Audit Quality, IPO First-Day Price Limit and IPO Underpricing

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Abstract: This paper collects non-financial IPOs in the A-share market of Shanghai Stock Exchange and Shenzhen Stock Exchange from July 2009 to July 2015 as a sample and uses two multiple regression models to analyze the correlations between pre-market audit quality, IPO first-day price limit and IPO underpricing. Firstly, this paper analyzes the correlation between the pre-market audit quality and the IPO underpricing. Secondly, the interaction effect leaded by IPO first-day price limit is analyzed to find out whether it will impact the effectiveness within pre-market audit quality and IPO underpricing. At last, we found that in Chinese IPO markets, pre-market audit does the signaling job and its effect is significantly influenced by the first-day price limit. When IPO first-day price is limited, the effect of pre-market audit quality on IPO underpricing is more significant.

1. Introduction

The correlation between pre-market audit quality and IPO underpricing has always been an important issue for both academia and practice. Although the pre-market audit quality has been confirmed to have a significant relationship with the IPO underpricing in previous studies, the conclusions among these studies are inconsistent, and most of the studies stay before the first-day price limit policy was issued.

Since January 2014, the Shanghai Stock Exchange and the Shenzhen Stock Exchange have implemented new IPO listing rules, limiting the first-day stock price to 64%-144% of the IPO price, and stipulated that the stock will be suspended for 30 minutes when the stock price rises or falls more than 10%. In this context, this paper is going to explore the interaction effect leads by IPO first-day price limit and find out whether it will affect the effectiveness within pre-market audit quality and IPO underpricing in a more comprehensive way.

Based on this perspective, this paper divides Chinese issuance period of new share into two time intervals based on this reform. Besides, the IPO underpricing generally means a phenomenon that the closing price of the IPOs in the first day is much higher than its issue price which causes the result that investors in the first market obtain the abnormally high initial return of A-share new issue. But because of the reform, the IPO underpricing rate during the time interval which implements the first-day price limit relates to the issue price and the transaction price when the new share is launched for retail investors after the trading board is opened. However, in order to facilitate the understanding of our paper, we still use the “IPO underpricing” to express the phenomenon leads to the abnormally high initial return of A-share new issue in both two time intervals.

The main contributions and innovations of this paper are as follows: this paper is the first research to discuss whether the correlation between pre-market audit quality and IPO underpricing will be influenced by the first-day price limit. The research further supports the viewpoints put forward by scholars in previous studies that the way in which specific factors affect the IPO underpricing rate will vary with the change of the issuance system, and the results will help Chinese market to find the way to decrease the high underpricing phenomenon by providing theoretical guidance.

This paper is divided into five parts. The following structural arrangements are as follows: the

second part is related research and hypotheses development, the third part is research design, the fourth part is empirical analysis and the fifth part is conclusions.

2. Related research and hypotheses development

The IPO underpricing is widespread in the capital markets of various countries on a global scale [7]. Scholars' research on IPO underpricing is mainly based on information asymmetry theory too and they mostly use empirical analysis to verify whether foreign theories are applicable in our Chinese market. However, under the special system background of Chinese markets, it is not feasible to use the foreign hypothesis generated in the western mature markets directly to explain the high IPO underpricing in China [1]. Some researches show the impact of information asymmetry on IPO underpricing will be affected by the reform of the issuance system [2]. Therefore, this paper believes the exploration must be carried out with the consideration of actual issue policy. Tang Qiming and Chen Hui [2] used the IPO data from July 2009 to July 2015 as a sample to find out how the IPO underpricing rate responds to the short-term market sentiment, corporate reputation and underwriters' reputation when the first-day price of new shares are limited and first proposed that the issuance system reform will change the interaction pattern and result how information asymmetry impact on IPO underpricing. The empirical research by Zhang Weidong et al. [3] shows the first day price limit will affect the way IPO underpricing reacts to the market sentiment. But because the impact of each factor affecting IPO underpricing are different, we scholars need to conduct more extensive and in-depth research in this area.

2.1 Audit quality and IPO underpricing

In the process of IPOs, the role of external auditing cannot be ignored. The previous literature on the correlation between pre-market audit quality and IPO underpricing was generally studied from the perspective of information asymmetry and signaling theory. In the perspective of information asymmetry, most scholars agree that pre-market audit can reduce the information asymmetry between enterprises and investors, thereby reducing the IPO underpricing rate; In the perspective of signaling theory, scholars believe that companies with high quality and good development prospects tend to hire high-quality auditors to pass on good signals to attract investors and thus increasing IPO underpricing rate.

As can be seen from the above literature review, there are two opposite viewpoints about the correlation between pre-market audit quality and IPO underpricing. Hu Dan [4] explained the rationality of their coexistence and believed that how pre-market audit acts is closely related to the information environment of the listed companies. When the environment demands for signaling function from pre-market audit, high-quality auditing will lead to an increase in underpricing; when the environment demands for informational function from pre-marketing audits, high-quality auditing can help investors make rational decisions, thereby reducing underpricing. Although the IPO market has implemented the first-day price limit for new shares since 2014, from the current market environment in China, the IPO situation is better, with few stocks falling below the issue price on the first day. Therefore, this paper assumes the current market environment in China demands for signaling function from pre-market audit so far, and puts forward the following hypothesis:

Hypothesis 1. Pre-market audit quality is positively correlated with IPO underpricing rate.

2.2 Interaction effect lead by IPO first-day price limit

The first-day price limit do affects the information environment during the process of IPO. In many studies on the effect of price limit, the “cooling effect” and “magnet effect” of stock price changes have been many scholars’ focal points. On the one hand, the temporary suspension measures create an environment similar to the daily price limit for new stocks; On the other hand, Ting Wu, Yue Wang and Ming-Xia Li [5] analyzed the IPOs of China’s stock market in recent years and found that first-day price limit will cause the phenomenon that the stock price is more likely to hit the limit

board again after the first time hitting it. These descriptions are all very similar to the mode of action how magnet effect performs. Most of the investors in China are composed of speculators and non-professional investors. When the stock price is about to trigger the compulsory measures, investors in the same trade direction may speed up the trading because of being afraid of losing the transaction chance. The investors in the opposite trade direction may delay the transaction to wait for better. These two phenomenon cause the result that it accelerates stock price to reach the limit board. After the stock price reaches the first day's limit board, the state of the stock enhances the good signal company releases to the market, attracting investors to buy more stocks, so that the stock price will continue to hit the limit board again after the first day hitting it. From this perspective, this paper speculates that the implementation of the first-day price limit will enhance the signaling function of pre-market audit. Besides, the transaction price in market can transmit information and in the meanwhile limiting the first-day price of new shares extend the trading time so that investors can conduct in-depth research for a company and thereby reducing information asymmetry. So from this perspective, the first-day price limit will weaken the demand for information function of pre-market audit. In summary, this paper puts forward the following hypothesis:

Hypothesis 2: The first-day price limit strengthens the positive correlation between pre-market audit quality and IPO underpricing rate.

3. Research Design

3.1 Data sample and data source

This paper collects non-financial IPOs in the A-share market of Shanghai Stock Exchange and Shenzhen Stock Exchange from July 2009 to July 2015 as a sample. The financial data, new stock transaction data, etc. are all from the CSMAR database. Market income data, the number of days before the limit board is opened for each IPOs are all from the Wind database. After eliminating the incomplete data and performing Winsorize tailing processing on the 1% and 99% quantiles, we obtained 1094 samples in total.

The full sample will be divided into two groups according to the implementation of first-day price limit: Group A represents the time interval without implementing price limit on the first day, the time span is from April 2009 to November 2012; Group B represents the time interval implementing the first-day price limit, time span is from January 2014 to July 2015.

3.2 Variable Design

3.2.1 Explained variable.

This paper's explained variable is IPO underpricing rate calculated by two formulas according to the implementation of first-day price limit. The IPO underpricing rate is called UP, when a stock's UP is greater than 0, it means the underpricing appear during the process of issuance. The IPO underpricing rate for group A is called (UP_a) and is conventionally calculated by taking the difference between the IPO listing day closing price (P_1) and the IPOs issue price (P_0) as follows:

$$UP_a = \frac{P_1 - P_0}{P_0} \times 100\% - \text{Listing Day Stock} - \text{Market Returns} \quad (1)$$

The IPO underpricing rate for group B is called (UP_b). Learning from previous research practices, the formula is calculated by taking the difference between the transaction price (P_2) when the new share is launched for retail investors after the trading board is opened and the IPOs issue price (P_0) as follows:

$$UP_b = \frac{P_2 - P_0}{P_0} \times 100\% - \text{Listing Day Stock} - \text{Market Returns} \quad (2)$$

3.2.2 Explaining variable.

The explaining variable of this paper is pre-market audit quality. Learning from the practice of scholars, the pre-market audit quality is measured by dummy variable representing the reputation of accounting firm, called “Audit”. When the accounting firm disclosed in the listing announcement belongs to the international big four accounting firms and the top ten Chinese accounting firms, the Audit is 1, otherwise Audit is 0.

3.2.3 Moderator Variable.

The dummy variable called “Limit” represents the moderator variable of whether there is first-day price limit. If the stock in the sample is issued before January 1, 2014, then there is no first-day price limit, so Limit is 0. Otherwise Limit is 1.

3.2.4 Control Variable.

Learning from the practices of Zhang Weidong [3] and Hu Dan [4], we choose the lottery rate, enterprise age, time interval, PE, corporate financial risk, underwriter reputation, year of listing, industry and exchange to be the control variables. Among them, enterprise age is measured by the natural logarithm of the days between establishment year and the year of listing, called “LnAge”; The time interval is measured by the natural logarithm of the days between the initial prospectus date and the listing date, called “LnGap”; Corporate financial risk is measured by asset-liability ratio, called “Leverage”. The underwriter reputation is measured by dummy variable representing the reputation of broker, called “Udwrep”. When the broker belongs to the international big ones and the top eight Chinese brokers, the Udwrep is 1, otherwise Udwrep is 0; Year of listing, industry and exchange are all dummy variables.

3.3 Model Design

In order to verify the above hypothesis, this paper establishes the following multiple linear regression models:

$$UP= \beta 0+ \beta 1 Audit+\sum Controls+\varepsilon \quad (3)$$

$$UP=\beta 0+\beta 1\ (Audit-)+\beta 2(Limit-)+\beta 3(Audit-)\times(Limit-) +\sum Controls+\varepsilon \quad (4)$$

Model (3) is for hypothesis 1; model (4) is for hypothesis 2. Among them, since the explaining variable and moderator variable are both dummy variables which will cause the impact on model’s regression coefficient. So we centralized these two variables in model (4). In order to facilitate expression and understanding, we call the centralized audit quality ($Audit-\overline{Audit}$) as Audit'; the centralized moderator variable ($Limit-\overline{Limit}$) as Limit'.The data in this paper will all be calculated by Stata.

4. Empirical Analysis.

4.1 Descriptive statistical Analysis

Descriptive statistics for the main variables in this paper are shown in Table 1 below. As can be seen from the table, the average IPO underpricing rate of full sample is 69.9% which means IPO underpricing rate is at a high level. In addition, we tested the mean of IPO underpricing rate in both group A and group B separately, and found the average rate is 30.77% in the group A. This result is similar to the statistics of Zhang Lei [6]. In the group B, the IPO underpricing rate average is 187.6%, which is significantly higher than group A.

The average of the reputation of accounting firms in group A is 0.405; and the average reputation of accounting firms in group B is 0.63. It shows that the proportion of enterprises that employ the “International Big Four” and “Domestic Top Ten” for pre-market auditing has also increased to some extent.

Table 1. Descriptive Statistics of Major Variables

	Full-Sample			Group A			Group B		
VARIABLES	N	mean	sd	N	mean	sd	N	mean	sd
UP	1,094	69.90	0.917	821	30.77	0.313	273	187.6	1.110
Audit	1,094	0.462	0.499	821	0.405	0.491	273	0.630	0.484
Lottery	1,094	1.289	2.764	821	1.465	3.102	273	0.758	1.139
LnAge	1,094	3.465	0.301	821	3.410	0.312	273	3.629	0.185
LnGap	1,094	1.050	0.221	821	1.075	0.244	273	0.977	0.098
PE	1,094	52.51	30.39	821	60.32	31.21	273	29.00	5.989
Leverage	1,094	28.15	25.08	821	37.40	22.24	273	0.315	0.184
Upwred	1,094	0.372	0.484	821	0.370	0.483	273	0.377	0.486

Note: China's IPO market began to be suspended in November 2012 and restarted at the end of . 2013, so the 2013 data is missing.

4.2 Descriptive statistical Analysis

The correlation coefficient of the main variables is shown in Table 3 below. We can see that the centralized pre-market audit quality is significantly positively correlated with the IPO underpricing rate, which indicates that the higher the audit quality, the higher the IPO underpricing. In addition, the correlation coefficients between the main variables are all less than 0.5, so there is no serious multicollinearity in models.

Table 2. Correlation Coefficient of Main Variables.

	UP	Audit’	Limit’	Audit’×Limit’	Lottery	LnAge	LnGap	PE	Leverage	Upwred
UP	1.00									
Audit’	0.21*	1.00								
Limit’	0.74*	0.19*	1.00							
Audit’Limit’	0.28*	0.03	0.23*	1.00						
Lottery	-0.19*	0.05	-0.11	-0.04	1.00					
LnAge	0.23*	0.16*	0.31*	0.05	-0.06	1.00				
LnGap	-0.08	-0.11*	-0.19*	-0.01	-0.06	-0.20*	1.00			
PE	-0.22*	-0.30*	-0.45*	-0.06	-0.12*	-0.24*	0.15*	1.00		
Leverage	-0.45*	-0.25*	-0.64*	-0.17*	0.13*	-0.21*	0.16*	0.13*	1.00	
Upwred	0.01	-0.03	0.01	0.01	-0.01	0.00	0.00	0.01	-0.05	1.00

4.3 Multiple Linear Regression Analysis

4.3.1 Audit quality and IPO underpricing.

Table 3 provides the results of the full-sample regression analysis of model (3). From the table below, we can find that the coefficient of Audit is significantly positive, indicating that the improvement of pre-market audit quality before listing will rise the IPO underpricing rate. It can be seen that although China's new stock market began to limit the first-day price of IPOs from 2014, pre-market audits still plays a role of signaling, thereby supporting hypothesis 1.

The regression results of the control variables in the model (3) are as follows: the regression coefficient of the Lottery is negative and is significant at the 1% level. The lottery represents the hot sale of new shares. This result indicates that there is a significant negative correlation between the lottery and the IPO underpricing. The regression coefficient of the PE is positive, and is significant at the 1% level. The higher the PE on the first day of listing, the higher the IPO underpricing. At the same time, the regression coefficient of corporate financial risk (Leverage) is positive and significant at 5% level. This paper uses the asset-liability ratio to measure the financial risk level of the enterprise. The higher the asset-liability ratio, the weaker the debt repayment ability. This is also in line with the current immature market development in China and the irrational decision-making of investors. The regression coefficient of enterprise age (LnAge) and time interval (LnGap) is positive,

but not significant, indicating that there is no obvious correlations between these factors and the IPO underpricing. The regression coefficient of the broker reputation (Upwred) is positive and not significant, indicating that there may be no obvious relationship between the reputation of the broker and the IPO underpricing.

Table 3. Correlation between Audit quality and IPO underpricing

Variables	Coefficient
Audit	0.133*** (3.62)
Lottery	-0.0213*** (-3.15)
PE	0.129*** (1.31)
Leverage	0.00257** (2.58)
LnAge	0.0499 (0.75)
LnGap	0.129 (1.31)
Upwred	0.000674 (0.02)
N	1094
R-squared	0.60
F	96.15

Note: *, **, ***, indicate the significant levels at 0.1, 0.05, and 0.01 respectively.

4.3.2 Audit quality, IPO First-Day Price Limits and IPO underpricing.

In order to further study whether the correlation between pre-IPO audit quality and IPO underpricing rate will be affected by the first-day price limit, we use model (4) to conduct regression analysis on the full sample.

Table 4 below provides the results of the full-sample regression analysis of model (4)'s main variables. After adding the centralized moderator variable "Limit'" and the interaction term "Audit'Limit'", we found that the coefficients of the explaining variable, the moderator variables and the interaction term are all significantly positive at the 1% level. This shows that after limiting the first-day price of IPOs, the positive effect of pre-market audit quality on the IPO underpricing rate has been significantly improved, thereby supporting the hypothesis 2. In another word, the first-day price limit strengthens the positive correlation between pre-market audit quality and the IPO underpricing.

Table 4. The Interaction Effect (Adding the Interaction Term)

Variables	Coefficient
Audit'	0.142*** (3.87)
Limit'	1.728*** (26.73)
Audit'Limit'	0.518*** (6.13)
N	1094
R-squared	0.60
F	115.75

Note: *, **, ***, indicate the significant levels at 0.1, 0.05, and 0.01 respectively.

5. Conclusion

This paper collects the in the A-share market of Shanghai Stock Exchange and Shenzhen Stock Exchange from July 2009 to July 2015 as a sample and empirically verifies the correlations between pre-market audit quality, IPO first-day price limit and IPO underpricing. The main conclusions are as follows:

First, pre-market audit quality is positively correlated with IPO underpricing. In China's new stock market, audit quality is more likely to play the role as a signal. The more high-quality companies are more likely to be recognized by the market, and the more high-quality companies will choose high-quality audits to signal about the future of business conditions to investors.

Second, there is an interaction effect lead by the first-day price limit impacts the effectiveness within pre-market audit quality and IPO underpricing, and the interaction effect is significantly positive. After the first day's price was limited, on the one hand it extends the investor's decision time, allowing investors to conduct in-depth research, thereby reducing the degree of information asymmetry and weakening the demand for information function of pre-market audit; On the other hand, the phenomenon new stocks hint the limit board continuously increase the demand for signal function of pre-market audit, so the higher the audit quality, the higher the IPO underpricing.

Based on the above analysis and conclusion, this paper advices that China's stock market continue to improve the information disclosure mechanism of listed companies. Besides, it is also necessary to guide investors to establish a correct investment philosophy in order to build a good and rational investment environment in China.

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