Factors Affecting IPO Premium Rate of Chinese Listed Companies

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ABSTRACT
With the continuous enhancement of China's economic strength, the status of China's stock market in the world market is also gradually rising, and the phenomenon of IPO underpricing in China's stock market has gradually attracted everyone's attention. IPO is the activity of an enterprise's initial public offering of shares. Listing through IPO is the key for an enterprise to successfully realize the financing in the stock market. In the process of IPO, the core problem is pricing. The level of pricing is directly related to the interests of issuers and investors. The most important symbol representing the issue pricing level and the division of interests of both sides is the degree of IPO underpricing. Therefore, this paper focuses on what factors affect IPO underpricing. Through the analysis of China's stock market, we can infer that the IPO underpricing rate is related to underwriter reputation, venture capital support, manager shareholding, total issuance scale, corporate governance, issuance and listing time interval, ranking of accounting firms undertaking IPO listing, ranking of law firms undertaking IPO listing, market inertia, issuance timing and other factors. By using the linear regression method, this paper finds that the IPO underpricing rate has a strong correlation with these factors, and puts forward some suggestions on some deficiencies in the Chinese market.

Keywords: *IPO, Premium rate, China, Listed companies*

1. INTRODUCTION

IPO is the activity of initial public offering of shares, and it is the key for enterprises to successfully realize the financing in the stock market.[1][9][10] The research on IPO underpricing has also become a more important issue in the economic field. [2][7] There are many factors affecting IPO discount, such as underwriter reputation, venture capital support, manager shareholding, total issuance scale, corporate governance, issuance and listing time interval, ranking of accounting firms undertaking IPO listing, ranking of law firms undertaking IPO listing, market habits, issuance timing, etc. [3][8] These factors directly or indirectly affect IPO Underpricing. Based on the original hypothesis that the above ten factors are related to the IPO underpricing rate, this paper demonstrates that these factors affect the IPO underpricing.[4] This paper collects 1369 currently listed stocks in China from wind, Guotai Junan and other databases, and analyzes that the IPO underpricing rate is affected by the ten factors mentioned above under different time intervals. Finally, the collected results are regressed with Eviews software, the correlation between these influencing factors and IPO and the size of influencing factors are obtained and confirmed, and on this basis, some suggestions are put forward for the results, so as to better develop China's IPO market in the future.

2. METHODOLOGY

The IPO listed companies surveyed in this survey are listed companies from 2016 to 2020, all of which are listed companies in Shanghai and Shenzhen, with a total of 1369. All relevant data required are from wind database and Guotai Junan database.[5] The collected aspects include underwriter reputation, venture capital support, manager shareholding, total issuance scale, corporate governance, issuance and listing time interval, ranking of accounting firms undertaking IPO listing, ranking of law firms undertaking IPO listing, market inertia, issuance time and other factors. The regression method used is based on the linear regression analysis under the assumption of Gauss Markov.[6] The required six regression equations are obtained by Eviews software, and the required assumptions are confirmed in three different cases.

3. RESULTS

In the following models, the required explanatory variables will be represented by the following characters: $Y_{IPO(t)}$ is the value of IPO underpricing at time period t. X_{ROU} is the underwriter reputation, and its size is the size of the IPO's lead underwriter ranking. X_{VC} is the number of venture capital companies that have invested in a specific IPO company. X_{SR} is the proportion of shares held by major shareholders of a specific IPO listed company, and its value is measured by the sum of the shareholding proportions of the top ten shareholders, and expressed as a percentage. X_{IS} is the issuance scale of the IPO listed company when it goes public on the day of its listing, and its value is measured by the issuance scale and the total amount of funds raised on the IPO day, and the unit is one billion. X_{CG} is the proportion of the CEO in the company to the total number of board members of the company. X_{II} is the size of the issuance time interval, which is used to measure the number of days between the filing of the company and the IPO listing. X_{RAF} is the ranking of accounting firms that undertake IPO listing, and its value is the ranking of accounting firms in that year. $X_{RAF}$is the ranking of law firms that undertake IPO listing, and its value is the ranking of law firms in that year. X_{MI} is the market inertia of the market where the IPO is located, and its value is the average of the Sharpe ratio over the past three years, expressed as a percentage. $X_{RT}$is the issuance timing of the market when the IPO is listed, and its value is the average of the roe ratios in the past three years, expressed as a percentage. ε is the value of the error term.This paper assumes that:

H_0: $Y_{IPO(t)}$ = （$\beta_0 + \beta_1 X_{ROU} + \beta_2 X_{VC} + \beta_3 X_{VC} + \beta_4 X_{SR} + \beta_5 X_{IS} + \beta_6 X_{CG} + \beta_7 X_{II} + \beta_8 X_{RAF} + \beta_9 X_{RAF}$）*（$X_{MI} + X_{RT}$）+ ε， β_i =0 （i=1,2,3,4,5,6,7,8,9）， H_1： β_i =0 （i=1,2,3,4,5,6,7,8,9)

Now bring all the IPO data collected into Eviews for regression analysis.

Without considering the influence of market inertia and issuance timing

（$Y_{IPO(t)} = \beta_0 + \beta_1 X_{ROU} + \beta_2 X_{VC} + \beta_3 X_{VC} + \beta_4 X_{SR} + \beta_5 X_{IS} + \beta_6 X_{CG} + \beta_7 X_{II} + \beta_8 X_{RAF} + \beta_9 X_{LFR}$）+ε

Dependent Variable: Y10
Method: Least Squares
Date: 07/26/21 Time: 16:37
Sample (adjusted): 1 1368
Included observations: 1368 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.485110	0.158945	3.052060	0.0023
CG	-0.015367	0.009864	-1.557799	0.1195
SR	0.557642	0.177831	3.135791	0.0018
II	1.89E-05	1.65E-05	1.146361	0.2518
IS	-0.119372	0.034440	-3.466109	0.0005
VC	0.050994	0.019428	2.624816	0.0088
LFR	0.000124	6.61E-05	1.868476	0.0619
RAF	-0.002769	0.001399	-1.979727	0.0479
ROU	0.003559	0.000828	4.299385	0.0000

R-squared	0.041116	Mean dependent var	0.801946
Adjusted R-squared	0.035471	S.D. dependent var	0.695557
S.E. of regression	0.683109	Akaike info criterion	2.082232
Sum squared resid	634.1608	Schwarz criterion	2.116582
Log likelihood	-1415.247	Hannan-Quinn criter.	2.095088
F-statistic	7.284098	Durbin-Watson stat	0.953608
Prob(F-statistic)	0.000000		

Figure 1. The least square result when t=10

Dependent Variable: Y15
Method: Least Squares
Date: 07/26/21 Time: 16:03
Sample (adjusted): 1 1368
Included observations: 1368 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.886270	0.251376	3.525682	0.0004
CG	-0.031155	0.015601	-1.997023	0.0460
SR	0.596979	0.281245	2.122632	0.0340
II	2.33E-05	2.60E-05	0.894961	0.3710
IS	-0.297565	0.054467	-5.463189	0.0000
VC	0.076515	0.030726	2.490281	0.0129
LFR	0.000163	0.000105	1.557481	0.1196
RAF	-0.004912	0.002212	-2.220237	0.0266
ROU	0.005231	0.001309	3.995514	0.0001

R-squared	0.047884	Mean dependent var	1.034505
Adjusted R-squared	0.042279	S.D. dependent var	1.103943
S.E. of regression	1.080354	Akaike info criterion	2.999013
Sum squared resid	1586.178	Schwarz criterion	3.033362
Log likelihood	-2042.325	Hannan-Quinn criter.	3.011868
F-statistic	8.543418	Durbin-Watson stat	1.079045
Prob(F-statistic)	0.000000		

Figure 2. The least square result when t=15

Dependent Variable: Y20
Method: Least Squares
Date: 07/26/21 Time: 16:04
Sample (adjusted): 1 1368
Included observations: 1368 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.991094	0.311227	3.184475	0.0015
CG	-0.043064	0.019315	-2.229553	0.0259
SR	0.783000	0.348208	2.248657	0.0247
II	2.14E-05	3.22E-05	0.663427	0.5072
IS	-0.400632	0.067436	-5.940961	0.0000
VC	0.069133	0.038041	1.817316	0.0694
LFR	0.000238	0.000129	1.838166	0.0663
RAF	-0.004784	0.002739	-1.746446	0.0810
ROU	0.004630	0.001621	2.855872	0.0044

R-squared	0.044383	Mean dependent var	1.110183
Adjusted R-squared	0.038757	S.D. dependent var	1.364280
S.E. of regression	1.337581	Akaike info criterion	3.426160
Sum squared resid	2431.419	Schwarz criterion	3.460510
Log likelihood	-2334.494	Hannan-Quinn criter.	3.439016
F-statistic	7.889647	Durbin-Watson stat	1.177685
Prob(F-statistic)	0.000000		

Figure 3. The least square result when t=20

Dependent Variable: Y25
Method: Least Squares
Date: 07/26/21 Time: 16:05
Sample (adjusted): 1 1368
Included observations: 1368 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.005377	0.341427	2.944638	0.0033
CG	-0.044215	0.021190	-2.086655	0.0371
SR	0.810713	0.381996	2.122309	0.0340
II	2.43E-05	3.54E-05	0.686026	0.4928
IS	-0.443111	0.073979	-5.989679	0.0000
VC	0.068600	0.041732	1.643813	0.1004
LFR	0.000307	0.000142	2.163967	0.0306
RAF	-0.003152	0.003005	-1.048866	0.2944
ROU	0.004364	0.001778	2.453968	0.0143

R-squared	0.042085	Mean dependent var	1.124081
Adjusted R-squared	0.036446	S.D. dependent var	1.494867
S.E. of regression	1.467373	Akaike info criterion	3.611381
Sum squared resid	2926.176	Schwarz criterion	3.645731
Log likelihood	-2461.185	Hannan-Quinn criter.	3.624237
F-statistic	7.463360	Durbin-Watson stat	1.281635
Prob(F-statistic)	0.000000		

Figure 4. The least square result when t=25

When considering the impact of market inertia and issuance timing:

$$(Y_{IPO(t)}=(\beta_0+\beta_1X_{ROU}+\beta_2X_{VC}+\beta_3X_{VC}+\beta_4X_{SR}+\beta_5X_{IS}+\beta_6X_{CG}+\beta_7X_{II}+\beta_8X_{RAF}+\beta_9X_{LFR})*(X_{MI}+X_{RT}))+\varepsilon$$

Dependent Variable: Y10
Method: Least Squares
Date: 07/26/21 Time: 16:35
Sample (adjusted): 1 1368
Included observations: 1368 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.786718	0.027119	29.00963	0.0000
CG*(RT+MI)	-0.030414	0.015167	-2.005274	0.0451
SR*(RT+MI)	0.200364	0.136054	1.472685	0.1411
II*(RT+MI)	0.000265	7.11E-05	3.727496	0.0002
IS*(RT+MI)	-0.274898	0.051477	-5.340162	0.0000
VC*(RT+MI)	0.056082	0.030280	1.852136	0.0642
LFR*(RT+MI)	0.000186	0.000116	1.603182	0.1091
RAF*(RT+MI)	-0.001810	0.002214	-0.817367	0.4139
ROU*(RT+MI)	0.004869	0.001435	3.392591	0.0007

R-squared	0.040273	Mean dependent var	0.801946
Adjusted R-squared	0.034624	S.D. dependent var	0.695557
S.E. of regression	0.683409	Akaike info criterion	2.083111
Sum squared resid	634.7182	Schwarz criterion	2.117460
Log likelihood	-1415.848	Hannan-Quinn criter.	2.095966
F-statistic	7.128530	Durbin-Watson stat	0.961446
Prob(F-statistic)	0.000000		

Figure 5. The least square result when t=10

Dependent Variable: Y15
Method: Least Squares
Date: 07/26/21 Time: 16:08
Sample (adjusted): 1 1368
Included observations: 1368 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.017096	0.042870	23.72502	0.0000
CG*(RT+MI)	-0.041614	0.023976	-1.735646	0.0829
SR*(RT+MI)	0.363049	0.215074	1.688019	0.0916
II*(RT+MI)	0.000396	0.000112	3.526508	0.0004
IS*(RT+MI)	-0.523771	0.081376	-6.436434	0.0000
VC*(RT+MI)	0.111288	0.047867	2.324964	0.0202
LFR*(RT+MI)	0.000285	0.000184	1.549268	0.1216
RAF*(RT+MI)	-0.005198	0.003500	-1.484946	0.1378
ROU*(RT+MI)	0.007920	0.002269	3.491042	0.0005

R-squared	0.047914	Mean dependent var	1.034505
Adjusted R-squared	0.042310	S.D. dependent var	1.103943
S.E. of regression	1.080337	Akaike info criterion	2.998981
Sum squared resid	1586.128	Schwarz criterion	3.033330
Log likelihood	-2042.303	Hannan-Quinn criter.	3.011836
F-statistic	8.549055	Durbin-Watson stat	1.075761
Prob(F-statistic)	0.000000		

Figure 6. The least square result when t=15

Dependent Variable: Y20
Method: Least Squares
Date: 07/26/21 Time: 16:08
Sample (adjusted): 1 1368
Included observations: 1368 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.123122	0.053139	21.13537	0.0000
CG*(RT+MI)	-0.053299	0.029719	-1.793409	0.0731
SR*(RT+MI)	0.539447	0.266594	2.023478	0.0432
II*(RT+MI)	0.000418	0.000139	3.001921	0.0027
IS*(RT+MI)	-0.654761	0.100869	-6.491196	0.0000
VC*(RT+MI)	0.110218	0.059333	1.857625	0.0634
LFR*(RT+MI)	0.000395	0.000228	1.732736	0.0834
RAF*(RT+MI)	-0.007514	0.004339	-1.731662	0.0836
ROU*(RT+MI)	0.007032	0.002812	2.500367	0.0125

R-squared	0.042175	Mean dependent var	1.110183
Adjusted R-squared	0.036537	S.D. dependent var	1.364280
S.E. of regression	1.339125	Akaike info criterion	3.428468
Sum squared resid	2437.036	Schwarz criterion	3.462817
Log likelihood	-2336.072	Hannan-Quinn criter.	3.441323
F-statistic	7.479940	Durbin-Watson stat	1.170254
Prob(F-statistic)	0.000000		

Figure 7. The least square result when t=20

Dependent Variable: Y25
Method: Least Squares
Date: 07/26/21 Time: 16:08
Sample (adjusted): 1 1368
Included observations: 1368 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.154655	0.058295	19.80713	0.0000
CG*(RT+MI)	-0.054386	0.032603	-1.668142	0.0955
SR*(RT+MI)	0.573103	0.292458	1.959605	0.0502
II*(RT+MI)	0.000411	0.000153	2.688301	0.0073
IS*(RT+MI)	-0.716208	0.110655	-6.472434	0.0000
VC*(RT+MI)	0.121504	0.065089	1.866739	0.0622
LFR*(RT+MI)	0.000452	0.000250	1.808936	0.0707
RAF*(RT+MI)	-0.008089	0.004760	-1.699522	0.0894
ROU*(RT+MI)	0.006569	0.003085	2.129316	0.0334

R-squared	0.039902	Mean dependent var	1.124081
Adjusted R-squared	0.034250	S.D. dependent var	1.494867
S.E. of regression	1.469045	Akaike info criterion	3.613659
Sum squared resid	2932.847	Schwarz criterion	3.648008
Log likelihood	-2462.743	Hannan-Quinn criter.	3.626514
F-statistic	7.059979	Durbin-Watson stat	1.274108
Prob(F-statistic)	0.000000		

Figure 8. The least square result when t=25

It can be found from the above chart:

In the overall model, the influence coefficient of is and Sr on dependent variables is the largest (close to 0.6), followed by the correlation coefficient of VC. Excluding the regression results on the first day, the analysis focused on the situation considering RT and MI. The constant term is positive at all times and increases continuously, indicating that the IPO underpricing rate of the company is increasing without considering all other factors, which is in line with real life. The coefficient of CG is negative, and the absolute value of slope coefficient increases with the increase of T value. Every time CG increases by one unit, the IPO underpricing rate will decrease by one unit, indicating that the increase in the number of senior executives can reduce the company's behind the scenes behavior, so it can promote the increase of IPO premium rate, which is in line with real life. The coefficient of SR is positive, and the absolute value of slope coefficient increases with the increase of T value. Every time SR increases by one unit, the IPO underpricing rate will increase by one unit. It indicates that when the shareholding ratio of major shareholders increases, the rights of the company's shares are more concentrated. It may lead to behind the scenes behavior, resulting in the increase of IPO underpricing rate, which is in line with real life. The coefficient of II is positive, and the absolute value of slope coefficient increases with the increase of T value. II for each additional unit, the IPO underpricing rate will increase by one unit. It indicates that with the increase of issuance time interval, there may be more transactions behind the company, resulting in the increase of IPO underpricing rate, which is in line with real life. The coefficient of is is negative, and the absolute value of slope coefficient increases with the increase of T value. Every time it is increased by one unit, the IPO underpricing rate will decrease by one unit, which indicates that with the increase of the issuance scale, the degree of concern of the company will increase, and the more people invest, the IPO underpricing rate will decrease, which is in line with real life.

4. CONCLUSION

In short, IPO underpricing rate is affected by many factors. The factors that can be observed and have significant correlation are the ten factors. IPO underpricing rate can be divided into the top eight endogenous factors: underwriter reputation, venture capital support, manager shareholding, total issuance scale, corporate governance, issuance and listing time interval, ranking of accounting firms undertaking IPO listing and ranking of law firms undertaking IPO listing, as well as two exogenous factors, market inertia and issuance timing, which affect the whole stock market, and are overall significant. Through this paper, the government can strengthen the governance of IPO listed companies and market supervision to some extent. Except the limitation in this paper, it is hoped that future research can further explore how investors solve the problem of information asymmetry in investment and bring more benefits to investors.

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