

**A Comparison of Initial Public Offering (IPO) Underpricing
between China A-shares and B-shares Markets**

By

Tianwei Zhang

A research project submitted in partial fulfillment of
the requirements for the degree of Master of Finance

Saint Mary's University

Copyright Tianwei Zhang 2012

Written for FIN 6669 under the direction of Dr.

Francis Boabang

Approved: Dr. Francis Boabang
Supervisor

Approved: Dr. Francis Boabang
Program Director

Date: January 10, 2013

Acknowledgement

First of all, I would like to thank Dr. Francis Boabang for his help and advice in finishing this research paper. Furthermore, I want to thank all the professors in the Master of Finance Program for their excellent work. Finally, I would like to express my appreciation to my family for their support, encouragement, and especially their patience during my study at Saint Mary's University.

Abstract

A Comparison of Initial Public Offering (IPO) Underpricing between China A-shares and B-shares Markets

By

Tianwei Zhang

November 8, 2012

This paper investigates the underpricing level of A-shares and B-shares IPO companies listed in the Chinese stock market from 1991 to 2010. The sample covers 84 IPOs of listed companies with 42 A-shares and 42 B-shares. Our results confirm that Chinese IPO underpricing is the highest among the major world markets. We further examined some of the factors that influence IPO underpricing such as: offering price, issuing size, age of the firm before going public, turnover rate in first trading day and industry type.

The results confirm that the offering price and the turnover rate have strong influence on IPO underpricing of A-shares. None of these factors has any significant effect on B-shares.

Table of Content

Introduction.....	1
1.1 Overview and background.....	1
1.2 Pricing method of China's stock market.....	2
1.3 Purpose of Study.....	3
Literature Review.....	5
2.1 High initial return phenomena of short-term IPO.....	5
2.2 Several explanations of IPO high initial return.....	10
2.2.1 Information asymmetry theory.....	10
2.2.2 High initial rate of return explanation in IPOs in the secondary market...	15
2.2.3 Economy behavior.....	17
2.2.4 Empirical research about underpricing in China.....	18
Data and methodology.....	20
3.1 Data sources and description.....	20
3.2 Methodology.....	21
3.3 Relationship between DUP and independent variables.....	22
Results and analysis.....	25
4.1 Descriptive statistic of variables.....	25
4.2 The result of regression.....	28
4.2.1 Issuing size.....	30
4.2.2 Offering price.....	30
4.2.3 Age of firm before going public.....	31
4.2.4 Turnover rate.....	32
4.2.5 Industry type.....	32
4.2.6 Error term.....	32

Conclusion.....34

 5.1 Conclusion of the study.....34

 5.2 Recommendation.....35

Reference.....36

Chapter 1: Introduction

1.1 Overview and Background

China's securities market began in the early 1990's, and has a relatively short history when compared with other markets in the world. At the early stage of the development of China's securities market, the main objective was to raise funds to support the state-owned enterprises. With the rapid development of China's stock market over the past decade, more private and public enterprises chose this method of issuing the listed stock as the preferred manner of financing. Both A and B-shares are listed as issued stock in the Chinese stock market. In simple terms, A-shares are for domestic investors; while B-shares are for overseas investors. Though B-shares are denominated in RMB value, foreign investors purchase them in foreign currency. For example, the Shanghai Stock Exchange is required to purchase in US dollars, while the Shenzhen Stock Exchange trades in HK dollars.

According to the latest statistics of the China Securities Regulatory Commission (published on April 5th, 2012), there are 2782 listed companies in China. There are 2674 companies issued A-shares and 108 companies issued B-shares. Both A and B-shares have the total market value of 227,312.5 billion RMB, while the flow of the market value is 171,869.3 million RMB, and the total share capital is 2.9897 trillion shares. In the Shanghai Stock Exchange (ending before July 2012), both A and B-shares market were worth 149,908.91 billion RMB, and the float market capitalization was 124,556.69 billion RMB, of which A-shares market value was 149,218.68 billion RMB, and float

market capitalization was 123,866.46 billion RMB, accounting for 99% of both A and B-shares. In conclusion, A-shares trading is more popular in the Chinese Securities Market, and the enthusiasm of the A-shares stock trading is greater than B-shares, resulting in different levels of underpricing.

Underpricing is a universal phenomena that exists widely in every country's stock market. Loughran et al. (1994) demonstrate evidence of IPO underpricing in 25 countries and regions, and discover underpricing levels are different between developed markets and developing markets; developed countries usually have a lower level of IPO underpricing. Moreover, there is a more serious underpricing phenomena in China when compared with other countries. As illustrated by Dimovski and Brooks (2004), the highest first-day returns were reported of 948.6% from 1987 to 1995 in Chinese A-shares (Su and Fleisher, 1999), with the highest underpricing of an individual offering incredibly reaching to 38,300%. Mok and Hui (1998) find that the underpricing of A shares in Shanghai was 289%, which shows a significant decreasing trend in the initial-day return for Chinese A share IPO underpricing from 1984 to the present day.

1.2 Pricing Method of China's Stock Market

In the securities market, the IPO pricing is the core part of the stock issuance. Whether the new pricing is reasonable will significantly impact the issuing company's ability to raise funds. Meanwhile, the stock performance in the secondary market directly affects

the allocation of resources in the security market. The China Securities issuance audit system regulates that the stock is issued by the approval system. The securities' authorities have the right to process the substantive review on the issuer's application and related materials according to the provisions of the Companies Act and Securities Exchange Act.

Under the pricing rules in the market, supply and demand determines the stock price. China's pricing system efficiently restrains the supply of some shares listed and helps to balances market demand and supply. Also, regulators become the implicit protectors for IPOs. On September 16th, 1999 and March 17th, 2000, China processed the securities supervision and management committee stock issuance examination committee regulations and the implementation of the approval procedures to accelerate the marketization of China's Stock Issuance System.

1.3 Purpose of Study

the same listed company that issues both A and B-shares have different stock prices and turnover rate, which leads to different degrees of underpricing. Many new shares listed on the first day have a huge increase, which means on the first day of listing the initial trading price in the secondary market far exceeds the initial public offering price. This results in the market or industry average return being much higher than excess returns. There are many possible reasons for this: 1) it could relate to the extreme unevenness

between supply and demand of IP. 2) The imperfect offering mechanism and the inadequate disclosure of information. 3) Problematic ownership structure, and over-speculation on the secondary market. These are all inevitable problems facing an emerging market.

Under the equity division reform and bookbuilding mechanism, the China A-share market is gradually emulating developed markets. Therefore it is very important to investigate how to solve and prevent the underpricing problem of China's Stock Market for the future in order to keep a healthy stock market environment. In this paper, I cover the period from 1991 to 2010 with the companies who have both A-shares and B-shares, and compare the degree of underpricing.

The paper is organized as follows: Chapter 2 reviews the literature on underpricing, chapter 3 about the multi regression model with data of 1991 to 2010 to analyze underpricing of both A-shares and B-shares, chapter 4 contains the analysis result about the model, and the elements, which may affect the results. The last chapter proposes several suggestions for IPO in China.

Chapter 2: Literature Review

2.1 High Initial Return Phenomena of Short-term IOP

From the 1970's, Western scholars have noted that the market price of listed IPO's on the first day or early in the secondary market is often much higher than the issue price, which makes market investors obtain a high initial rate of return. Therefore, the secondary market is much larger than the normal market rate of return. Continuous empirical research shows that this widespread phenomena has existed in the stock market for a long time. Also the problem exists in more mature securities markets, such as the United States; there is even a gradual rising trend on the initial rate of return in developed markets. Of course, the initial yields of different countries on IPO are often quite different. Figure 2.1 and Table 2.1 show the country average underpricing from 1960 to 1990, and Figure 2.2 and Table 2.2 show the country average underpricing from 2001 to 2006. We can see from Figure 2.1 and Figure 2.2 that the degree of underpricing is significantly different in different countries. The stock markets of developed countries have lower underpricing rates than emerging markets. In summary, the IPOs from developed countries are closer to the market prices.

For example I show in Table 2.1, the average underpricing rates are over 30% in South Korea, Portugal, Thailand and Brazil from 1970 to 1990; the highest underpricing rate is 80% from Malaysia. However, the underpricing levels of developed markets such as the United States, the Netherlands, France, Canada, and Finland are usually below 16% on average, which keeps the same trend from 2001 to 2006. Table 2.2 shows that the

highest underpricing rate is 110.44% from China, which is developing markets as well. In contrast the lowest underpricing rate is 6.22% from Sweden.

Figure2.1: Country average underpricing

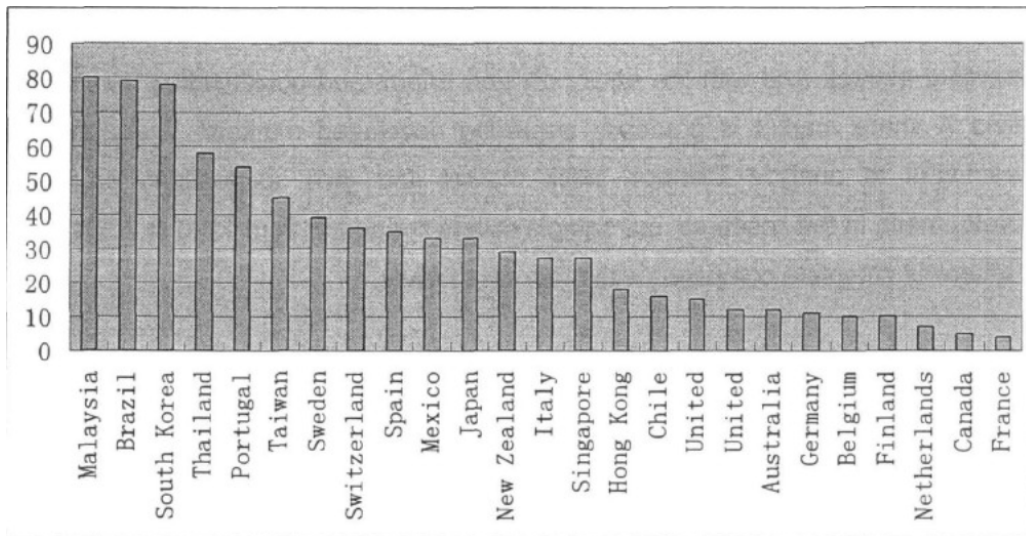


Table 2.1: Country average underpricing

Country	Average underpricing %	Period	Studied Sample Size
Malaysia	80	1980-1991	132
Brazil	79	1979-1990	62
South Korea	78	1980-1990	347
Thailand	58	1988-1989	32
Portugal	54	1986-1987	62
Taiwan	45	1971-1990	168
Sweden	39	1970-1991	213
Switzerland	36	1983-1989	42

Spain	35	1985-1990	71
Mexico	33	1970-1991	472
Japan	33	1987-1990	37
New Zealand	29	1979-1991	149
Italy	27	1985-1991	75
Singapore	27	1979-1987	66
Hong Kong	18	1980-1990	80
Chile	16	1982-1990	19
United States	15	1960-1992	10,626
United Kingdom	12	1959-1990	2133
Australia	12	1976-19889	266
Germany	11	1987-1992	170
Belgium	10	1984-1990	28
Finland	10	1984-1992	85
Netherlands	7	1982-1991	72

Canada	5	1971-1992	258
France	4	1983-1992	187

Source: Financial Markets and Corporate strategy-Mark Grinblat and Sheridan Titaman, Tata Mcgraw Hill, 2nd edition, exhibit3.5 pg. 83

Figure 2.2: Country average underpricing (2001-2006)

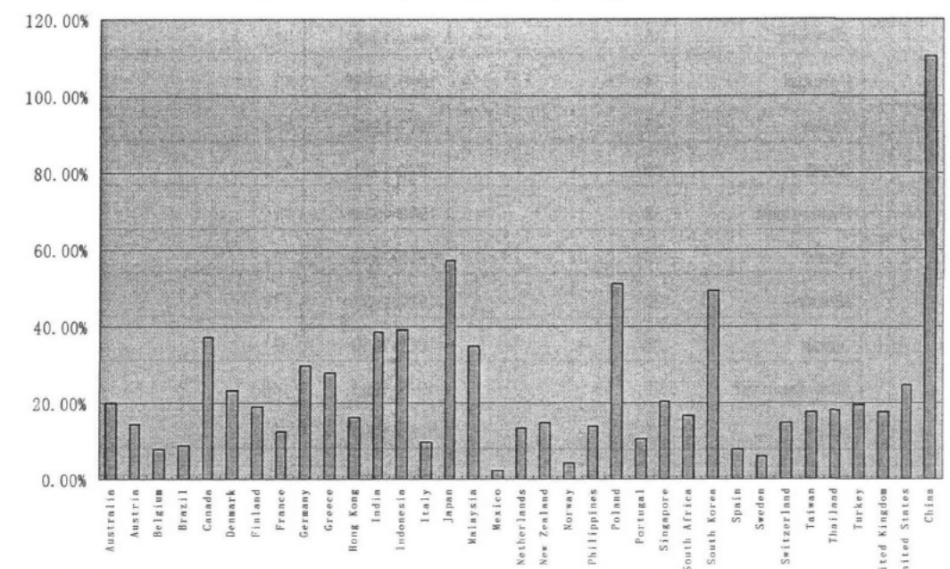


Table 2.2: Country average underpricing (2001-2006)

Country	Studied Sample size	Average underpricing %	Aggregate Gross Proceeds (US \$)
Australia	711	19.96	15,575.33
Austria	25	14.31	4,194.38
Belgium	24	8.11	3,669.78
Brazil	28	8.96	5,735.15

Canada	21	37.03	2,462.26
Denmark	15	23.18	1,409.35
Finland	21	18.94	1,904.69
France	282	12.63	21,473.64
Germany	223	29.96	25,350.67
Greece	49	28.02	1,370.63
Hong Kong	521	16.10	43,379.99
India	97	38.73	7,558.13
Indonesia	53	38.89	1,549.59
Italy	99	9.62	12,319.03
Japan	1,092	57.29	51,969.59
Malaysia	331	35.04	2,816.09
Mexico	5	2.53	419.23
Netherlands	12	13.49	3,691.84
New Zealand	35	15.03	967.92
Norway	60	4.18	7,628.94
Philippines	23	14.08	674.42
Poland	23	50.97	1,805.38
Portugal	8	10.65	1,676.34
Singapore	360	20.37	7,295.99
South Africa	5	16.85	221.70
South Korea	327	49.08	13,619.99
Spain	20	7.95	6,209.96

Sweden	42	6.22	7,882.64
Switzerland	43	14.86	8,544.51
Taiwan	431	17.90	6,626.98
Thailand	153	18.35	5,016.80
Turkey	5	19.51	746.84
United Kingdom	1034	17.70	63,976.36
United States	1128	24.60	23,222.79
China	397	110.44	

Source: Earning Quality and International IPO Underpricing, Thomas J. Boultonam
Scott B. Smartb, Chad J. Zutterc, P35

2.2 Several Explanations of IPO High Initial Return

2.2.1 Information Asymmetry Theory

Previous scholars, such as Ibbotson (1975), referred to the word underpricing to represent the high initial rate of return phenomena on IPO. This is in fact, the expressed or implied acceptance of rational and efficient market assumption in mainstream financial theory, which means IPO pricing is efficient in the secondary market and reflects the company's true value. In contrast, the IPO excess initial return is caused by the deliberate underpricing behavior of issuers or underwriters. As a starting point here, scholars investigated and developed many explanations that tend to be known as the underpricing theory, which occupied the mainstream view of the IPO. Simultaneously, the development of Western IPO theory falls under the asymmetric information of the

financial field. All of the above shows that the IPO underpricing is becoming a topic of focus in the world, and it had the support of many empirical conclusions in the 1980's.

A. Asymmetry theory between investors

(1) Winner's Curse Hypothesis

Capen, Clapp and Campbell first proposed the *Winner's Curse Hypothesis*. They believe that the auction value of the objects is uncertain in any style of auction; the winners usually are the people who overvalued the auction objects, and the rate of return from the auction is usually lower than the abnormal return. From the Rock's (1986) model, the issuing companies are uncertain about the true value of the IPO market, however they have to set the IPO offering price. If IPO's are over subscription, it is necessary to execute quota supply. Rock believes that there is information asymmetry between the informed and uninformed investors. Uninformed investors have more opportunities to subscribe to the IPO compared to informed investors, and they will face the Winner's Curse. Underwriters have to underprice the IPO in order to attract more uninformed investors. The more uncertain the market value of the listed companies, the more underpricing will be on the IPO.

Beatty and Ritter (1986) expanded Rock's model, and they put forward that there is a monotonic relationship between IPO underpricing and the uncertainty of firm value. They believe that the higher uncertainty of the company and the higher

cost for investors to access information, the greater the Winner's Curse issue and the greater the degree of underpricing on the IPO. There are many empirical results that support this view, which becomes one of the most definite explanations on IPO underpricing theory.

(2) Bandwagon Hypothesis

The *Bandwagon hypothesis* refers to the idea that an investor will not subscribe if he finds that no one is willing to subscribe for the IPO, even if the investor has the advantage of information of the company; in contrast, an investor will be willing to subscribe for the IPO, even if he has a lack of IPO information if he sees others subscribing. In order to attract the first potential investors, the issuing company set the underpricing on IPO, which causes the bandwagon effect.

B. Asymmetry between issuers and underwriters

Baron (1982) proposed an Agent-based explanation theory. The theory is that underwriters tend to have more information on the capital market and the offering price compared to the issuing company, which has a monopoly power on the pricing of IPO's. Issuing companies and underwriters are both important characters in stock markets with different objectives. The goal of the issuing companies is obviously to maximize the issuing revenue; however the target of the underwriters is to maximize their commission fees. In order to reach the target, underwriters may do a tradeoff between maximizing the commission fees and reducing the issuing price. If a listed company is not a good superintendent to regulate the behavior of underwriters during the processing

time on stock issuance, the underwriter may be tempted to lower the offering price in order to increase the probability of success on its underwriting activities. That is to say, the optimal choice for the issuer is underpricing the IPO.

However, Muscarella and Vetsuypens (1989) put forward related evidence to the above theory. They found that underwriters issued at underpricing as well when they listed their own shares. It shows that it is not significant whether the company is supervising or not. Generally speaking, scholars believed that the results do not support Baron's hypothesis; however, this evidence does not fully refute Baron's theory either. People may think that this underpricing is the basic necessary cost of listing stocks as an explanation.

C. Asymmetry between issuers and investors

(1) Signaling hypothesis

Allen and Faulhaber (1989), Grinblatt and Hwang (1989) and Welch (1989) advocated the IPO underpricing signal theory. Actually it is an extension of "leaving a good taste" from Ibbotson (1975): the issuer may be underpricing to investors intentionally in order to leave a good taste. Scholars believe that the outside investors have difficulty distinguishing between good and bad corporations in the IPO markets; therefore, the underpricing IPO becomes an important way to transmit signals about the quality of listed companies for outside investors. This is a good method to solve the adverse selection problem that may arise by rational investors. At that time, investors have already got the good taste of the underpriced IPO, and the listed companies begin to make up for their losses from the underpriced IPO through the method of refinancing on

high offering prices.

Moreover, the signaling hypothesis states that the percentage of the shares of the original shareholders from the issuing company and the offering price of the IPO are a signal of the company's intrinsic value, which reflects the mean and variance of future cash flows on the intrinsic value of the company as well. This theory shows the information asymmetry between the issuers and investors. Good issuers often send a high quality signal for investors by underpricing IPO, because the high quality issuers are able to launch a Secondary Equity Offering (SEO) in order to make up their losses from underpricing quickly. In contrast, the lower quality companies cannot mimic this signal behavior due to cost constraints, which means they cannot be compensated by issuing in the future to make up their losses. In addition, Welch (1989) also believes that the underpricing on the IPO is a good way to obtain a higher issuing price in the future. However, Michaely and Shaw (1994) show different options about underpricing on the IPO, which argue that there is not a huge difference between significantly underpricing an IPO and not underpricing an IPO on SEO in the future.

(2) Dynamic information acquisition hypothesis

Benveniste and Welch (1990), Spatt and Srivastava (1991) used this model to analyze how to get the true information of listed companies by using underpricing on the IPO. The writers believed that the underpricing on the IPO could bring more attention to the inquiring investors, and lower the quoted price they wish to subscribe in their minds.

Underwriters usually give investors more underpricing on the IPO in order to encourage more inquiring investors to subscribe in the markets. Moreover, Aggarwal, Prabhala and Puri (2002) mentioned that there is a positive correlation between the proportion of the IPO shareholding and the degree of underpricing.

In addition, Chemmanur (1993) had analyzed the asymmetry between issuers and investors as well, and he clarified that the issuing companies have more information compared to the outside investors, such as the information on intrinsic value of the listed companies. That is to say, outside investors may spend more time to work on the listed company's information, but well-performing issuers will compensate investors by underpricing the IPO.

2.2.2 High Initial Rate of Return Explanation in IPOs in the Secondary Market

(1) Price support explanation

Price support means the behavior that underwriters consciously use in the stock trading market in order to prevent or slow down the reduction on the stock price at the beginning, which keeps the offering price at a certain level. In principle, the price support of underwriters falls under the behavior of stock manipulation. However, the Securities and Exchange Commission (SEC) in the United States believes that this is a disadvantage element on the equity diversification if an IPO has a sharp decline on the first day of listing; it is important to allow the behavior of keeping IPO price stability on the initial day. At the same time, the SEC requires for the strict disclosure system, which means the underwriters must disclose in the prospectus if they intend to use price support. When this behavior begins, the underwriter needs to notify the SEC as well.

Moreover, the SEC requires that the floor price could not exceed the offering price; otherwise it is going to be considered a violation of the regulations.

Ruud (1993) first proposed that underwriter price support might cause a high initial rate of return on the IPO. Ruud tested the existence of price support by checking whether the rate of return on the IOP is normal distribution or skewed distribution in four weeks after listing. Moreover, Schultz and Zaman (1994) showed us some reasons about the underwriter price support, and one of the main reasons was to successfully maintain the IPO issuing. Furthermore, Chowdhry, Nanda (1996), Benveniste, Busaba and Wilhelm (1996) believed that the underwriter price support theory and underpricing theory are actually two alternative methods to overcome the uncertainty of information of an IPO.

(2) Speculator bubble explanation

Aggarwal and Rivoli (1990) and Shiller (1990) first proposed that the excess initial rates of return in the short term might be caused by the investors' overenthusiasm and an investing bubble in the stock market. They believed that the characteristics and the process of IPO distribution could easily lead investors to set high offering pricing in their minds on the early trading stage of an IPO. Camerer (1989) also pointed out that the valuation of listed companies is difficult to evaluate, and there is high uncertainty on the company's stock; investors' enthusiasm on the stock market leads to the existence of investing bubbles.

In fact, this theory actually implies a hypothetical: if the high initial rate of return on the IPO is caused by the over-enthusiasm of investors, then it brings the negative rate of return after the cooling of market sentiment. Therefore people think that if the initial rate of return on the IPO is low for a long period of time, it is caused by the high trading price on the first day instead of the low offering price on that day.

2.2.3 Economy Behavior

(1) Short sales constraints

Miller (1997) mentions the short sales constraints theory, and he believes that only those who are optimistic about the future of companies will purchase the new shares. An IPO offering price usually goes up in the first trading day because of the restriction of short selling on IPOs.

(2) Market sentiment hypothesis

When the market is going down, issuers often adapt to the new market by changing timing and volume of IPOs, as well as the degree of underpricing. Most issuers will go public during a “hot” issue, a time when their stock is very popular. Lucas and McDonald (1990) build a model to explain that the issuer of a company may delay the listing shares when the market underestimates its true value. Moreover, Ritter (1984) refers to the fact that the higher the price risk, the higher the degree of underpricing that will be allowed by the issuers and underwriters in order to attract the emerging investors. Conroy and Aggarwal (2000) prove the negative correlation between market sentiment and the degree of underpricing.

2.2.4 Empirical Research about Underpricing in China

Base on the literature review in Table 2.3, it is found that the sample period used is often limited to a certain period of time, which is mostly before 2005. Moreover many studies do not take all relevant factors into consideration to explain IPO underpricing in China. Furthermore, there is a lack of systematic research on the comparison of different determinants for Chinese underpricing in various periods.

Table 2.3: Empirical Researches on Chinese Underpricing

Author	Sample period	Sample numbers	Initial Return (%)	Main theory
Zinan Bi (2007)	1996-2006	1072	107	Negative correlation between underpricing and offer price.
Shi yuan Zhang (2007)	1995-2007	1031	119	Positive correlation between underpricing and PE ratio
Min Gao (2006)	2001-2003	165	113	Positive correlation between underpricing and underwriter reputation
Wenyan Xu and Kangping Wu	2000-2001	NA	NA	Market maker is a reason for underpricing

(2007)				
Chi and Padgett (2005)	1996-2000	668	129	Strictly controlled issue data and inequality of supply are reason for underpricing
Mok and Hui (1998)	1990-1993	87	289	Underpricing related to state ownership
Ting and Tse (2006)	1995-1998	343	124	Winner curse theory is reason for underpricing

Chapter 3: Data and Methodology

3.1 Data Sources and Description

The data contains all listed companies with both A-shares and B- shares that went public from 1991 to the end of 2010, which covers 42 companies in total in the Shenzhen Stock Exchange (SZSE). Most companies listed in Shanghai Stock Exchange (SSE) are difficult to find data source of variables in my model, such as information on turnover rates of first trading date, so I only cover the listed companies with fully disclosed information for samples. The main data used are collected and calculated from China Center Economic Research (CCER) and Chinese Stock Market and Accounting Research Database (CSMAR). These databases mainly contain information about IPOs. Meanwhile, some information, including industry type and age of the company before issuing, is collected manually from the public documents from SZSE and prospectus.

There are two steps in total for processing the data I collect. The first step is to use Excel program to summarize all the data, and calculate the mean and standard deviation. The second step is to use programming Stata to run the regression model.

The Chinese stock market started in 1991, and it quickly developed in the period of 1991 to the end of 2010. A-shares stock is more popular to trade than B-shares in China. There were 2861 IPOs of A-shares from 1991 to 2010, but only 108 IPOs of B-shares. From the statistics we can see that the huge difference on the number of issuing between A-

shares and B-shares in the Chinese stock exchange market.

3.2 Methodology

The degree of underpricing (DUP) is measured as first-day return (RET_{it}): $DUP = RET_{it} = (P_{i1} - P_{i0}) / P_{i0}$, where P_{i1} is the closing price of stock i on the first trading day, and P_{i0} is the offering price of stock i . The higher the initial return is, the higher the degree of underpricing is. If DUP is positive, we can say that the issue is underpriced. If DUP is negative, we say that the issue is overpriced. If DUP is equal to zero, then the issue is fairly priced.

The multi regression model I use for testing the variables that explain underpricing is defined as follows:

$$DUP = RET_{it} = \alpha_0 + \beta_1 * X_1 + \beta_2 * X_2 + \beta_3 * X_3 + \beta_4 * X_4 + \beta_5 * D + \varepsilon$$

In the equation above, D is a dummy variable, $X_1 \sim X_4$ and variable D are independent variables, DUP or RET_{it} is the dependent variable, α_0 is a constant term, $\beta_1 \sim \beta_5$ are partial regression coefficients, ε is error term which is assuming $\varepsilon \sim (0, \sigma^2)$.

Where,

$$X_1 = \text{Ln}(\text{Issue size}) = \text{Ln}(\text{Issue price} * \text{Total issue shares}),$$

X_2 = Offering price,

X_3 = Turnover rate of first starting date,

X_4 = Age of company before issuing,

D = Type of industry, it is the dummy variable which takes on the value of 1 if the IPO is in manufactory industry, 0 for others.

3.3 Relationship Between DUP and Independent Variables

X_1 : Ln (Issue size)

The logarithm of the total funds that IPO raise, which equals total shares issued multiply by offer price. Some scholars from China predicted that the degree of underpricing would increase when the issue size decreases, which is negative relationship between them. That is because the small offerings always associate with high uncertainty. Carter and Manaster (1990) showed some investors use issue size to evaluate the performance of IPO firms.

X_2 : IPO offering price

Offering Price is the initial price of IPO. In general speaking, the stocks with high offering price have limited space to move up; while, the stocks with low price have more opportunity to jump up to the higher price level. According to Grinblatt and Hwang

(1989), the low offering price is the signal to reveal the company's average rates of return and variance; therefore, the issuing company can transmit the intrinsic value to the markets through the underpricing level of IPO and the percentage of inside shareholders. From the Chinese stock market, we can see that most of the investors is individually instead of institutional investors. The individual investors are small and their investment behaviors are more flexible, and some of institutional investors use the advantage of their funds to make the malicious speculation, which causes the strong atmosphere of speculation on Chinese security market. The speculative phenomenon is popular in China, and the stocks with low offering price are much easier for individual investors to speculate, which causes the higher level on underpricing of IPOs. In other words, the offering price may exert an influence on underpricing level of IPO, and there is a negative relationship between offering price and the degree of IPO underpricing.

X₃: Turnover rate of first starting date

Turnover rate in the first starting date is equal to the number of shares traded in the first trading day divided by the total number of shares outstanding. Generally speaking, the turnover rate measures the potential development and the market value of the listed company and represents the expectation of the listed company from investors; therefore, the turnover rate determines the offering price of IPO in some way. Moreover, base on the fixed enterprise value, the higher the turnover rate of the listed company, the more expectation are given by investors, which means the investors have lower risk to invest in this company and the offering price is going to be high; therefore, the degree of IPO

underpricing will be low. That is to say, there is a negative relationship between turnover rate and degree of IPO underpricing.

X₄: Age of company before issuing

Age of the firms before issuing shares means the number of years in existence before going public. The time interval between the issuing date and the listing date of the company is an important variable to measure the asymmetric information on underwriters and investors. Ritter (1984) has written a research paper that the longer the firm establishes the less risk of issuing the new stocks, which means the low underpricing level on IPO. In other words, there is a negative relationship between the age of firms before issuing and the degree of IPO underpricing.

D: Dummy variable for the type of industry

Type of firms is dummy variables that the value equals to 1 if the listed company is in manufactory industry, and it equals to 0 for others. Some scholars found that the degree of IPO underpricing in the manufacture company is usually more than in other companies in China.

Chapter 4: Results and Analysis

4.1 Descriptive Statistic of Variables

The sample data I collected are 84 IPOs from both A-shares and B-shares in Chinese stock market from 1991 to 2000. Table 4.1 and Table 4.2 describe the statistic analysis of independent variable on A-shares and B-shares, which report the detail information on the sample size, sample mean and standard deviation, and the minimum and maximum value of the sample data.

Table 4.1: Descriptive statistics of independent variable on A-shares

DUPE0%EO				
Percentiles		Smallest		
1%	-.14	-.14		
5%	.04	-.01		
10%	.21	.04	Obs	42
25%	.63	.05	Sum of Wgt.	42
50%	1.475		Mean	2.413095
		Largest	Std. Dev.	3.539809
75%	2.36	6.67		
90%	6.34	10.33	Variance	12.53025
95%	10.33	13.51	Skewness	2.774228
99%	17.05	17.05	Kurtosis	10.48331

Table 4.2: Descriptive statistics of independent variable on B-shares

		DUPE0%			
Percentiles		Smallest			
1%	-1.21	-1.21		Obs	42
5%	-.87	-.87		Sum of Wgt.	42
10%	-.7	-.87		Mean	.1390476
25%	-.02	-.83		Std. Dev.	.527848
50%	.11			Variance	.2786235
		Largest		Skewness	-.1462311
75%	.35	.78		Kurtosis	4.046841
90%	.76	1.08			
95%	1.08	1.14			
99%	1.51	1.51			

From the table we can see that the mean value of A-shares samples is 2.41, and the standard deviation is 3.54; while the mean value of B-shares samples is only 0.14, and the standard deviation is 0.53. That is to say, A-shares have more degree of underpricing IPOs than B-shares. Furthermore, if we compare with the maximum value between A-share and B-share, we can get the largest value of A-share is 17.05; in contract, the largest value of B-share is only 1.51, which means the IPO underpricing issue can be shown more significantly on Chinese A-shares stock market. X_4 refers to the age of company before issuing and D refers to the type of company, and both A-shares and B-shares have similar average on the variable of X_4 and D.

From Table 4.3 and Table 4.4, we can see the statistic analysis of dependent variables on A-shares and B-shares. X_1 refers to the ln of issue size, which keeps stabilize from 7 to 8 for both A-shares and B-shares. X_2 refers to the offering price. The A-share stocks have higher offering price compare to B-shares. As we can see from the tables below, the

mean value of offering price for A-shares is 6.07; while the mean value for B-shares is only 3.58. X_3 refers to the turnover rate. The average of turnover rate of A-shares is much higher than B-shares, which indicates that investors are preferred to invest more in A-shares in the stock market.

Table 4.3: Descriptive statistics of dependent variables on A-shares

Variable	Sample Size	Mean	Std. dev	Minimum	Maximum	Median
X_1	42	7.452381	.5037605	7	8	7
X_2	42	6.070952	4.843343	1	20.8	4.365
X_3	42	12.9031	14.62857	0.01	64.57	10.32
X_4	42	7.738095	13.40924	0	81	4.5
D	42	.5238095	.5054867	0	1	1

Table 4.4: Descriptive statistics of dependent variables on B-shares

Variable	Sample Size	Mean	Std. dev	Minimum	Maximum	Median
X_1	42	7.690476	.5174089	7	9	8

X ₂	42	3.584286	1.734608	1.19	10.53	3.365
X ₃	42	2.398095	3.342751	0	12.46	0.92
X ₄	42	7.761905	13.63426	0	83	4
D	42	.5238095	.5054867	0	1	1

4.2 The Result of the Regression

I use the Stata program to run the ordinary least square regression model of IPO underpricing. I am going to use 5% as the significant level for this regression model. The formula of the regression model I mentioned before from my paper is as follows:

$$DUP = RET_{it} = \alpha_0 + \beta_1 * X_1 + \beta_2 * X_2 + \beta_3 * X_3 + \beta_4 * X_4 + \beta_5 * D + \varepsilon$$

Table 4.5 and Table 4.6 show the result of this regression model for both A-shares and B-shares.

Table 4.5: the regression result of model on A-shares

Source	SS	df	MS			
Model	193.240011	5	38.6480021	Number of obs =	42	
Residual	320.500071	36	8.90277975	F(5, 36) =	4.34	
				Prob > F =	0.0034	
				R-squared =	0.3761	
				Adj R-squared =	0.2895	
Total	513.740081	41	12.5302459	Root MSE =	2.9838	

dup	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
logissuesize	-2.230466	1.041517	-2.14	0.039	-4.34276	-.1181714
offerprice	-.171367	.1135633	-1.51	0.140	-.4016841	.0589501
turnoverrate	-.0801841	.03328	-2.41	0.021	-.1476791	-.0126891
ageofcompa~g	-.0177277	.0361759	-0.49	0.627	-.0910958	.0556404
industrydu~y	-1.017626	.9947282	-1.02	0.313	-3.035028	.9997768
_cons	21.78058	7.642128	2.85	0.007	6.281628	37.27954

Table 4.6: the regression result of model on B-shares

Source	SS	df	MS			
Model	1.14818375	5	.22963675	Number of obs =	42	
Residual	10.2753782	36	.285427172	F(5, 36) =	0.80	
				Prob > F =	0.5540	
				R-squared =	0.1005	
				Adj R-squared =	-0.0244	
Total	11.4235619	41	.278623462	Root MSE =	.53425	

dup	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
logissuesize	-.066593	.1714127	-0.39	0.700	-.4142339	.281048
offerprice	.0579969	.0521806	1.11	0.274	-.0478304	.1638241
turnoverrate	-.0125651	.0278886	-0.45	0.655	-.0691258	.0439956
ageofcompa~g	.0003686	.0067763	0.05	0.957	-.0133744	.0141116
industrydu~y	.1825532	.1692724	1.08	0.288	-.1607471	.5258535
_cons	.3749502	1.359873	0.28	0.784	-2.383	3.1329

4.2.1 Issuing Size

The issuing size is the offer price multiplied by the number of shares issued. From the previous analysis we found that there is a negative relationship between degrees of underpricing (DUP) and issuing size. Based on the statistical analysis from both A-shares and B-shares, we can see that the coefficient for A-shares between DUP and issuing size is negative 2.23, and for B-shares is negative 0.67. The negative means that the bigger of the issuing size, the lower the average initial return. Moreover, as the increase of the issuing size, the standard deviation of initial return becomes smaller, which is better proof that the negative relationship between DUP and issuing size. In addition, if we look at the value of Prob. (t) for A-shares, Prob. (t) equal to 0.039, which is less than 0.05. Therefore, the issuing size of A-shares has statistically significant effect on the underpricing of IPO in Chinese stock market. However, the Prob. (t) for B-shares is equal to 0.7, which is more than 0.05. It indicates that the issuing size of B-shares may not impact on the underpricing of IPO.

4.2.2 Offering Price

The second parameter β_2 is referring to the offering price. From the table 4.5 we can see that the slope coefficient for IPO offering price is -1.71 for A-shares, and it further proves the negative relationship between offering price and underpricing IPO. In addition, the sample data I collect from Chinese stock market show that almost 70% of new shares have low offering price. This fact means that most of the new shares' prices have large room to go up in the secondary market.

The regression model shows that the t ratio of A-shares for offer price is -1.51, and the value of Prob. (t) is equal to 0.14. The value is much higher than 0.05, which means this result is not statistically significant on underpricing of IPO. Compare to B-shares, the value of Prob. (t) is equal to 0.27. The result is not statistically significant as well. B-shares are not popular to pay as A-shares in Chinese stock market, and the offering price is much higher than A-shares. Therefore, the IPO underpricing is not obviously showing in the B-shares market.

4.2.3 Age of the Firm Before Going Public

There is a relationship between the age of the firm before going public and underpricing IPO. From the regression analysis result of A-shares, the value of Prob. (t) is equal to 0.63. The Prob. (t) value is more than 0.05, which means the result is not significant and the age of firm before going public has little effect on the underpricing of IPO. If we look at the coefficient, it is only -0.0177, which is better show us the age of the firm before going public and the underpricing of IPO do not have significant linear relationship.

Compare to B-shares, let us look the regression result again. The Prob. (t) value for B-shares is 0.96, and the value is more than 0.05 as well, which is not significant. The coefficient is 0.0003, even more smaller compare with A-shares. Both results from A-shares and B-shares show that there is little linear relationship between the age of firm before going public term and the underpricing of IPO. It demonstrates that the age of firm before going public term is not the reason for the underpricing of IOP.

4.2.4 Turnover Rate

In the empirical analysis of the IPO underpricing, I try to find the underpricing reasons only from the primary market, and do not consider of the risk and the information asymmetry effects. The underpricing of IPO may not all from the primary market, it may from the over speculation of the secondary market. The turnover rate is an important index to measure the over speculation issue in the secondary market. From the regression analysis, we can see the Prob. (t) is equal to 0.021; it is less than 0.05, which is significant result. The turnover rate is one of the most important variables to affect underpricing of IPO. If we look at for B-shares, the Prob. (t) is equal to 0.65; more than 0.05, which means turnover rate is not significant to affect underpricing IPO for B-shares.

4.2.5 Industry Type

Some research paper indicate that manufactory industry has dominated position in Chinese market, and the degree of IPO underpricing in the manufacture company is usually more than in other companies in China. However, as we can see from the table, Prob. (t) value equal to 0.313 for A-shares, and 0.288 for B-shares. Both of them are statistically insignificant variable. Perhaps, the reason why it is not main factor to influence underpricing is investors can know equal information about IPO companies in Chinese stock market.

4.2.6 Error Term

In our model, the error term may consists of other influenced variables such as return on equity, earning per share, operation margin, reputation for stock and so on. The Prob. (t) value for A-shares is 0.007, which is a statistically significant variable. Perhaps some other factors like speculation behavior, reputation, and imperfect information disclosure are important factors for underpricing IPO.

Chapter 5: Conclusions

5.1 Conclusion of the Study

IPO underpricing is a universal phenomenon that exists widely in every country's stock market. Compared with evidence from other countries, the magnitude of underpricing in China is even more serious.

In the research, the study examined the initial underpricing level for a sample of 42 IPOs on both of A-shares and B-shares in Chinese stock market from 1991 to 2010. I have examined the relationship between the degree of underpricing and five independent variables hypothesized to impact underpricing issue.

Results have shown that turnover rate and error term affect the initial return significantly for A-shares, and none of terms from B-shares are significantly variables for resulting underpricing IPO. We find that ex ante uncertainty alone could not well explain Chinese IPO underpricing, which is due to the imperfect information disclosure and lack of market discipline in Chinese emerging market. Underwriter reputation and management credibility could partially explain Chinese underpricing. And market sentiment as well as speculation behavior is feasible to explain underpricing IPO in Chinese stock market to some extent.

The result of this regression model show that the R square is equals to 0.38 for A-shares and only 0.1 for B-shares. R square means a statistic to test the goodness of fit of the model, which indicates that the model needs to be improved due to relatively lower number of R square. The chosen factors cannot explain the degree of underpricing sufficiently. There is 38% of the variation in dependent variable can be explained by explanatory variable for A-shares. And there is only 10% of the variation in dependent variable can be explained by explanatory variable for B-shares. In conclusion, turnover rate is the most important factor on A-shares IPO underpricing in the Chinese stock market.

5.2 Recommendation

Since the R square is low, especially for the B-shares, the model is not good for examining the factors influence underpricing. It implies that there are more variables should be include in the model for the further study, like speculation behavior, underwriter reputation, ROE, ROA, EPS and so on.

Reference

- Capen Capen Capen, Roger G., 1975, "Price Performance of Common Stock New Issues," *Journal of Financial Economics* 2, 235-272.
- Ibbotson, R.G. and Jaffe J. F., 1975, " 'Hot Issue' Markets," *Journal of Finance* 30, 1027-1042.
- Ibbotson, R. G., Sindelar, J. and Ritter, J., 1994, "The Market's Problems with the Pricing of Initial Public Offerings," *Journal of Applied Corporate Finance* 7, 66-74.
- Rock, Kevin, 1986, "Why New Issues are Underpriced," *Journal of Financial Economics* 15, 187-212.
- Baron, David P., 1982, "A model of the Demand for Investment Banking Advising and Distribution Services for New Issues," *Journal of Finance* 37, 955-976.
- Beatty, Randolph P., and Jay R. Ritter, 1986, "Investment Banking, Reputation, and the Underpricing of Initial Public Offerings," *Journal of Financial Economics* 15, 213-232.
- Muscarella, Chris J., and Michael R. Vetsuypens, 1989, "A Simple Test of Baron's Model of IPO Underpricing," *Journal of Financial Economics* 24, 125-136.
- Allen, Franklin and Gerald R. Faulhaber, 1989, "Signaling by Underpricing in the IPO Market," *Journal of Financial Economics* 23, 303-324.
- Grinblatt, M. and Hwang, C.Y., 1989, "Signaling and the Pricing of New Issues," *Journal of Finance* 44, 393-420.

Welch, Ivo, 1989, "Seasoned Offerings, Imitation Costs, and the Underpricing of Initial Public Offerings," *Journal of Finance* 44, 421-450.

Benveniste, Lawrence M., and Paul A. Spindt, 1989, "How Investment Bankers Determine the Offer Price and Allocation of New Issues," *Journal of Financial Economics* 24, 343-362.

Benveniste, Lawrence M., and William J. Wilhelm, 1990, "A Comparative Analysis of IPO Proceeds under Alternative Regulatory Environments," *Journal of Financial Economics* 28, 173-208.

Spatt, Chester S., and Sanjay Srivastava, 1991, "Preplay Communication, Participation Restrictions, and Efficiency in Initial Public Offerings," *Review of Financial Studies* 4, 709-726.

Chemmanur, Thomas J., 1993, "The Pricing of Initial Public Offers: A Dynamic Model with Information Production," *Journal of Finance* 48, 285-304.

Ruud, J. S., 1993, "Underwriter Support and the IPO Underpricing Puzzle," *Journal of Financial Economics* 34, 135-151.

Schultz, Paul H., and Mir A. Zaman, 1994, "Aftermarket Support and Underpricing of Initial Public Offerings," *Journal of Financial Economics* 35, 199-219.

Chowdhry, Bhagwan, and Ann Sherman, 1996, "International Differences in Oversubscription and Underpricing of Initial Public Offerings," *Journal of Corporate Finance* 2, 359-381.

Benveniste, Lawrence M., Walid Y. Busaba, and William J. Wilhelm, Jr., 1996, "Price Stabilization as a Bonding Mechanism in New Equity Issues," *Journal of Financial Economics* 42, 223-256.

Aggarwal, R., and Rivoli, P., 1990, "Fads in the Initial Public Offering Market?" *Financial Management* 19, 45-57.

Shiller, R., 1990, "Speculative Prices and Popular Models," *Journal of Economic Perspective* 4, 55-65

Camerer, C., 1989, "Bubbles and Fads in Asset Prices: A Review of Theory and Evidence," *Journal of Economic Surveys* 3, 3-41.

Miller, Edward M., 1977, "Risk, Uncertainty, and Divergence of Opinion," *Journal of Finance* 32, 1151-1168.

Ritter, J. R., 1984, "The 'Hot Issue' Market of 1980," *Journal of Business* 57, 215-240.

Aggarwal, R., 2000, "Stabilization Activities by Underwriters after Initial Public Offerings," *Journal of Finance* 55, 1075-1103.

Michaely, R. & Shaw, W. H. (1994). The pricing of initial public offerings: Test of adverse-selection and signaling theories [J]. *Review of Financial Studies*, 7, 279-319.

Aggarwal, R. N. R., Prabhala, M. & Puri. (2002). Institutional allocation in initial public offerings: Empirical evidence [J]. *Journal of Finance*, 57, 1421-1442.

Lucas, Deborah & Robert McDonald (1990). Equity issues and stock price dynamics,

Journal of Finance, 45, 1019-1043.

Bi, Z. N. & Sun J. (2007). Institutional investors and IPO pricing [J]. Stock Market research, 4, 23-27.

Xu Wenyan, Wu Kangping. (2003). Chinese IPO underpricing-price support by underwriters [J]. Journal of Shanxi Finance and Economy University, 23 (6); 71-75.

Gao Min (2006). Underwriter reputation and IPO underpricing [J]. Finance Research, 11, 48-50.

Chi, J & Padgett, C. (2005). Short-run underpricing and its characteristics in Chinese initial public offering (IPO) markets [J]. Research in international Business and Finance, 19, 71-93.

Mok, H. M. K. & Hui, Y. V. (1998). Underpricing and Aftermarket Performance of IPOs in Shanghai, China [J]. Pacific-basin Finance Journal, 6, 453-474.

Ting, Y. U. & Tse, Y. K. (2006). An empirical examination of IPO underpricing in the Chinese A-share market [J]. China Economic Review, 17, 363-382.