

IPO Pricing of Chinese Stock Market under Registration System

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Abstract

The full implementation of registration system in China in 2020 is a great change in the development of capital market. Research on the pricing mechanism of A-share under the registration system is of great significance to promote the comprehensive marketization of China 's IPO system. Firstly, this paper uses stepwise regression analysis to select the factors that really affect IPO pricing, and uses regression model to obtain pricing method. Then using factor analysis and multiple stepwise regression analysis for empirical research to explore the internal principle of IPO pricing.

Keywords

China's Stock Market; Registration System; IPO Pricing; Factor Analysis; Stepwise Regression.

1. Introduction

In 2018, Nobel Prize winner Romer focused on how to make healthy economic growth, which prompted us to explore the healthy development of the stock market, and IPO pricing efficiency has a decisive role in the development of the stock market. The issue price of IPO should take into account the balance of interests between issuers, underwriters and institutional investors. with the vigorous development of Chinese stock market for more than 30 years, IPO pricing mechanism in China has experienced the promotion from government-guided non-market pricing under examination and approval system to market-oriented inquiry system under examination and approval system. The inquiry mechanism was introduced in 2004, and the IPO pricing window guidance of CSRC was later implemented. In 2009, window guidance was abolished. In 2014, we guided the ipo pricing of 23 times p/E ratio. During this period, the ipo pricing mechanism was constantly improved and the marketization of IPO pricing was gradually explored. However, there are still many problems in the IPO issuance audit system under the examination and approval system, among which the biggest problem is that administrative intervention has been hindering the marketization of the IPO issuance system. Window navigation, where an IPO price does not exceed 23 times earnings, has become a potential hidden red line for ipos. Most of the companies are offering at 22.99 times. The cumulative bid inquiry system is futile and is essentially more like fixed p/E pricing. The factors considered in the IPO pricing process are not comprehensive enough. The inefficiency of IPO pricing system leads to the substantial underestimation of new share prices, leading to the drastic fluctuation of secondary market.

In 2020, China's full implementation of the registration system will become a great change in the development process of capital market [1-4]. The newly revised ' Securities Law of the People ' s Republic of China ' was formally implemented on March 1, 2020. At present, China ' s IPO pricing theory system is not perfect, IPO underpricing phenomenon is serious, homogeneous company pricing difference is big, the price of offline distribution is low, cannot reflect the internal value of the enterprise, the first day excess return is serious. Fundamentally speaking, this is caused by the incomplete marketization of IPO system. The biggest feature of

the registration system is market-oriented pricing. This paper takes the registration system as an opportunity to study the IPO pricing efficiency to achieve scientific pricing.

2. Variable Screening and Regression Model

The variables selected in this paper are all possible factors related to IPO pricing, which does not mean that these factors will affect IPO pricing [5-6]. When using multiple independent variables to establish the regression model, if we try to introduce all the independent variables into the regression model, there are often difficult problems to solve, and the results may not be effectively explained. This article first to collect the independent variables screening, remove irrelevant independent variables. In this paper, stepwise regression [7-12] is used to screen variables. After stepwise regression, 13 independent variables affecting IPO price are finally selected. They are EPS per share earnings (latest share capital amortization) (yuan), cost rate during sales (%), ROIC (TTM) (%), net earnings per value change / total profit (%), current ratio, net cash flow from operating activities / interest-bearing debt, fixed asset turnover (times), non-current asset turnover (times), year-on-year growth rate of basic earnings per share (%), year-on-year growth rate of net assets earnings (amortization) (%), year-on-year growth rate of net cash flow (%), year-on-year growth rate of total operating costs (%), year-on-year growth rate of total operating costs (%) and year-on-year growth rate of equity of shareholders belonging to the parent company (%).

Taking these 13 factors as independent variables and IPO price as dependent variable, the regression model is established. It can be concluded that the multi-factor model of IPO price is

$$\begin{aligned}
 P = & 16.200X_1 + 0.023X_2 + 0.069X_3 + 0.456X_4 \\
 & - 0.115X_5 + +0.114X_6 + 0.117X_7 - 0.081X_8 \\
 & + 0.248X_9 + 0.090X_{10} - 0.159X_{11} \\
 & + 0.864X_{12} + 0.001X_{13} - 9.606.
 \end{aligned}
 \tag{1}$$

According to the regression test results, this model has a good fitting degree for IPO pricing of A-shares since the implementation of the registration system. The coefficient of determination of the equation test results and the adjusted coefficient of determination reached 0.854 and 0.814, respectively. The variable F was 3.955, and the change of the dominant F was 0.049, indicating that the established pricing model had high accuracy. In order to verify the accuracy of the model, the A-share IPO issued in 2021 with better results is used for testing. The results are shown in Figure1.

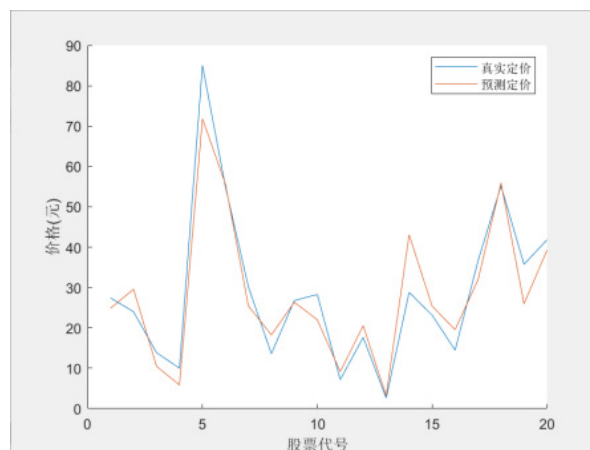


Fig 1. Comparison of pricing model results and real results

It can be seen from the test results that the error of the model is within 35 %, and the prediction results are basically the same as the real results, so the model has good prediction effect. The error of the model is partly due to the fact that the stock data of the real price predicted by the price comparison are only a relatively good part of the pricing selected in the study. There are also some problems in the real pricing of these stocks, and the real price is not a perfect pricing. So, the pricing model itself should be less than 35 % error.

3. Factor Analysis

There are a large number of independent variables in the pricing model in this paper, and there may be strong correlation between each variable, so we conduct factor analysis on the influencing factors. Firstly, KMO test and Butterley spherical test are conducted on the correlation between variables. The KMO value is 0.617, and the Bartley spherical test is 0.000, indicating that there is a correlation between the factors affecting IPO pricing, which is suitable for factor analysis.

According to the results of factor analysis, only the characteristic roots of the first five factors are greater than 1, and the cumulative variance contribution rate of the first five factors reaches 66.305 %. Therefore, the first five factors are selected as the main factors representing the influencing factors of IPO pricing, and the factor load matrix is established. Comparing the results after rotation with those before rotation, the factor after rotation can better explain the main factor. The score formula of the factor is

$$V_1 = 0.026X_1 + 0.121X_2 - 0.037X_3 + \dots + 0.168X_{11} + 0.402X_{12} + 0.082X_{13},$$

$$V_2 = 0.438X_1 - 0.097X_2 + 0.394X_3 + \dots - 0.117X_{11} - 0.054X_{12} - 0.228X_{13},$$

$$V_3 = -0.009X_1 - 0.174X_2 + 0.130X_3 + \dots - 0.064X_{11} + 0.043X_{12} + 0.369X_{13},$$

$$V_4 = -0.094X_1 - 0.020X_2 - 0.040X_3 + \dots + 0.284X_{11} + 0.049X_{12} + 0.097X_{13},$$

$$V_5 = -0.131X_1 + 0.636X_2 - 0.001X_3 + \dots - 0.038X_{11} + 0.142X_{12} - 0.026X_{13}.$$

Where $v_1 \sim v_5$ is the extracted five common factors, $x_1 \sim x_{13}$ is the model screening IPO pricing factors. Using factor analysis method to extract five common factors to avoid the possible collinearity between variables.

4. Quadratic Regression Analysis

Five common factors are extracted through factor analysis to construct a new IPO pricing model is

$$P = \alpha_0 + \alpha_1V_1 + \alpha_2V_2 + \alpha_3V_3 + \alpha_4V_4 + \alpha_5V_5 + \varepsilon . \quad (2)$$

In order to further study the influencing factors of IPO pricing, this paper uses stepwise regression again. The forward selection method is used to bring the above variables in turn, the order of which is affected by the partial correlation coefficient, and the first entry with the largest numerical value. Finally, the variables that can be included in the model are only observed whether they have a significant impact on the explained variables. The multi-factor model of IPO price is

$$P = 10.682 + 0.119V_2 + 0.389V_5 + 0.123V_3 + 0.084V_4 + 0.079V_1 . \quad (3)$$

5. Interpretation of Regression Results

From the order of variable substitution in stepwise regression analysis and the impact of variable on IPO pricing, EPS (latest diluted share capital) (yuan), ROIC(TTM) (%) and net income/total profit of value change (%) are the most critical factors affecting IPO pricing. These three variables reflect the asset quality and profitability of an enterprise. Since the implementation of the registration system, most a-share listed companies in China are mature enterprises with relatively stable operation, large scale and small operation risk. When such companies go public, investors focus more on their ability to generate earnings. The higher the quality of corporate assets, the stronger the ability of corporate assets to generate income. The higher the earnings per share value, the higher the rate of return to investors. Therefore, EPS (latest diluted equity) (yuan) and ROIC(TTM) (%) are significantly positively correlated with IPO pricing.

Secondly, the operating ability of enterprises reflected by the sales period cost rate (%) and liquidity ratio also has a great impact on IPO pricing. The operation ability of the enterprise can reflect the operation level of the enterprise. The stronger the operation ability of the enterprise, the higher the asset utilization rate of the enterprise, and the higher the efficiency of creating income for the enterprise. Therefore, the cost rate (%) and the current ratio during the sales period are also positively correlated with IPO pricing.

In addition, the year-on-year growth rate of net cash flow / interest-bearing debt and net asset yield from operating activities (abate) (%) is also positively correlated with IPO pricing. Since the implementation of the registration system, A-share listed companies have been basically mature enterprises, but the growth of enterprises is still the focus of investors. Under the ever-changing market environment, the development ability of enterprises affects the development space of enterprises. The greater the development potential of enterprises, the higher the return on investment of investors.

Other factors that reflect corporate solvency have no obvious influence on IPO pricing, which also indicates that investors do not pay special attention to these factors in the investment process.

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