Research on the Impact of Irrational Investor Behavior on IPO Underpricing in Main-board, SME Board and gem: Based on Behavioral Finance Perspective

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Abstract. This paper analyzes the phenomenon of IPO underpricing from the perspective of behavioral finance, and examines the effects of the irrational behavior of investors on the IPO underpricing of China's stock market by selecting the IPO underpricing rate, the first day turnover rate, the opening price rate and the lottery rate and so on. The study found that the investor sentiment in the three markets has a significant impact on the IPO underpricing, in which the investor sentiment in the continuous trading stage of the SME board and the gem has more strong influence on IPO underpricing. At the same time, this paper compares the difference between the Main-board, the SME board and the gem on the underpricing rate of IPO. Among them, the raising scale of the SME board and the gem has a significant negative impact on the IPO underpricing. Finally, combining with the reality of IPO underpricing in China's stock market, the paper puts forward some countermeasures and suggestions in order to weaken the problem of underpricing and promote the healthy development of China's securities market.

Introduction

With the development of China's capital market, the single capital market environment is not enough to meet the capital demand of Chinese enterprises and the capital supply of investors. Since the development of 1990s, China's capital market has formed the internal market and the external market. Among them, the floor market, including the main board, small and medium-sized board and gem, better meet the financing needs of enterprises at different stages of development and scale levels. But at the same time, there are also problems in China's capital market, in which IPO underpricing seriously weakens the function of the capital market to optimize the allocation of resources.

Research on IPO underpricing mainly adopts the framework of EMH and asymmetric information. Scholars believe that the first day of listing price is the fair value in the effective market, and the information asymmetry among the participants leads to the undervaluation of the issue price. However, many theoretical models based on EMH and asymmetric information do not have enough explanatory power for it, so some behavioral finance scholars believe that IPO underpricing is the result of overvaluation on the first day of listing. Based on considerations of this kind of situation, this article attempts through the theory of behavioral finance related study of irrational behavior of investors, the irrational behavior of investors explore influence on IPO underpricing, and compare the second board stock market, small and medium-sized board and gem and differences between the three markets in order to further improve the system of our country stock market IPO pricing to provide the corresponding policy recommendations.

Methodology

Research Hypothesis

The Impact of Investor Sentiment on IPO Underpricing. Financial scholars believe that under the basic framework of behavioral finance, investors are not completely rational and usually show
emotions such as fear, greed and enthusiasm when making decisions, which will influence their investment decisions and thus affect asset prices (Hong and Stein, 1999)[1]. Most investors have cognitive bias and response bias, and it is under the influence of these cognitive bias and response bias that investors tend to show excessive optimism, overconfidence, herd mentality and other irrational behaviors. Derrien (2005) [2] believes that investors' irrational behaviors have an impact on IPO pricing, initial earnings and long-term performance. Emotional investors and rational investors do not have the same judgment on the stock price in the case of information asymmetry. In the case of investors' opinions diverging and short-selling restrictions, IPO price only reflects the expectations of the most optimistic investors. Therefore, the rising irrational investor sentiment will push up the IPO price on the first day of listing (Cook et al., 2006) [3]. Feng yumei (2015) et al. [4] and Sun qian (2016) [5] all used proxy indicators of investor sentiment: turnover rate on the first day, winning rate and other factors to test the impact of IPO underpricing. They found that investor sentiment would indeed increase IPO underpricing rate. Therefore, this paper proposes:

Hypothesis 1: investor sentiment affects IPO underpricing, and investor sentiment is positively correlated with IPO underpricing rate.

Offering Size. The IPO underpricing rate of the main board market will be different from the IPO underpricing rate of the small and medium-sized board market and the growth enterprise market, because the main board market shares are larger, about 70% of the listed companies are listed at more than 50 million shares, while most of the small and medium-sized board market and the growth enterprise market shares are below 30 million shares, and the tradable shares are much smaller. The larger the company's issuance scale is, the larger the circulating capital stock is, the less likely the stock price is to be inflated, and the smaller the discount is (han dezong and Chen jing, 2001) [6]. Therefore, this paper proposes:

Hypothesis 2: IPO underpricing is affected by the size of the offering, and the size of the offering is negatively correlated with the IPO underpricing rate.

Sample Selection and Data Sources
This paper selects all new A-share listed companies from May 2015 to April 2018. Due to the lack of data of relevant indicators, 138 samples of main board market, 159 samples of small and medium-sized board market and 265 samples of gem market are selected after eliminating the missing data. The data are all from RESSET database.

Variable Definition and Model Setting
Explained Variable. This article selects the IPO underpricing rate is (RIPO) as the explained variable, in order to eliminate the stock market overall yield, the influence of factors on its debut on the IPO underpricing level do adjustment, the market is offering will be deducted from the underpricing level fluctuations on the first day of the market index,

\[
RIPO = \frac{p_{it} - p_{i0}}{p_{i0}} - \frac{p_{mt} - p_{m0}}{p_{m0}},
\]

where \(p_{it}\) is the closing price of stock i on the first day of listing, \(p_{i0}\) is the issue price of stock i, \(p_{mt}\) is the market index price of stock i on the first day of listing, and \(p_{m0}\) is the market index price of stock i at the time of issuing.

Explaining Variable. Turnover rate (Turnover), the opening rate of return (Rop), online lottery rate (On_lottery) are selected as the explaining variables.

Control variable. The offering size (IPO_Size) is selected as the control variable in this paper, and the IPO_Size =Ln[total fundraising amount].

The Regression Model. In order to investigate the impact of investor sentiment on IPO underpricing, this paper uses multiple regression model (1) to test hypothesis 1. Meanwhile, this paper examines the difference of IPO underpricing between the main board, SME board and gem market, and adds control variable to test hypothesis 2. The regression model is as follows:

\[
RIPO = \beta_0 + \beta_1 Turnover + \beta_2 Rop + \beta_3 On\_lottery + \beta_4 IPO\_Size + \varepsilon
\]
Empirical Analysis

According to the model (1), multiple regression analysis was performed on the three markets, and the test results were as follows:

Table 1. The influence of investor sentiment on IPO underpricing in the main board market.

| Explained variable | Coefficient Non-Control variable | P | Coefficient Add-Control variable | P |
|-------------------|----------------------------------|---|----------------------------------|---|
| Constants         | 0.44                             | 0.000 | 0.438                           | 0.000 |
| turnover          | 2.028                            | 0.001 | 0.018                           | 0.727 |
| Rop               | 1.201                            | 0.000 | 0.005                           | 0.037 |
| On_lottery        | -0.305                           | 0.650 | -0.523                           | 0.445 |
| IPO_Size          |                                  |    |                                  | -0.911 | 0.166 |
| $R^2$             | 0.202                            |      |                                  | 0.373 |
| Adj.$R^2$         | 0.102                            |      |                                  | 0.107 |
| F Stat.           | 10.13                            |      |                                  | 12.51 |

The results in table 1 show that both turnover rate and opening price yield have significant influence on IPO underpricing rate in the main board market, and they are positively correlated, indicating that investor sentiment has a positive influence on IPO underpricing rate, and hypothesis 1 is true. After the scale control variable is added, other variables are no longer significant, and the scale factor is not significant for IPO underpricing rate, but the goodness of fit of the model is improved, and the coefficient of the scale of IPO is negative, indicating that the scale of IPO in the main board market may reduce the IPO underpricing rate.

Table 2. The impact of investor sentiment on IPO underpricing in the SME board market.

| Explained variable | Coefficient Non-Control variable | P | Coefficient Add-Control variable | P |
|-------------------|----------------------------------|---|----------------------------------|---|
| Constants         | 0.439                            | 0.000 | 0.437                           | 0.000 |
| turnover          | 12.370                           | 0.000 | 6.836                           | 0.000 |
| Rop               | -0.201                           | 0.612 | 0.195                           | 0.177 |
| On_lottery        | -0.725                           | 0.012 | 0.023                           | 0.845 |
| IPO_Size          |                                  |    |                                  | -1.057 | 0.003 |
| $R^2$             | 0.234                            |      |                                  | 0.465 |
| Adj.$R^2$         | 0.218                            |      |                                  | 0.401 |
| F Stat.           | 17.93                            |      |                                  | 21.702 |
Table 3. The impact of investor sentiment on IPO underpricing in gem market.

| Explained variable | coefficient | P  | coefficient | P  |
|--------------------|-------------|----|-------------|----|
|                    | Non-Control variable |     | Add-Control variable |     |
| Constants          | 0.44        | 0.000 | 0.440       | 0.000 |
| turnover           | 6.028       | 0.002 | 4.018       | 0.027 |
| Rop                | 5.014       | 0.002 | 4.061       | 0.365 |
| On_lottery         | -0.035      | 0.004 | -0.005      | 0.675 |
| IPO_Size           | -8.024      |       | -8.024      |       |
| $R^2$              | 0.202       |       | 0.298       |       |
| Adj.$R^2$          | 0.202       |       | 0.317       |       |
| F Stat.            | 10.40       |       | 19.60       |       |

Table 2 and table 3 shows that in the small and medium-sized board and gem market, investor sentiment on IPO underpricing rate is significant, the influence of the turnover rate has a significant positive influence on IPO underpricing rate, turnover rate has a significant negative influence on IPO underpricing rate, and on the growth enterprise market opening price yield has a significant positive influence on IPO underpricing rate. All of these shows that investor sentiment and IPO underpricing rate is positive correlation, and hypothesis 1 was established. However, after adding the scale control variable, the turnover rate still has a significant impact on the IPO underpricing rate, indicating that the turnover rate has a strong impact on the IPO underpricing rate. The effect of fundraising scale on IPO underpricing rate of small and medium-sized board market passed the significance test of 1%, while the effect of fundraising scale on IPO underpricing rate of gem market passed the significance test of 5%, and the coefficients were all negative, indicating that fundraising scale has a significant negative impact on IPO underpricing rate. Compared with the main board market, the goodness of fit of the model not only has improved, offering size influence on IPO underpricing is significant, indicating that for small and medium-sized plate and the growth enterprise market, in addition to the influence of investor sentiment, raise scale effect on IPO underpricing also plays an important role, to raise the scale and IPO underpricing rate is negative correlation, so the hypothesis 2 is established.

Conclusions

The research of this paper shows that from the perspective of the whole stock market, the investor sentiment in the stage of continuous trading and the stage of collective bidding all contribute to the IPO underpricing rate, among which the investor sentiment in the stage of continuous trading has a more dominant influence on the IPO underpricing rate for the SME board and gem market.

The fundraising scale has a negative impact on IPO underpricing, especially on the small and medium-sized board and gem market. The brief analysis of this paper deals with the reason: first, the main market of the stock plate is bigger, the small and medium-sized board market and the growth enterprise market stocks plate is small, many float plate is relatively small, therefore, small and medium-sized plate and the growth enterprise market share prices are more likely to be manipulated hype, the speculative funds for the purpose of arbitrage will towards these two markets, resulting in the small and medium-sized plate and the higher the gem IPO underpricing rate. Second, small and medium-sized plate and no significant differences between the growth enterprise market, because the two either in the plate size, or is similar to the requirement of listed companies, small and medium-sized board market is a transition state gem, it can be said that small and medium-sized plate is a forerunner of the gem, so both has the similarity is understandable.

The existence of high IPO underpricing rate has many adverse effects on China’s stock market. The issuance of new shares has extremely high risk-free returns, resulting in a large amount of capital flowing into the primary market, fueling speculative bubbles and seriously reducing the efficiency of capital allocation across the whole society.
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