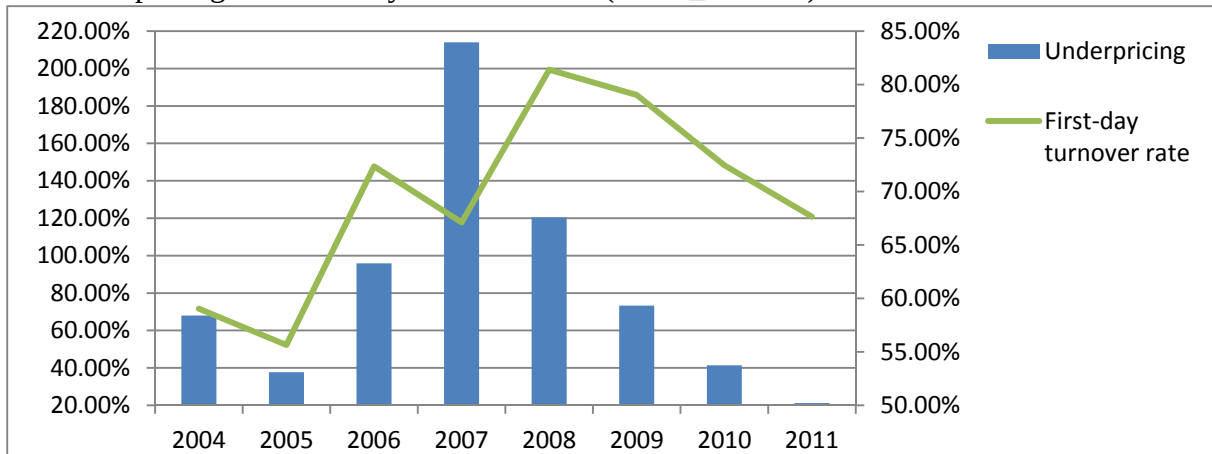
2.3 Underpricing and Subscription Rate (HKEX_H Share)



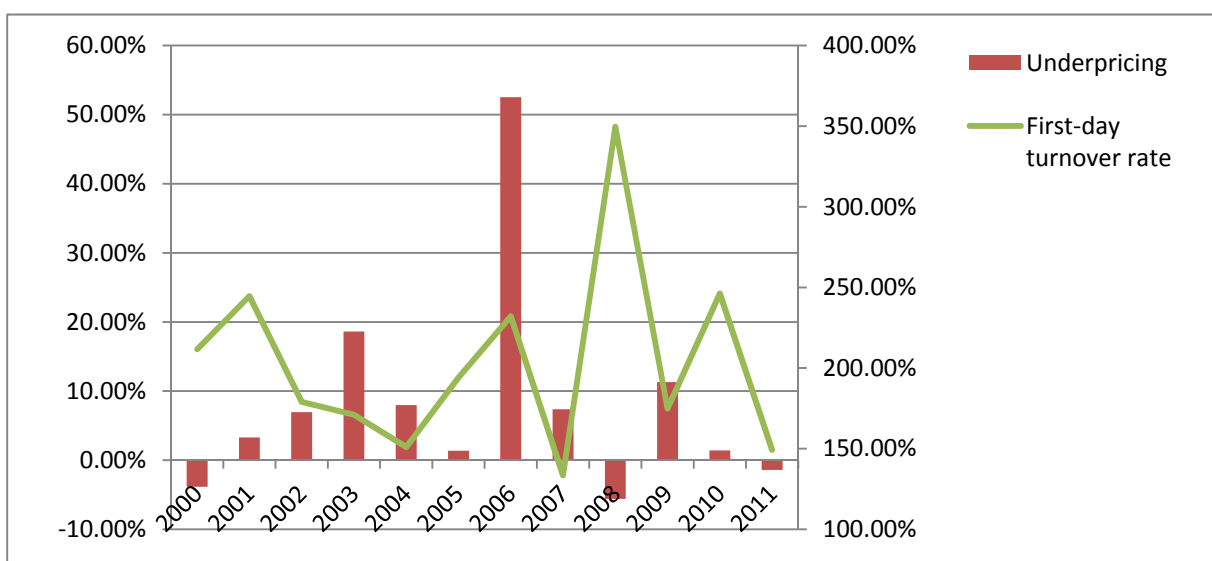
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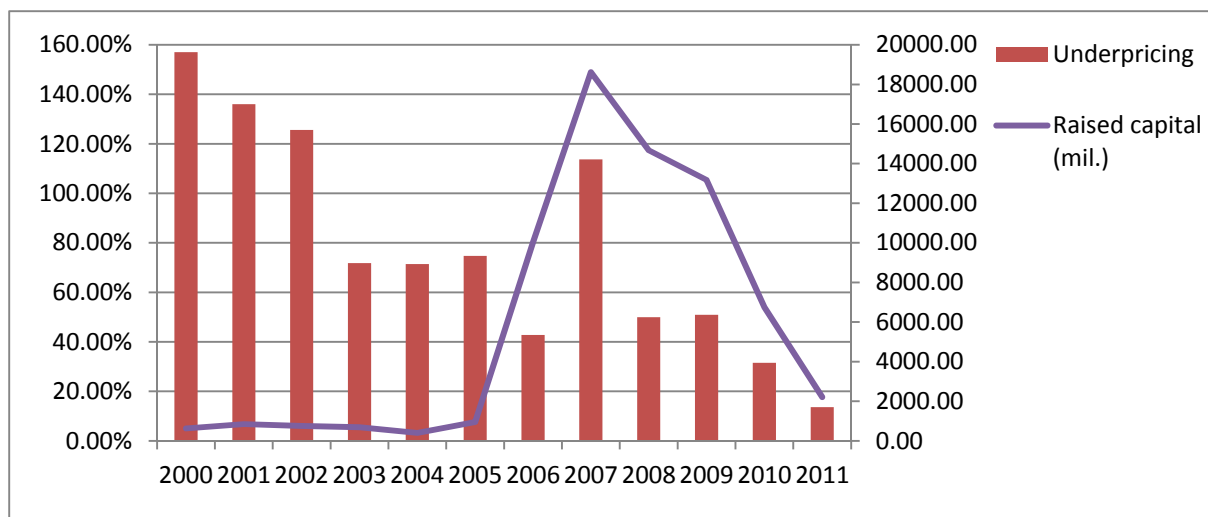
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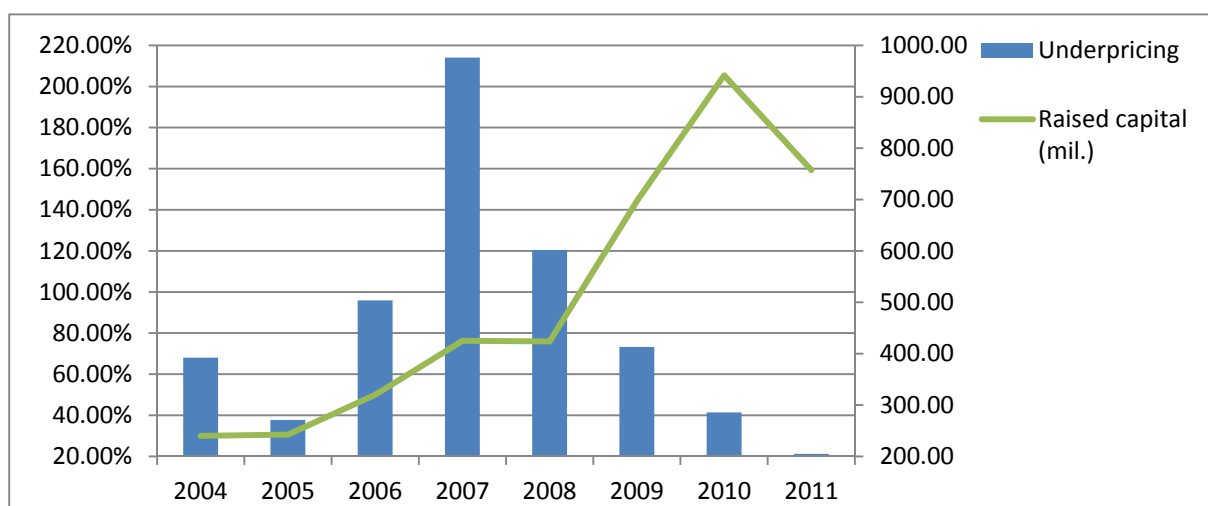
2.6 Underpricing and First-day Turnover Rate (HKEX_H Share)



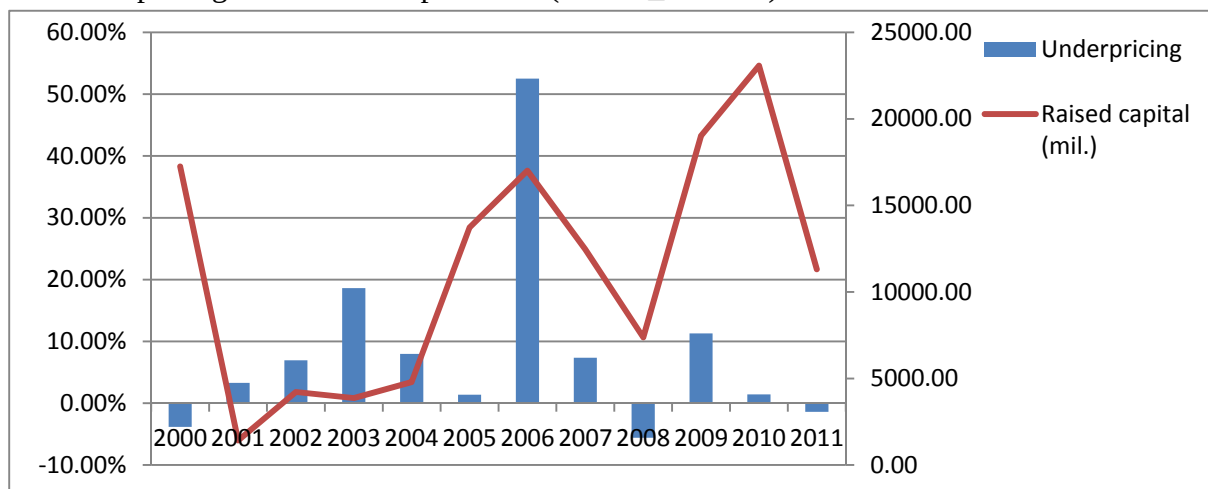
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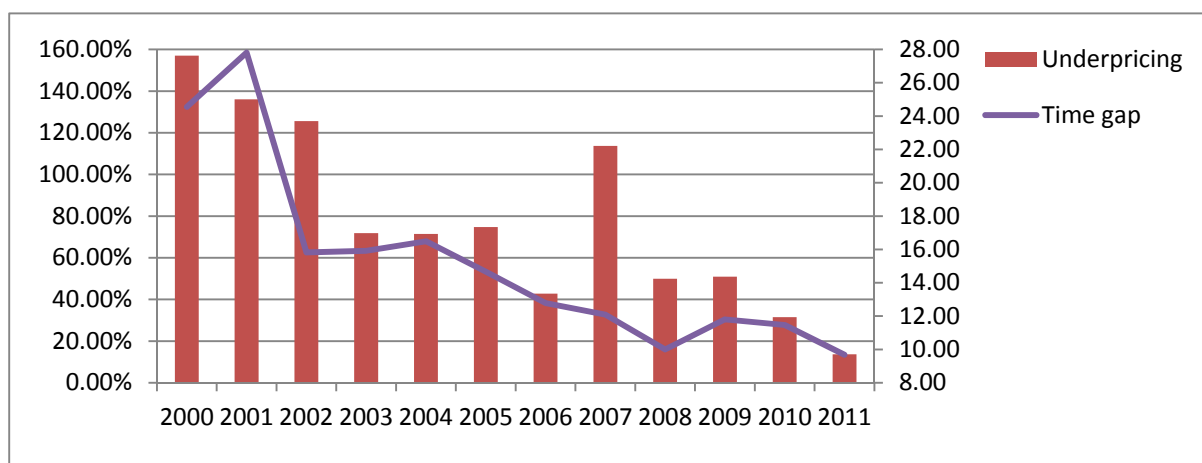
2.8 Underpricing and Raised Capital Size (SZSE_A Share)



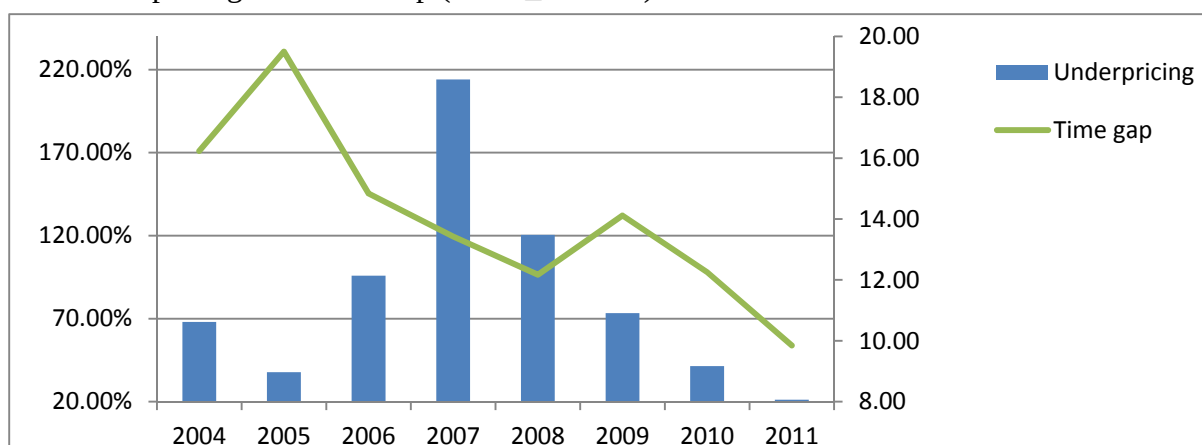
2.9 Underpricing and Raised Capital Size (HKEX_H Share)



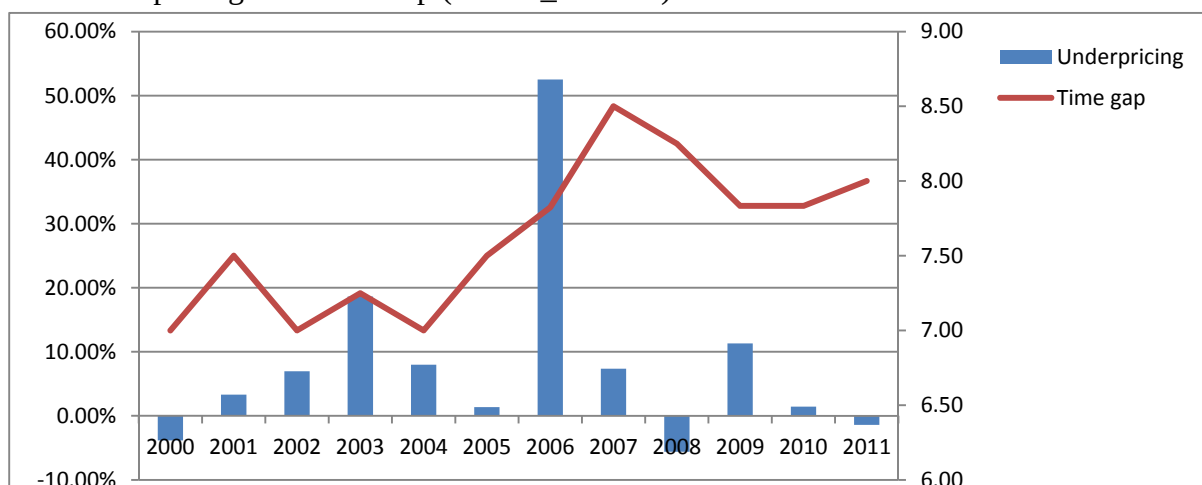
2.10 Underpricing and Time Gap (SSE_A Share)



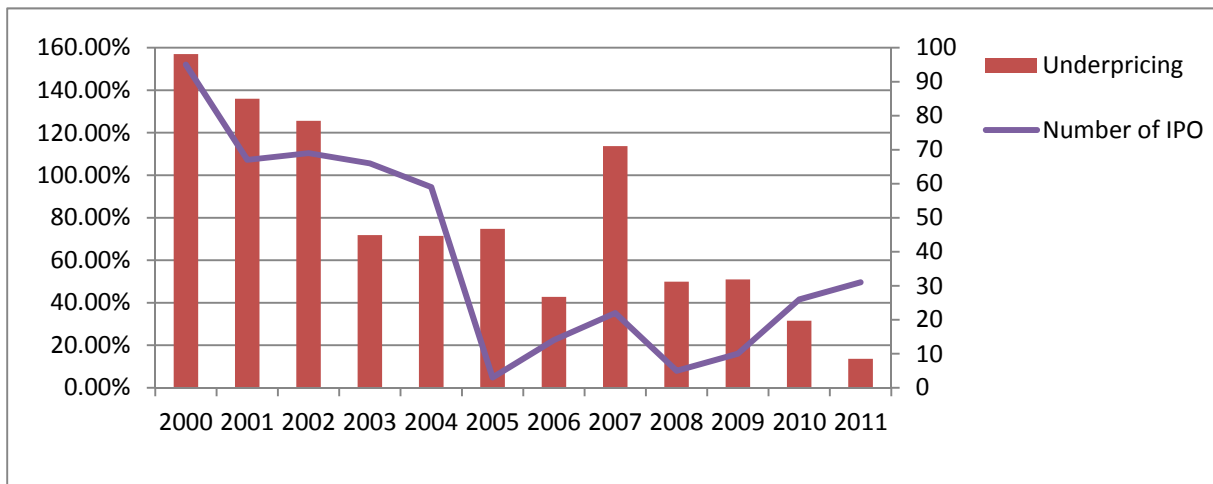
2.11 Underpricing and Time Gap (SZSE_A Share)



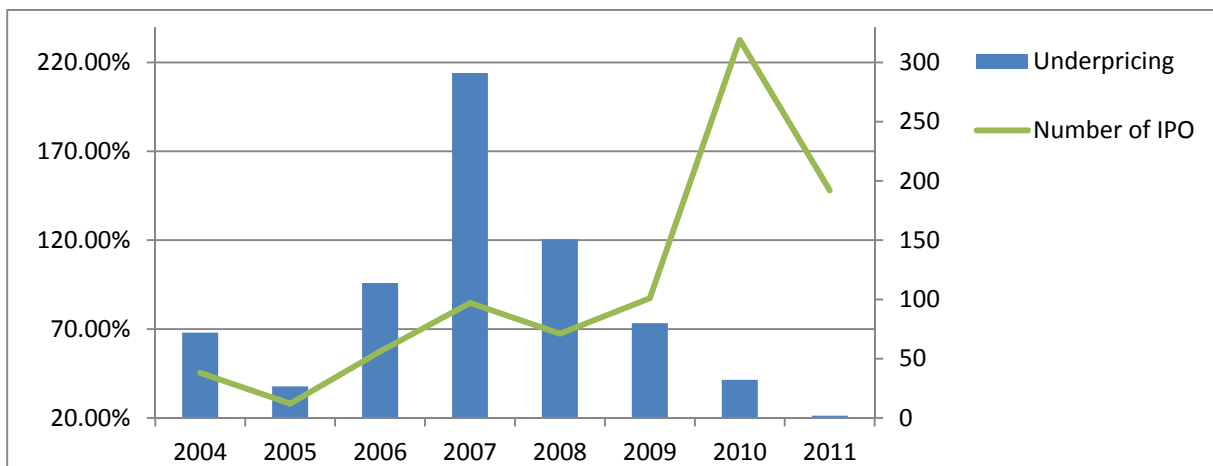
2.12 Underpricing and Time Gap (HKEX_H Share)



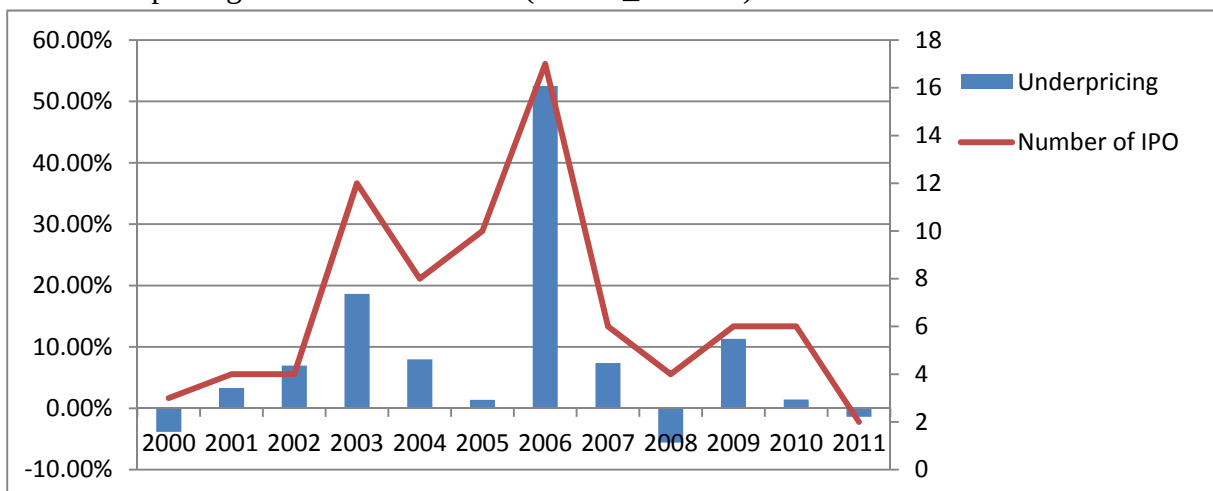
2.13 Underpricing and Number of IPOs (SSE_A Share)



2.14 Underpricing and Number of IPOs (SZSE_A Share)



2.15 Underpricing and Number of IPOs (HKEX_H Share)



3. Detailed Summary of Sample Data Descriptive Statistics

3.1 Detailed Summary of Sample Data Descriptive Statistics from 2000 to 2011 (SSE_A Share)

	Variable	Observation	Mean	Std. Dev.	Min	Max
2000	underpricing	95	157.00%	85.85%	21.82%	476.77%
	subscription rate	95	356.76	226.03	26.04	1000.00
	first-day turnover rate	95	61.18%	9.91%	35.62%	81.19%
	raised capital size (mil.)	95	631.37	916.87	144.00	7845.86
	offering price	95	8.02	2.84	3.78	18.24
	time gap	95	24.56	15.79	13.00	120.00
2001	underpricing	67	136.01%	91.36%	0.74%	413.79%
	subscription rate	67	481.53	413.29	19.88	1666.67
	first-day turnover rate	67	64.65%	12.49%	26.53%	88.44%
	raised capital size (mil.)	67	843.79	1463.03	138.00	11816.00
	offering price	67	9.46	5.87	2.27	36.68
	time gap	67	27.81	13.26	12.00	87.00
2002	underpricing	69	125.63%	78.32%	11.33%	428.25%
	subscription rate	69	1325.16	793.20	36.36	3333.33
	first-day turnover rate	69	61.00%	12.14%	43.24%	83.39%
	raised capital size (mil.)	69	749.22	1853.36	100.00	11500.00
	offering price	69	7.17	3.31	2.20	16.18
	time gap	69	15.81	3.30	10.00	31.00
2003	underpricing	66	71.84%	43.64%	10.73%	227.99%
	subscription rate	66	1483.20	730.54	69.93	3333.33
	first-day turnover rate	66	51.80%	7.98%	36.51%	68.56%
	raised capital size (mil.)	66	687.13	1404.15	157.50	10001.80
	offering price	66	7.42	3.48	2.60	23.04
	time gap	66	15.91	2.58	13.00	25.00
2004	underpricing	59	71.43%	50.66%	-5.24%	269.78%
	subscription rate	59	1758.06	776.58	400.00	3333.33
	first-day turnover rate	59	51.99%	9.90%	26.46%	67.34%
	raised capital size (mil.)	59	402.11	230.12	150.90	1399.20
	offering price	59	7.82	3.86	2.60	23.05
	time gap	59	16.49	3.01	13.00	28.00
2005	underpricing	3	74.75%	61.32%	11.43%	133.86%
	subscription rate	3	700.46	502.90	263.16	1250.00
	first-day turnover rate	3	63.16%	16.25%	44.76%	75.54%
	raised capital size (mil.)	3	951.51	845.91	436.74	1927.80
	offering price	3	4.52	2.66	2.52	7.53
	time gap	3	14.67	5.03	10.00	20.00

2006	underpricing	14	42.78%	30.28%	0.00%	106.20%
	subscription rate	14	99.97	58.76	18.76	192.31
	first-day turnover rate	14	60.94%	14.56%	34.79%	82.21%
	raised capital size (mil.)	14	10018.51	11964.27	1081.00	40560.00
	offering price	14	6.71	4.85	2.40	18.88
	time gap	14	12.79	4.12	7.00	21.00
2007	underpricing	22	113.73%	71.20%	32.25%	329.53%
	subscription rate	22	287.67	368.67	40.49	1666.67
	first-day turnover rate	22	58.51%	12.88%	34.39%	78.52%
	raised capital size (mil.)	22	18621.47	21217.42	467.50	66800.00
	offering price	22	11.86	9.74	2.88	36.99
	time gap	22	12.09	4.69	7.00	22.00
2008	underpricing	5	49.94%	27.89%	28.19%	95.23%
	subscription rate	5	249.28	100.45	136.99	370.37
	first-day turnover rate	5	71.46%	17.54%	50.57%	92.53%
	raised capital size (mil.)	5	14670.80	8654.82	6540.00	25671.36
	offering price	5	10.36	6.31	2.18	16.83
	time gap	5	10.00	2.83	7.00	13.00
2009	underpricing	10	50.94%	63.50%	2.34%	202.78%
	subscription rate	10	167.45	162.58	35.34	526.32
	first-day turnover rate	10	71.89%	12.88%	58.48%	90.83%
	raised capital size (mil.)	10	13181.99	14327.57	903.50	50160.00
	offering price	10	10.24	8.94	3.60	31.00
	time gap	10	11.80	4.52	7.00	22.00
2010	underpricing	26	31.52%	31.27%	-4.12%	117.85%
	subscription rate	26	85.21	51.01	6.93	196.08
	first-day turnover rate	26	68.31%	23.78%	16.83%	92.08%
	raised capital size (mil.)	26	6747.53	11691.07	837.29	59590.59
	offering price	26	12.54	7.91	2.68	29.80
	time gap	26	11.46	3.08	7.00	17.00
2011	underpricing	31	13.65%	28.94%	-23.16%	84.58%
	subscription rate	31	63.69	57.48	4.05	212.77
	first-day turnover rate	31	55.29%	32.31%	12.11%	94.11%
	raised capital size (mil.)	31	2209.81	1918.08	530.00	9459.00
	offering price	31	21.69	15.72	3.90	90.00
	time gap	31	9.68	1.97	7.00	13.00

3.2 Detailed Summary of Sample Data Descriptive Statistics from 2004 to 2011 (SZSE_A Share)

	Variable	Observation	Mean	Std. Dev.	Min	Max
2004	underpricing	38	68.02%	62.38%	-9.00%	324.89%
	subscription rate	38	2598.95	449.36	1577.29	3815.34
	first-day turnover rate	38	59.05%	12.59%	23.17%	81.28%
	raised capital size (mil.)	38	239.69	81.82	122.40	473.20

	offering price	38	9.80	3.13	6.12	18.20
	time gap	38	16.24	2.20	14.00	23.00
2005	underpricing	12	37.72%	23.34%	2.79%	74.12%
	subscription rate	12	1395.25	273.19	938.61	1958.10
	first-day turnover rate	12	55.64%	5.79%	47.29%	64.43%
	raised capital size (mil.)	12	242.38	99.62	119.50	438.60
	offering price	12	7.18	3.63	3.55	16.70
	time gap	12	19.50	6.96	13.00	31.00
2006	underpricing	56	95.92%	58.59%	24.47%	345.71%
	subscription rate	56	235.93	169.46	35.54	822.03
	first-day turnover rate	56	72.35%	9.58%	44.86%	94.05%
	raised capital size (mil.)	56	319.88	206.34	90.45	1252.50
	offering price	56	8.81	4.78	3.24	26.00
	time gap	56	14.84	3.00	9.00	23.00
2007	underpricing	96	214.01%	110.64%	51.02%	538.12%
	subscription rate	96	498.43	565.60	47.23	2820.08
	first-day turnover rate	96	67.68%	8.66%	38.97%	87.07%
	raised capital size (mil.)	96	388.79	475.72	111.38	4140.00
	offering price	96	11.38	4.94	5.08	36.00
	time gap	96	13.56	3.31	7.00	22.00
2008	underpricing	71	120.46%	90.90%	7.66%	403.54%
	subscription rate	71	738.45	487.75	120.00	3091.19
	first-day turnover rate	71	81.39%	6.60%	54.21%	93.26%
	raised capital size (mil.)	71	423.72	296.97	122.20	1510.18
	offering price	71	12.16	5.47	2.88	26.08
	time gap	71	12.17	3.07	8.00	21.00
2009	underpricing	101	73.30%	39.94%	19.68%	209.73%
	subscription rate	101	208.62	135.81	48.45	738.01
	first-day turnover rate	101	79.02%	8.52%	60.98%	91.19%
	raised capital size (mil.)	101	696.80	386.48	196.60	2700.00
	offering price	101	24.79	11.57	8.20	60.00
	time gap	101	14.12	7.50	8.00	35.00
2010	underpricing	319	41.39%	42.16%	-9.91%	275.33%
	subscription rate	319	154.19	79.32	23.16	391.08
	first-day turnover rate	319	72.45%	14.97%	19.94%	91.72%
	raised capital size (mil.)	319	941.64	659.72	125.94	5934.80
	offering price	319	31.77	16.77	5.80	148.00
	time gap	319	12.26	3.42	9.00	50.00
2011	underpricing	192	21.21%	31.23%	-16.68%	198.89%
	subscription rate	192	115.55	86.02	1.53	395.88
	first-day turnover rate	192	67.66%	25.06%	17.99%	95.92%
	raised capital size (mil.)	192	757.26	540.38	171.00	4690.00
	offering price	192	27.82	13.96	8.00	86.00
	time gap	192	9.85	2.42	7.00	19.00

3.3 Detailed Summary of Sample Data Descriptive Statistics from 2000 to 2011 (HKEX_H Share)

	Variable	Observation	Mean	Std. Dev.	Min	Max
2000	underpricing	3	-3.84%	1.16%	-4.72%	-2.52%
	subscription rate	3	1.77	2.03	0.20	4.06
	first-day turnover rate	3	211.69%	183.79%	81.47%	421.93%
	raised capital size (mil.)	3	17250.27	12753.08	2740.15	26680.98
	offering price	3	1.58	0.30	1.27	1.87
	time gap	3	7.00	1.00	6.00	8.00
2001	underpricing	4	3.30%	8.19%	-7.08%	12.68%
	subscription rate	4	45.25	54.97	1.00	120.06
	first-day turnover rate	4	244.64%	173.54%	115.00%	482.44%
	raised capital size (mil.)	4	1417.73	1639.85	100.06	3767.35
	offering price	4	2.39	1.40	1.13	4.10
	time gap	4	7.50	2.38	6.00	11.00
2002	underpricing	4	6.96%	6.93%	-2.04%	12.50%
	subscription rate	4	7.48	7.56	2.40	18.70
	first-day turnover rate	4	179.02%	73.92%	94.75%	250.60%
	raised capital size (mil.)	4	4218.40	5103.33	857.73	11800.29
	offering price	4	4.47	4.44	1.47	10.95
	time gap	4	7.00	1.41	6.00	9.00
2003	underpricing	12	18.63%	23.10%	-5.66%	72.73%
	subscription rate	12	180.76	256.59	1.60	744.30
	first-day turnover rate	12	171.09%	101.38%	68.34%	431.02%
	raised capital size (mil.)	12	3870.84	7410.93	65.00	26713.82
	offering price	12	3.49	3.77	0.50	13.30
	time gap	12	7.25	1.42	6.00	10.00
2004	underpricing	8	7.98%	14.44%	-12.44%	28.57%
	subscription rate	8	225.09	318.70	1.20	928.00
	first-day turnover rate	8	151.02%	67.74%	64.97%	273.59%
	raised capital size (mil.)	8	4790.53	5200.13	30.00	14336.92
	offering price	8	8.76	8.18	0.54	22.00
	time gap	8	7.00	0.93	6.00	9.00
2005	underpricing	10	1.37%	7.39%	-10.72%	13.20%
	subscription rate	10	38.34	65.10	0.38	204.00
	first-day turnover rate	10	194.13%	103.84%	64.47%	409.41%
	raised capital size (mil.)	10	13723.94	21903.28	54.59	71578.26
	offering price	10	3.61	3.20	0.53	10.80
	time gap	10	7.50	1.08	6.00	10.00
2006	underpricing	17	52.51%	68.01%	-19.53%	292.04%
	subscription rate	17	316.18	255.15	1.40	851.00
	first-day turnover rate	17	232.05%	222.71%	107.00%	946.15%
	raised capital size (mil.)	17	17006.82	34708.67	79.10	124947.90
	offering price	17	3.59	2.96	1.13	12.68

	time gap	17	7.82	0.81	7.00	9.00
2007	underpricing	6	7.36%	50.53%	-86.15%	59.12%
	subscription rate	6	286.16	130.31	120.82	475.00
	first-day turnover rate	6	133.49%	86.16%	0.01%	249.03%
	raised capital size (mil.)	6	12462.22	12291.04	2330.21	32923.24
	offering price	6	5.87	0.79	4.50	6.80
	time gap	6	8.50	0.55	8.00	9.00
2008	underpricing	4	-5.60%	15.01%	-19.23%	12.34%
	subscription rate	4	78.15	143.32	1.42	293.00
	first-day turnover rate	4	349.54%	103.89%	244.78%	450.70%
	raised capital size (mil.)	4	7372.09	8667.12	1306.37	20196.69
	offering price	4	5.90	4.64	1.30	10.70
	time gap	4	8.25	0.50	8.00	9.00
2009	underpricing	6	11.30%	24.08%	-11.50%	56.43%
	subscription rate	6	328.65	283.12	27.04	774.64
	first-day turnover rate	6	174.86%	33.67%	116.84%	212.65%
	raised capital size (mil.)	6	19029.40	9542.96	6847.86	31228.62
	offering price	6	12.33	8.46	6.35	28.00
	time gap	6	7.83	0.41	7.00	8.00
2010	underpricing	6	1.43%	5.09%	-6.01%	8.14%
	subscription rate	6	50.44	95.09	0.89	242.19
	first-day turnover rate	6	246.23%	162.64%	76.07%	457.26%
	raised capital size (mil.)	6	23076.01	34797.52	3294.24	93515.29
	offering price	6	7.73	6.92	2.33	17.98
	time gap	6	7.83	1.17	7.00	10.00
2011	underpricing	2	-1.40%	1.98%	-2.80%	0.00%
	subscription rate	2	8.36	10.90	0.65	16.06
	first-day turnover rate	2	149.32%	20.41%	134.89%	163.75%
	raised capital size (mil.)	2	11315.70	6644.61	6617.25	16014.15
	offering price	2	12.75	14.50	2.50	23.00
	time gap	2	8.00	0.00	8.00	8.00

4. Multiple Regression Estimates for Testing Determinant Reasons for Underpricing Difference

Table 6.5 Multiple Regression Estimates for Testing Determinant Reasons for Underpricing Difference between SSE (A Share) and HKEX (H Share)

Full Sample, No. of Observations=549					
Dependent variable	underpricing	coefficient	standard error	t statistics	p value
Independent variable	D1	-1.002051	0.5129304	-1.95	0.051
	subscription rate	0.0007584	0.0003164	2.40	0.017
	Sub*D1	-0.0006649	0.0003191	-2.08	0.038
	first-day turnover rate	0.16408*	0.0520306	3.15	0.002
	Tur*D1	2.439695*	0.2011196	12.13	0.000
	raised capital size (mil.)	0.00000149	0.00000365	0.41	0.683
	Siz*D1	0.00000792	0.00000561	1.41	0.159
	time gap	-0.0956768	0.0671833	-1.42	0.155
	Gap*D1	0.1060217	0.0672485	1.58	0.115
	year dummy	0.0503223	0.1535404	0.33	0.743
	Yrd*D1	-0.7432647*	0.1777464	-4.18	0.000
	SEO5	0.0698841	0.1691395	0.41	0.680
	SEO5*D1	-0.2045678	0.1839826	-1.11	0.267
	constant	0.3629007	0.4907414	0.74	0.460
Adjusted R-squared = 0.4516		F (13, 535) = 35.72		Prob > F = 0.0000	

Note: *1% significance level.

Table 6.6 Multiple Regression Estimates for Testing Determinant Reasons for Underpricing Difference between SZSE (A Share) and HKEX (H Share)

Full Sample, No. of Observations=967					
Dependent variable	underpricing	coefficient	standard error	t statistics	p value
Independent variable	D1	-0.6749844	0.560809	-1.20	0.229
	subscription rate	0.0007787	0.0003459	2.25	0.025
	Sub*D1	-0.0006467	0.0003485	-1.86	0.064
	first-day turnover rate	0.1664729*	0.0574274	2.90	0.004
	Tur*D1	1.06129*	0.1532677	6.92	0.000
	raised capital size (mil.)	0.00000176	0.00000396	0.44	0.657

Siz*D1	-0.0002496*	0.0000441	-5.66	0.000
time gap	-0.0906369	0.0729085	-1.24	0.214
Gap*D1	0.1054061	0.0731115	1.44	0.150
SEO5	0.0647311	0.1877343	0.34	0.730
SEO5*D1	0.6132643*	0.2003746	3.06	0.002
constant	0.345522	0.54387	0.64	0.525
Adjusted R-squared = 0.2811		F (11, 955) = 35.35		Prob > F = 0.0000

Note: *1% significance level.

Table 6.7 Multiple Regression Estimates for Testing Determinant Reasons for Underpricing Difference between SSE (A Share) and SZSE (A Share)

Full Sample, No. of Observations=1352					
Dependent variable	underpricing	coefficient	standard error	t statistics	p value
Independent variable	D2	-1.099928*	0.289753	-3.80	0.000
	subscription rate	0.0000935	0.0000453	2.06	0.039
	Sub*D2	0.0004448*	0.000084	5.29	0.000
	first-day turnover rate	2.60378*	0.2136868	12.19	0.000
	Tur*D2	-1.552286*	0.2567634	-6.05	0.000
	raised capital size (mil.)	0.00000941	0.00000469	2.01	0.045
	Siz*D2	-0.0002318*	0.0000437	-5.30	0.000
	time gap	0.0103448*	0.003258	3.18	0.002
	Gap*D2	0.007053	0.0062935	1.12	0.263
	year dummy	-0.692944*	0.0984983	-7.04	0.000
	Yrd*D2	2.103487*	0.220338	9.55	0.000
	SEO5	-0.1346835	0.0796325	-1.69	0.091
	SEO5*D2	0.7222541*	0.1061932	6.80	0.000
	constant	-0.6391513*	0.1641461	-3.89	0.000
Adjusted R-squared = 0.3419		F (13, 1338) = 54.99		Prob > F = 0.0000	

Note: *1% significance level. $D2_i$: a dummy variable, equals to 1 if a new issue is listed on SZSE, otherwise 0.