Based on the Empirical Analysis of the Factors Influencing Ipo Discount Rate in Shanghai Stock Market

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Keywords: Ipo discount, Multiple regression, the shanghai stock market

Abstract: In view of the capital market IPO discount, common seen in early 2010 - the end of 2018 on the data of listed companies on the Shanghai stock market as sample, in comprehensive consideration on the first day, the waiting period, p/e ratio and so on six big influence factors, using the least squares multiple regression method to solve these variables to explain the influence of (yield) on the first day. The results show that the first day turnover rate, lottery rate, p/E ratio and issue size have a significant impact on the first day yield, and the first day turnover rate is positively correlated with IPO discount, while the other three are negatively correlated.

1. Introduction

At present, IPO discount phenomenon has occurred in most capital markets. There are mainly winner's curse, information asymmetry, signal hypothesis and other theories to explain the situation when the IPO price of the stock is lower than the market price of the first day of listing [1]. In addition, most studies show that the particularity of China's stock market makes the discount of IPO listed stocks not only conform to the general rules, but also have many unique rules [2]. Based on this general situation, this paper takes the data of Shanghai stock market as an example to prove, and empirically analyzes the IPO discount model of Shanghai stock market by selecting key indicators and using multiple regression method.

2. Data Source and Model Introduction

2.1 Data Source

The IPO data of this paper are mainly from the Shanghai stock exchange and CSMAR. The selected samples are the data of companies listed on the Shanghai stock market during January 1, 2010 and December 31, 2018. Eviews8.0 software is used for data processing in this paper.

2.2 Explained Variable

In the research, there are many ways to express IPO discount rate, including first-day return and first-day excess return [3]. Considering the convenience of data processing in Shanghai stock market, the paper adopts the first-day return RF_i as the explained variable:

$$RF_i = \frac{P_{i1} - P_{i0}}{P_{i0}} \times 100\%$$

P_{i1} Represents the closing price of the i-th stock on the first day of trading, and P_{i0} represents the IPO price of the i-th stock on the first day of trading. RF_i The higher the value, the higher the discount.

2.3 Explanatory Variables

TURN (first-day turnover rate): As a symbol of investors' interest and market sentiment, a high turnover rate represents investors' strong interest in this new issue and strong speculative color [4].

WAIT (waiting period) : A long waiting period not only means a higher time cost, but also a variety of uncertainties in the stock situation, which brings high volatility to investors' earnings.

PE (p/E ratio): P/E ratio index is divided by the stock price per share earnings, is often used to

  DOI: 10.25236/icemeet.2020.151

measure whether the stock pricing is one of the key indicators.

LOT (winning rate): The Company's stock governance, profitability and development potential will affect the attitude of investors to subscribe, thus indirectly affecting the winning rate [5].

FEE (issuing expenses): The level of issuing expenses will directly affect the interests of the underwriters, and will also influence the choice of issuing mode of the underwriters.

VOL (issue scale): To some extent, issue scale can indirectly measure company scale. Moreover, the theory of information asymmetry holds that company scale can also represent the degree of information asymmetry. Thus, the issue size is related to the degree of information asymmetry.

2.4 Model Setup

Based on the above discussion on the selection of explained variables and explanatory variables, this paper establishes the following regression model:

$$RF_i = \beta_0 + \beta_1 TURN_i + \beta_2 WAIT_i + \beta_3 PE_i + \beta_4 LOT_i + \beta_5 FEE_i + \beta_6 VOL_i$$

3. Regression Analysis

The main regression method used in this paper is the least square multiple regression. In order to solve the multicollinearity problem in the regression process, the stepwise regression method is used to determine the final regression equation step by step.

3.1 Global Regression Analysis

Table 1 Overall Multiple Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PE	-0.000436	0.000246	-1.774033	0.0766
WAIT	0.000980	0.001182	0.829384	0.4072
VOL	4.89E-09	3.20E-08	0.152748	0.8786
FEE	-2.63E-06	1.95E-06	-1.346826	0.1786
LOT	-0.039821	0.002933	-13.57590	0.0000
TURN	0.085468	0.023914	3.573955	0.0004
C	0.449055	0.018577	24.17248	0.0000

R-squared	0.283926	Mean dependent var	0.414258
Adjusted R-squared	0.276582	S.D. dependent var	0.163171
S.E. of regression	0.138783	Akaike info criterion	-1.100054
Sum squared resid	11.26755	Schwarz criterion	-1.048222
Log likelihood	332.6160	Hannan-Quinn criter.	-1.079865
F-statistic	38.65918	Durbin-Watson stat	1.808420
Prob(F-statistic)	0.000000		

As can be seen from the regression results, the p/E ratio, signing rate and first-day turnover rate all passed the significance test of 10%, while the waiting period, issuance scale and issuance cost did not pass the significance test. Therefore, the problem of multicollinearity in the model can be considered preliminarily. Then the correlation coefficient method is used to further verify the existence of multicollinearity.

Table 2 Correlation Coefficient Results

	TURN	PE	LOT	WAIT	FEE	VOL
TURN	1.000000					
PE	0.153210	1.000000				
LOT	0.327038	0.055673	1.000000			
WAIT	-0.067872	-0.037107	-0.059557	1.000000		
FEE	0.204051	0.058588	0.299808	-0.016710	1.000000	
VOL	0.189911	0.007447	0.317992	-0.019758	0.872308	1.000000

The correlation coefficient test shows that the correlation between all variables is relatively large, especially the correlation coefficient between issuance cost and issuance scale reaches as high as

0.87, which indicates that the multicollinearity problem does exist, and it is treated by stepwise regression method below.

3.2 Turn, Pe and Lot Regression Analysis

In the second regression, based on the results obtained in the previous step, TURN, PE and LOT were used for the regression analysis.

Table 3 Results of Re-Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TURN	0.078172	0.023802	3.284279	0.0011
PE	-0.000461	0.000245	-1.880539	0.0605
LOT	-0.041600	0.002824	-14.73016	0.0000
C	0.447009	0.008463	52.82080	0.0000

R-squared	0.276199	Mean dependent var	0.414258
Adjusted R-squared	0.272506	S.D. dependent var	0.163171
S.E. of regression	0.139174	Akaike info criterion	-1.099456
Sum squared resid	11.38914	Schwarz criterion	-1.069838
Log likelihood	329.4390	Hannan-Quinn criter.	-1.087919
F-statistic	74.79273	Durbin-Watson stat	1.781254
Prob(F-statistic)	0.000000		

The results also showed that the turnover rate, p/E ratio and signing rate all passed the significance test of 1%.

3.3 Introduce Wait Re-Regression

Considering that the correlation coefficient matrix shows the greatest correlation coefficient between issuance cost and issuance size, the waiting period is first added to the explanatory variable for regression. Regression results showed that the corresponding P value of WAIT still failed the significance test, and the goodness of fit obtained by the result did not improve significantly, so WAIT was not retained.

Table 4 Regression Results after Adding Wait

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TURN	0.079075	0.023835	3.317569	0.0010
PE	-0.000455	0.000245	-1.857619	0.0637
LOT	-0.041510	0.002827	-14.68245	0.0000
WAIT	0.000956	0.001185	0.806781	0.4201
C	0.435360	0.016737	26.01195	0.0000

3.4 Introduce Lnvol Re-Regression

Considering that the initial coefficient of VOL is too small, if it is simply introduced into the model as a variable, the effect is not obvious, so the paper conducts logarithmic treatment on it before introducing regression.

Table 5 Regression Results after Introducing Lnvol

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TURN	0.112960	0.024558	4.599659	0.0000
PE	-0.000405	0.000241	-1.680878	0.0933
LOT	-0.037305	0.002925	-12.75380	0.0000
LNVOL	-0.032406	0.006960	-4.655932	0.0000
C	0.799644	0.076194	10.49480	0.0000

After the addition of LNVOL, the goodness of fit is increased and the model fits well. Except that the PE ratio is significant at 10% significance level, the other three variables all pass the significance test of 1%, so LNVOL can be retained.

3.5 Introduce Fee Re-Regression

The coefficient could not pass the significance test when issuing FEE was added for regression. Due to the high volatility of issuing FEE, the logarithm of issuing FEE was tried for regression, but still could not pass the significance test, so the explanatory variable FEE was deleted.

Table 6 Regression Results after the Introduction of Lnfee

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TURN	0.113301	0.024830	4.562983	0.0000
PE	-0.000407	0.000242	-1.682182	0.0931
LOT	-0.037287	0.002933	-12.71220	0.0000
LNVOL	-0.033398	0.012415	-2.690217	0.0073
LNFEE	0.002034	0.021062	0.096561	0.9231
C	0.793181	0.101469	7.817000	0.0000

4. Treatment Results and Conclusions

To sum up, logarithm LNVOL of the first day turnover rate TURN, acceptance rate LOT, price-earnings ratio PE and release size are selected as explanatory variables in the final model, and the final regression equation is:

$$RF_i = 0.7996 + 0.1130TURN_i - 0.0004PE_i - 0.0373LOT_i - 0.0324LNVOL_i$$

It can be concluded from the final regression equation that the IPO first-day return (IPO discount) is positively correlated with the first-day turnover rate, and negatively correlated with the price-earnings ratio, winning rate and issuance scale, which all meet the actual situation. In addition, from a further perspective, the first-day turnover rate turned increased by 1, and the first-day yield RF increased by 0.1130; The P/E ratio increases by 1, and the first-day yield decreases by 0.0004. The winning rate increased by 1, and the first-day yield decreased by 0.0373; The release size of LNVOL increased by 1 and the first-day yield decreased by 0.0324.

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