

The Impact of Chairman's Education on IPO Price Underpricing -- Regulation of corporate P/E ratio

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Abstract. Based on behavioral finance theory, we empirically test the effect of the chairman's education on IPO price underpricing and analyze the moderating role played by the firm's P/E ratio. The results show that the chairman's education is significantly and positively related to IPO price underpricing, while the increase in the P/E ratio significantly mitigates the positive effect of the chairman's education on IPO price underpricing. Further study shows that the positive effect of the chairman's education on IPO price underpricing is more significant in stocks with low turnover rate, while the increase of firm P/E ratio better mitigates the positive effect of chairman's education on IPO price underpricing in stocks with high turnover rate; the positive effect of chairman's education on IPO price underpricing is more significant in firms with low R&D investment, while the increase of firm P/E ratio better mitigates the positive effect of chairman's education on IPO price underpricing in firms with high R&D investment. The positive effect of the chairman's education on IPO price underpricing is more significant in firms with low R&D investment, in contrast, the positive effect of the chairman's education on IPO price underpricing in firms with high R&D investment is better mitigated by the increase in firm P/E ratio. In addition, the effect of the chairman's education on IPO price underpricing is more significant when the chairman is also the CEO, and the moderating effect of the firm's P/E ratio on the relationship between the two is more significant.

Keywords: IPO price underpricing; chairman's education; corporate P/E ratio.

1. Introduction

With the continuous development of China's capital market and investors' ability to collect information, the executive team's background is considered to have significant information content, which significantly impacts the company's stock price reaction or corporate value (Huang Jicheng et al., 2013)[1]. The chairman, as the top general leader in the company, is the prominent core member who guides the operation of the whole company, where the chairman's education, as one of the most essential information in his background information, also plays a vital role in the capital market and affects the IPO price underpricing rate.

The educational background of the chairman has a significant effect on the production and operation behavior of the company, and the higher the educational level of the chairman, the higher the quality of control within the company, thus having a positive effect on the company's operation (Chen Hanwen et al., 2014)[2]. The educational level of the chairman has a significant negative effect on the firm's investment behavior. At the same time, there is a significant positive effect on the financial elasticity of the firm (Cao Hongxia, 2017) [3]. There is a significant correlation between a firm's P/E ratio and the quality of information disclosure; the higher the P/E ratio, the better the quality of information disclosure, and the higher the P/E ratio also has different effects on the IPO price underpricing rate (Wang Yan et al., 2018)[4].

In January 2014, China's IPO restarted, ushering in the accelerated development of the capital market. In order to solve the phenomenon of IPO breakage, China's stock market implementation of the first day of IPO price limit; that is, for the provisions of the first day up and down limit of 20%, the stock price for the new issue of 64%-144%, and the provisions of the suspension of trading for 30 minutes when the stock price rises or falls 10% This measure is used to solve the problem of short trading time on the first day of listing of new shares. At the same time, according to many empirical and theoretical studies by domestic and foreign scholars, the up-and-down stop system for listed stocks is also considered an effective mechanism for stabilizing stock prices in the securities market

(Chen Kaini, 2019)[5]. Therefore, this paper uses two different calculations for the IPO price underpricing rate before and after limiting the first-day up and down rate.

Excessive reliance on the earnings generated by IPOs adversely affects both companies and investors. For firms, the persistently high price underpricing rate gives them huge gains once they successfully go public, so they have more incentives to whitewash their financial information, thus neglecting to improve their core competitiveness, adversely affecting the real economy's development. In pursuit of excess returns, firms will list in sectors with higher price underpricing rates (Pan Shengwen et al., 2020) [6], reducing market efficiency. For investors, the avid pursuit of IPOs will intensify the speculative sentiment of other investors in the market and increase irrational investors, which is detrimental to investors making correct value judgments and hinders the sustainable and healthy development of China's securities market.

Compared with the existing literature, the main research innovations of this paper are: (i) the combination of the up-and-down limit system to accurately measure the IPO price underpricing rate. (ii) The IPO price underpricing rate is studied from the perspective of the chairman's education, and the corporate P/E ratio is introduced as a moderating variable, which fills the gap of related research.

2. Literature Review and Research Hypothesis

The problem of "IPO price underpricing" was first raised by Ibbotson in 1975. IPO price underpricing is the closing price of new shares on the first day of the listing is higher than the issue price (Ibbotson, 1975) [7]. There are two hypotheses in academic circles: the primary market price underpricing theory and the secondary market premium theory.

For the theory of primary market price underpricing, under the traditional financial analysis framework, early studies by foreign scholars mainly rely on the theory of information asymmetry to explain primary market price underpricing and implicitly assume that the trading price of stocks in the secondary market is fair. Baron and Holmstrom (1980) find that there is information asymmetry between issuers and underwriters [8]. In the pricing of new share issues, underwriters who are on the superior side of information offer companies a price that companies more readily accept, and in order to gain revenue from companies and investors, underwriters usually offer companies an issue price that is lower than the actual price, which not only ensures the smooth issuance of the company's new shares but also maintains their reputation as underwriters. Rock (1986) put forward the "winner's curse" theory, arguing that there are two types of investors in the market, those who have sufficient information and those who do not, and information asymmetry exists not only between investors and underwriters but also between investors and investors [9]. However, when the issue price is higher than the actual value of the new shares, the investors with sufficient information will give up purchasing, so the investors with insufficient information will get the same number of new shares as the subscription, then the investors with insufficient information will recognize the risk expectation and ask for compensation. Otherwise, they will not subscribe to avoid the risk, and the underwriters will issue new shares at a discount to compensate for the investors with insufficient information to ensure the smooth issuance of new shares. The underwriters will issue the new shares at a discount to compensate the investors with insufficient information. In simple terms, the theory of primary market price underpricing means that under the premise that the secondary market is efficient and the issuance market is competitive (Liu Yuhui et al., 2011), IPO price underpricing is caused by the issue price being lower than the actual price [10]. Mehmood et al. (2021) show that weak institutional set-up to protect investors and poor regulation are the leading causes of information asymmetry when fixed price mechanisms are used in emerging markets [11]. Therefore, these factors can create communication errors during the IPO process and between the main IPO parties, such as issuers, underwriters, and investors, leading to IPO price underpricing issuance in the primary market. In addition to this, many studies by domestic and foreign scholars have concluded that the degree of pre-IPO audit (Dye, 1993)[12], information disclosure (Chen Shenglan, 2010; Qiu Dongyang, Chen Lin et al., 2010)[13,14], team experience (Li Weian, Liu Zhenjie, et al., 2014)[15], majority shareholder

control (Zhang Hua, Liu Yupeng, et al., 2014; Zhang Hua, Yin Shunda, et al., 2014)[16,17], and political connections (Chen Yansen, Zheng Dengjin, et al. 2014) also have significant effects on the price underpricing of IPOs in the primary market[18].

For the secondary market premium theory, the reason for the high degree of IPO price underpricing is the high first-day closing price. Some scholars have explained this phenomenon from a behavioral finance perspective, and Daniel et al. (1998) find that investors are eager to "speculate" on IPOs [19]. In addition, Cornelli et al. (2006) find that small and medium-sized investors are overly optimistic about the prospects of IPOs and have a higher willingness to pay for new shares, which also makes the price of IPOs deviate excessively from the actual value resulting in price depression [20]. Investor behavior is one of the vital research perspectives in behavioral finance. The irrational "speculation" of investors in the secondary market is an important reason for the high IPO price depression, and the severe imbalance between the supply and demand of IPOs makes the trading price continue to rise, further increasing the price depression. This leads to a significant increase in price underpricing. Singh and Gupta (2018) find that the subscription ratio is positively related to the IPO price underpricing rate by studying the relationship between board structure and IPO price underpricing, indicating that IPO price underpricing is affected by investor sentiment [21]. In addition, the low specialization and fragmentation of investors in China make investors' irrational sentiment more susceptible to market influence, which further amplifies the degree of influence of investor sentiment on IPO price underpricing. Gan Lu (2022) studied the effect of investor sentiment on IPO price underpricing based on GEM IPO listed companies in China from 2009-2019 and measured investor sentiment using indicators such as first day of listing turnover rate and online winning rate and concluded that the higher the first day of listing turnover rate, the higher the GEM IPO price underpricing rate, and the lower the online winning rate, the higher the GEM IPO price underpricing rate [22]. The same conclusion is drawn that investor sentiment affects IPO price underpricing.

This paper is mainly based on behavioral finance theory. Tversky's (1974) study first pointed out the prospect theory, pointing out that investment decisions are derived from one's own expectations [23]. However, information asymmetry and limited rationality are essential factors leading to wrong decisions. Zhong Chen et al. (2021) studied the influence of trust companies on the "stock price anomaly" of listed real estate companies based on behavioral finance perspective [24]. Qin Rong (2021) analyzed investor behavior from behavioral finance perspective, pointing out that Chinese investors have characteristics of overconfidence, herding Richard H. Thaler, a 2017 Nobel laureate in economics, studied the intersection of psychology and behavioral finance theory, acknowledging that it "demonstrates how features of the human mind affect decision-making and market outcomes by exploring the consequences of limited rationality, social preferences, and lack of self-control[25]. Exploring the consequences of limited rationality, social preferences, and lack of self-control shows how the characteristics of the human mind systematically influence decisions and market outcomes.

Exploring IPO price underpricing from a behavioral finance perspective, this paper considers the influence of the executive team on the firm's internal decisions and the influence of executive team information on the firm's external investors and is selected to explore the causes of IPO price underpricing from that perspective. The top ladder theory suggests that managerial traits influence their strategic choices and, in turn, the firm's behavior. Thus, the psychological structure of the top management team in terms of cognitive abilities, perceptions, and values determines the strategic decision-making process and the corresponding performance outcomes. Existing literature has studied firms' tax behavior based on the top ladder theory (Yang Huiyun, 2022), concluding that gender characteristics and knowledge background of executives can lead to aggressive tax behavior [26]. A study by H. Zhang Haiyan et al. (2020) based on the high-level ladder theory showed that an increase in the proportion of female executives enhanced firm value and that female executives weakened the negative effect of debt financing on firm value [27].

The top ladder theory also suggests that the top management team's objectively measurable demographic background characteristics (e.g., age, tenure, occupation, education, etc.) are closely related to managers' cognitive abilities and values. Thus, by looking at demographic characteristics

variables, it is possible to objectively study the relationship between top management teams and firm performance. In this paper, one of the most essential roles in the top management team, the board's chairman, is taken as the primary research object. The educational background, i.e., academic background, which has received the most attention among the background characteristics, is taken as a representative characteristic of the board's chairman for this paper's empirical study. Among the existing literature, the study by Fan Lili et al. (2019) found that the educational background of the chairman has a significant positive relationship with corporate innovation investment[28]; the study by Xiong Wei (2019) showed that the higher the educational background of the chairman of state-owned enterprises, the larger the scale of corporate mergers and acquisitions[29]. In his study, Zhong Lihan (2017) found that a chairman with high educational background would choose a lower gearing ratio and enhance the company's long-term solvency [30].

In the existing literature, more literature explores the impact of background information of executive teams on intra-firm, such as tax behavior, corporate strategy, and corporate performance. However, less literature explores the impact of background information of executive teams on capital market behavior, so this paper fills the research gap and explores the impact of the chairman's education on IPO price underpricing based on high-level ladder theory and behavioral finance.

2.1 The effect of the chairman's education on IPO price underpricing

As one of the most essential pieces of information in the executive team's background, the chairman's education significantly impacts the company's business development strategy and plays an important role in influencing investors' decision-making behavior in the market. There is a significant positive relationship between the average education of the executive team and the degree of strategic change in the company. The higher the average education of the executive team, the greater the degree of strategic change of the company, which leads to the excellent behavior of the company in the capital market, thus enhancing the IPO price underpricing rate (Ye Qutong et al., 2021)[31]. The level of education has an inverted U-shaped relationship with the company's stock price response (Huang Jicheng & Sheng Mingquan, 2013) [1], and the average level of education of the executive team was also found to have a negative effect on the performance of entrepreneurial firms through the study (Sun Kai, 2019)[32]. At the same time, the higher the level of education, the higher the "opportunity cost" of learning, and the longer the time spent in school, the more likely it is to be out of touch with society. Obviously, investors are less willing to pay for a highly educated executive team so they will prefer an executive team with relatively low education (Ren Yong, 2020)[33].

Therefore, as the chairman's education increases, the chairman's work experience and ability are also somewhat lacking. The company's management performance depends on the chairman's experience and ability rather than the level of education, and there is a big difference between research ability and workability. High-quality management can establish a more reliable information transmission mechanism so that market stakeholders can recognize the company's actual value, which is conducive to mitigating price underpricing and reducing the underpricing price rate of IPO (Fang Qiang, 2014)[34]. Therefore, the hypothesis is proposed.

H1: There is a significant positive effect of the educational level of the chairman on the IPO price underpricing rate, i.e., the higher the educational level of the chairman, the higher the IPO price underpricing rate.

2.2 The moderating effect of the P/E ratio

In the securities market, the information asymmetry problem between investors and issuers is severe, and the information asymmetry problem is also one of the main reasons for IPO price depression. The P/E ratio of a company has a significant positive relationship with the quality of information disclosure, and high-quality information disclosure can alleviate the information asymmetry caused by the chairman's education from the perspective of information adequacy, therefore alleviating the high IPO price underpricing rate (Wang Yan, 2018)[4]. Since the chairman's

education is only one indicator, but a large amount of information behind it is difficult to measure by a single indicator due to its high uncertainty, investors need more complete corporate information when investing in stocks. Therefore, a higher quality of information disclosure can help investors deepen their comprehensive understanding of the chairman of the company, understand the impact of the chairman's education on the chairman himself and the business situation of the company from multiple perspectives, enhance investors' further knowledge of the company and strengthen investors' confidence. This overall perception will also influence investors' judgment of the company's stock, reduce investors' risk estimation of the company, and promote the value of the chairman's education to be pretty reflected in IPO pricing.

H2: By raising the P/E ratio, firms can mitigate the positive impact of the chairman's education on IPO price underpricing.

3. Study Design

3.1 Sample and data

In this paper, IPO companies on the SSE and SZSE from January 1, 2014, to December 31, 2022, are selected as the study sample, and after excluding the sample containing missing values, a sample of 2043 companies is obtained. The data were mainly obtained from the Wind database and the CSMAR database.

3.2 Variable definition

Explained variable: IPO underpricing *UP*. Since on August 24, 2020, the GEM cancels the first-day limit on upside and downside, drawing on Pan et al. (2020), in the sample with a first-day limit on upside and downside, the formula is: $UP = (\text{first non-stop up or non-stop down closing price after listing} - \text{issue price}) / \text{issue price}$, and in the sample without a first-day limit on upside and downside, the formula is: $(\text{closing price on the first day of listing} - \text{issue price}) / \text{issue price}$ [6].

Explanatory variable: chairman's education *EDU*. The educational data from the CSMAR database were taken, 1=secondary school and below, 2=junior college, 3=bachelor's degree, 4=master's degree, 5=doctoral degree, 6=other (degrees published in other forms, such as honorary doctorate, correspondence course, etc.), and 7=MBA/EMBA.

Moderating variable: price-to-earnings ratio *PE*. The P/E ratio data from the Wind database is taken, and the P/E ratios of the companies at the time of their debut are selected.

Control variables: Control variables were selected regarding Zeng Jianghong and Ma Runze. The variables are defined in table 1.

Table 1. Variable definition.

| Variable Type | Variable Name | Variable Symbols | Variable Definition |
|-----------------------|--------------------------|------------------|---|
| Explained variables | IPO Price underpricing | UP | (The closing price of the first non-stop up or non-stop down after listing - issue price)/issue price |
| | | | (Closing price on the first day of listing - issue price)/issue price |
| Explanatory variables | Chairman's Education | EDU | According to CSMAR database data, 1=secondary school and below, 2=junior college, 3=bachelor's degree, 4=master's degree, 5=doctoral degree, 6=other (degree published in other forms, such as honorary doctorate, correspondence course, etc.), 7=MBA/EMBA |
| Adjustment variables | Issue P/E Ratio | PE | Issue price/earnings per share before issue |
| | Issue Price to Net Ratio | PB | Issue price / Net assets per share before issue |
| Control variables | Company Age | Age | Ln (date of listing - date of company formation) |
| | Registered Capital | capital | Ln company registered capital |
| | Winning Rate | Lottery | Number of IPO shares issued / Number of valid subscriptions |
| | Financing Size | Proceed | Ln (issue price × total number of shares issued) |
| | Return on Net Assets | ROE | Return on net assets for the year prior to listing |

3.3 Model Construction

$$UP = \alpha_0 + \alpha_1 \text{EDU} + \alpha_i \text{Control} + \sum \text{year} + \sum \text{industry} + \epsilon \quad (1)$$

$$UP = \alpha_0 + \alpha_1 \text{EDU} + \alpha_2 \text{PE} + \alpha_3 \text{EDU} \times \text{PE} + \alpha_i \text{Control} + \sum \text{year} + \sum \text{industry} + \epsilon \quad (2)$$

UP is the IPO depression, and EDU represents the chairman's education. To test the moderating effect, the moderating variable issue P/E PE and the interaction term EDU× PE are added to the model (2). Control is the control variable, ϵ is the residual term, industry and year-fixed effects are added to the model, and a mixed OLS model is used for regression.

4. Analysis of the empirical results

4.1 Descriptive statistical analysis

Table 2 shows the results of descriptive statistics for the main variables. The mean value of IPO underpricing (*UP*) is 2.282 with a standard deviation of 2.206, indicating that compared to the issue price, the share price of IPO companies on the first day of listing or the first non-stop up or non-stop down day has increased by more than two times on average, which is much higher than the average of 10% to 20% in mature capital markets in Europe and America. Looking at the education level (*EDU*) of the chairman, the mean value is 2.979, which can be roughly considered that the bachelor's degree is the average education level of the chairman in the sample, where the maximum value is 7, representing the MBA/EMBA, and the minimum value is 0, indicating that the chairman's education is secondary school or below.

Looking at the control variables at the firm level, the minimum value of return on net assets (*ROE*) for the year prior to listing is -11,409%, the maximum value is 231.1%, and the standard deviation is 253.5, which shows that the profitability of the firm varies widely. However, the average value is 15.85%, indicating that the overall profitability of the listed firm is relatively good. The age of the company is measured by the logarithm of the number of days from the establishment of the company to the listing (*Age*), with a minimum value of 6.977, roughly three years, a maximum value of 10.01, roughly 60 years, and the average value of 8.544, roughly 14.01 years. From the logarithm of the registered capital (*Capital*) taken, there is a significant difference between the groups, with a mean value of 19.56, roughly 312 million.

In terms of control variables at the issue level, the logarithm of the product of issue price and number of issues is used to measure issue size (*Proceed*), with a minimum value of 17.50, a maximum value of 25.32, and a mean value of 19.56. The minimum value of the company's first day of listing price-earnings ratio (*PE*) is -42,041, with a maximum value of 24,536, indicating a considerable variation in PE ratios across companies, while the first issue The average value of the P/E ratio is 47.52, indicating that the overall listing P/E ratio is high. The minimum value of PB ratio (*PB*) on the first day of listing is -1422, and the maximum value is 417.9, indicating a significant difference in pricing between different companies, while the average value of PB on the first issue is 11.99, indicating a high overall listing PB. The minimum value of the Lottery is 0, and the maximum value is 4.870%, indicating that there may be a "winner's curse" phenomenon in the market. The winning rate of popular stocks is low, with an average value of 0.15%, indicating that investors are more enthusiastic about IPOs.

Table 2. Descriptive statistics.

| VARIABLES | (1) N | (2) mean | (3) sd | (4) min | (5) max |
|----------------|----------|-------------|-----------|------------|------------|
| <i>UP</i> | 2,043 | 2.282 | 2.206 | -0.427 | 19.78 |
| <i>EDU</i> | 2,043 | 2.979 | 1.899 | 0 | 7 |
| <i>PE</i> | 2,043 | 47.52 | 1,095 | -42,041 | 24,536 |
| <i>PB</i> | 2,043 | 11.99 | 39.35 | -1,422 | 417.9 |
| <i>Age</i> | 2,043 | 8.554 | 0.399 | 6.977 | 10.01 |
| <i>capital</i> | 2,043 | 19.56 | 1.057 | 17.50 | 25.32 |
| <i>Lottery</i> | 2,043 | 0.150 | 0.339 | 0 | 4.870 |
| <i>Proceed</i> | 2,043 | 20.23 | 0.873 | 18.18 | 24.70 |
| <i>ROE</i> | 2,043 | 15.85 | 253.5 | -11,409 | 231.1 |

4.2 Correlation analysis

Before regressing the research hypotheses, this paper performs a correlation test to determine whether there is multicollinearity among the variables, and the results of the test are shown in Table 3, which demonstrates the correlation coefficients and significance levels between the main variables. From the correlation coefficient of the explanatory variable IPO depression (*UP*) and the explanatory variable chairman's education (*EDU*), it can be found that the correlation coefficient is significantly positive 0.072 at 1% significance level, which indicates that there is a specific positive correlation between the explanatory variable IPO depression (*UP*) and the explanatory variable chairman's education (*EDU*). From Table 2, it can be found that the correlation coefficients between variables are all small, but there are cases where the absolute value of correlation coefficients between variables is greater than 0.6; for example, the correlation coefficient between return on net assets (*ROE*) and the first day of IPO net price ratio (*PB*) reaches 0.808, so it cannot be judged for sure whether there is a problem of multicollinearity between variables.

Table 3. Correlation analysis.

| | <i>UP</i> | <i>EDU</i> | <i>PB</i> | <i>Age</i> | <i>capital</i> | <i>Lottery</i> | <i>Proceed</i> | <i>ROE</i> | <i>PE</i> |
|----------------|--------------------|--------------------|--------------------|--------------------|-------------------|-----------------|-----------------|----------------|-----------|
| <i>UP</i> | 1.000 | | | | | | | | |
| <i>EDU</i> | 0.072*** 0.001 | 1.000 | | | | | | | |
| <i>PB</i> | -0.048** 0.031 | -0.021 0.338 | 1.000 | | | | | | |
| <i>Age</i> | -0.032 0.155 | -0.086*** 0.000 | -0.047** 0.033 | 1.000 | | | | | |
| <i>capital</i> | 0.029 0.193 | 0.121*** 0.000 | -0.087*** 0.000 | -0.049** 0.027 | 1.000 | | | | |
| <i>Lottery</i> | -0.039* 0.076 | 0.057** 0.010 | -0.042* 0.055 | -0.118*** 0.000 | 0.332*** 0.000 | 1.000 | | | |
| <i>Proceed</i> | -0.480*** 0.000 | 0.048** 0.030 | 0.129*** 0.000 | -0.052** 0.019 | 0.416*** 0.000 | -0.003 0.894 | 1.000 | | |
| <i>ROE</i> | 0.000 0.985 | -0.029 0.191 | 0.808*** 0.000 | 0.006 0.772 | -0.019 0.397 | 0.006 0.774 | -0.017 0.445 | 1.000 | |
| <i>PE</i> | -0.048** 0.030 | -0.021 0.352 | 0.088*** 0.000 | -0.004 0.843 | -0.029 0.191 | -0.005 0.835 | 0.037* 0.094 | 0.005 0.813 | 1.000 |

4.3 Multicollinearity test

The correlation coefficient analysis cannot certainly determine whether there is a multicollinearity problem among the variables selected in this paper, and the variance inflation factor (VIF) values of the variables need to be further calculated to finally determine whether there is a multicollinearity problem among the variables. Table 4 shows the variance inflation factor values of the variables. From the table, it can be found that the variance inflation factor values of the variables are all less than the critical value of 10 for measurement, so by calculating the variance inflation factor of the variables, we can finally determine whether there is no multicollinearity problem among the variables.

Table 4. Multicollinearity test.

| Variable | VIF | 1/VIF |
|----------------|-------|-------|
| <i>PB</i> | 3.350 | 0.298 |
| <i>ROE</i> | 3.190 | 0.313 |
| <i>capital</i> | 1.500 | 0.669 |
| <i>Proceed</i> | 1.390 | 0.721 |
| <i>Lottery</i> | 1.170 | 0.854 |
| <i>Age</i> | 1.030 | 0.969 |
| <i>EDU</i> | 1.020 | 0.978 |
| <i>PE</i> | 1.020 | 0.979 |
| Mean | VIF | 1.710 |

4.4 Regression results

Table 5 shows the regression results for the sample, and the industry and year-fixed effects were included in all four regressions to reduce the influence of external factors on the study results and more accurately explore the relationship between the study subjects.

Column (1) is a simple regression considering only the effect of chairman's education on IPO price underpricing, column (2) is a simple regression with moderating variables added to column (1), column (3) is a regression with many control variables added to column (1), and column (4) is a regression with control variables and moderating variables added.

From the results in Table 4, the chairman's education *EDU* in columns (3) (4) are all significantly positive at the 1% level. The chairman's education *EDU* in columns (1) (2) are significantly positive at the 5% level, indicating a significant positive relationship between the chairman's education and the IPO price underpricing rate. The empirical results support H1, suggesting that the chairman's high education is more likely to increase investors' fair assessment of corporate value in the capital market. The empirical results support H1, indicating that the higher education of the chairman is more likely to increase the difficulty of investors' fair assessment of corporate value in the capital market and thus increase the IPO price underpricing rate. The coefficients of the moderating effects in columns (2) and (4) are all significantly negative at the 1% level, demonstrating that a high P/E ratio can mitigate the positive effect of the chairman's education on IPO price underpricing. The positive effect of high education on IPO price underpricing is mitigated. Column (4) incorporates both control variables and moderating effects and finds that its R^2 reaches 44.6%, which is a significant increase compared to the previous three columns, further indicating the significant effect of the chairman's education on IPO price underpricing rate and the significance of the moderating effect.

In the regression results in column (3) (4), most of the control variables are significant at different confidence levels, indicating that the IPO premium rate in China is affected by many factors. Among them, the first day of listing PB ratio *PB* and the log of registered capital *capital* are both significantly positive at the 1% level. The study by Yang Rui (2017) found that the IPO stocks with higher PB ratio will become higher due to the higher value of the issue price, and the higher issue price makes the upside of the stock price more minor than the corresponding high price underpricing rate is less likely to be generated [35]. Ye Gang (2010) found through an empirical study that registered capital has a significant positive effect on IPO price underpricing rate; investors have more confidence in

companies with substantial capital, even if the company's share price is high, investors are willing to bear the high risk associated with high-priced stocks[36]. They are more enthusiastic about investing in them. The issue winning rate *Lottery*, issue size *Proceed*, and return on net assets *ROE* one year before listing are all significantly negative at the 1% level. However, the coefficient of *ROE* is smaller, so it is considered to have a weaker IPO price underpricing rate. Chen Shenglan (2010) found that issue size is inversely related to IPO price underpricing [13]. Small companies have to issue shares at a high price because it is more challenging to raise capital. However, large companies generally issue at a larger size at a lower price when they issue, which is beneficial for retail investors to invest. According to Pan Shengwen et al. (2020), the inverse relationship between company age and IPO price underpricing rate indicates that the longer the company is established and the more mature it is, the more accurate the IPO issue pricing will be and the lower the degree of IPO price underpricing[6]. Furthermore, the lower the winning rate, the more failed applicants will have to enter the secondary market to buy and sell IPO shares. Many funds into the secondary market will undoubtedly enhance the "new speculation" fever, IPO price underpricing rate will also rise.

Table 5. Regression results.

| VARIABLES | (1) UP | (2) UP | (3) UP | (4) UP |
|------------------------|----------------------|----------------------------|---------------------------|----------------------------|
| <i>EDU</i> | 0.0487** (0.0237) | 0.0493** (0.0236) | 0.0578*** (0.0209) | 0.0595*** (0.0208) |
| <i>PE</i> | | 0.000909*** (0.000283) | | 0.000901*** (0.000258) |
| <i>EDU</i> × <i>PE</i> | | -0.000213*** (5.99e-05) | | -0.000205*** (5.43e-05) |
| <i>PB</i> | | | 0.00799*** (0.00175) | 0.00683*** (0.00181) |
| <i>Age</i> | | | -0.147 (0.0961) | -0.127 (0.0959) |
| <i>capital</i> | | | 0.585*** (0.0499) | 0.578*** (0.0497) |
| <i>Lottery</i> | | | -1.012*** (0.182) | -1.014*** (0.181) |
| <i>Proceed</i> | | | -1.394*** (0.0605) | -1.384*** (0.0603) |
| <i>ROE</i> | | | -0.00101*** (0.000264) | -0.000864*** (0.000270) |
| <i>Constant</i> | 0.544 (0.491) | 0.510 (0.490) | 19.26*** (1.512) | 18.99*** (1.507) |
| Observations | 2,043 | 2,043 | 2,043 | 2,043 |
| R-squared | 0.274 | 0.281 | 0.441 | 0.446 |
| Industry FE | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES |

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

4.5 Robustness tests

4.5.1. Shortening the sample interval

This paper's sample is shortened to a sample of IPO companies on the SSE and SZSE from January 1, 2015, to December 31, 2021. The model regression is conducted as a robustness test, and the specific test results are shown in table 6. From the regression results, we can find that the coefficient of *EDU* of the chairman's education is still significantly positive. The coefficient of the cross-product term of chairman's education and P/E ratio is still significantly negative, both consistent with the

benchmark regression results, so the model of main effect and moderating effect is robust and valid, and the model conclusion has high credibility.

Table 6. Shortening the sample interval robustness test.

| VARIABLES | (1) UP | (2) UP | (3) UP | (4) UP |
|------------------------|----------------------|----------------------------|----------------------------|----------------------------|
| <i>EDU</i> | 0.0543** (0.0265) | 0.0549** (0.0264) | 0.0589** (0.0232) | 0.0610*** (0.0231) |
| <i>PE</i> | | 0.000913*** (0.000300) | | 0.000935*** (0.000272) |
| <i>EDU</i> × <i>PE</i> | | -0.000214*** (6.34e-05) | | -0.000210*** (5.72e-05) |
| <i>PB</i> | | | 0.00790*** (0.00187) | 0.00661*** (0.00193) |
| <i>Age</i> | | | -0.206* (0.111) | -0.178 (0.111) |
| <i>capital</i> | | | 0.649*** (0.0574) | 0.641*** (0.0572) |
| <i>Lottery</i> | | | -1.401*** (0.387) | -1.410*** (0.385) |
| <i>Proceed</i> | | | -1.523*** (0.0696) | -1.511*** (0.0694) |
| <i>ROE</i> | | | -0.000992*** (0.000281) | -0.000832*** (0.000287) |
| <i>Constant</i> | 2.644*** (0.555) | 2.607*** (0.553) | 22.68*** (1.716) | 22.35*** (1.712) |
| Observations | 1,739 | 1,739 | 1,739 | 1,739 |
| R-squared | 0.233 | 0.240 | 0.418 | 0.424 |
| Industry FE | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES |

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

4.5.2. Winsorize processing

This paper further performs upper and lower 5% tail-shrinking on all variables. It conducts model regression as a robustness test, and the specific test results are shown in table 7. From the regression results, we can find that the coefficient of *EDU* of the chairman's education is still significantly positive. The coefficient of the cross-product term of chairman's education and P/E ratio is still significantly negative, both consistent with the benchmark regression results, so the model of main effect and moderating effect is robust and valid, and the model conclusion has high credibility.

Table 7. Winsorize processing robustness test.

| VARIABLES | (1) UP | (2) UP | (3) UP | (4) UP |
|------------------------|----------------------|---------------------------|------------------------|---------------------------|
| <i>EDU</i> | 0.0421** (0.0182) | 0.0526*** (0.0182) | 0.0482*** (0.0155) | 0.0589*** (0.0154) |
| <i>PE</i> | | 0.00681*** (0.00119) | | 0.00849*** (0.00119) |
| <i>EDU</i> × <i>PE</i> | | -0.00238*** (0.000408) | | -0.00179*** (0.000348) |
| <i>PB</i> | | | 0.0319*** (0.00457) | 0.0102* (0.00588) |
| <i>Age</i> | | | -0.124 (0.0793) | -0.121 (0.0784) |

| | | | | |
|-----------------|---------|---------|------------|------------|
| <i>capital</i> | | | 0.444*** | 0.438*** |
| | | | (0.0433) | (0.0429) |
| <i>Lottery</i> | | | -2.509*** | -2.565*** |
| | | | (0.355) | (0.351) |
| <i>Proceed</i> | | | -1.258*** | -1.237*** |
| | | | (0.0552) | (0.0547) |
| <i>ROE</i> | | | -0.0208*** | -0.0148*** |
| | | | (0.00345) | (0.00356) |
| <i>Constant</i> | 0.671* | 0.327 | 19.84*** | 19.16*** |
| | (0.378) | (0.379) | (1.278) | (1.268) |
| Observations | 2,043 | 2,043 | 2,043 | 2,043 |
| R-squared | 0.321 | 0.333 | 0.514 | 0.526 |
| Industry FE | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES |

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

4.5.3. Adjusting for explanatory variables

This paper replaces the explanatory variable IPO price underpricing rate calculated as (closing price on the 15th day of listing - issue price)/issue price and conducts model regression as a robustness test. The specific test results are shown in table 8. From the regression results, it can be found that the coefficient of *EDU* of the chairman's education is still significantly positive. The coefficient of the cross-product term of chairman's education and P/E ratio is still significantly negative, both consistent with the benchmark regression results, so the model of main effect and moderating effect is robust and valid, and the model conclusion has high credibility.

Table 8. Adjusting for explanatory variables robustness test.

| VARIABLES | (1) UP15 | (2) UP15 | (3) UP15 | (4) UP15 |
|------------------------|-------------|-------------|-------------|-------------|
| <i>EDU</i> | 0.0285* | 0.0376** | 0.0309** | 0.0403*** |
| | (0.0161) | (0.0161) | (0.0137) | (0.0136) |
| <i>PE</i> | | 0.00678*** | | 0.00799*** |
| | | (0.00106) | | (0.00105) |
| <i>EDU</i> × <i>PE</i> | | -0.00204*** | | -0.00147*** |
| | | (0.000360) | | (0.000306) |
| <i>PB</i> | | | 0.0341*** | 0.0117** |
| | | | (0.00404) | (0.00519) |
| <i>Age</i> | | | -0.155** | -0.156** |
| | | | (0.0702) | (0.0693) |
| <i>capital</i> | | | 0.400*** | 0.397*** |
| | | | (0.0383) | (0.0379) |
| <i>Lottery</i> | | | -1.751*** | -1.796*** |
| | | | (0.313) | (0.309) |
| <i>Proceed</i> | | | -1.151*** | -1.136*** |
| | | | (0.0489) | (0.0484) |
| <i>ROE</i> | | | -0.0198*** | -0.0136*** |
| | | | (0.00305) | (0.00314) |
| Constant | 0.960*** | 0.631* | 18.64*** | 18.06*** |
| | (0.335) | (0.335) | (1.130) | (1.119) |
| Observations | 2,037 | 2,037 | 2,037 | 2,037 |
| R-squared | 0.305 | 0.319 | 0.504 | 0.518 |
| Industry FE | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES |

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

4.6 Endogeneity test

To ensure the robustness of the test results, this paper used the PSM method to exclude the endogeneity problem and used 1:3 nearest neighbor matching and caliper 0.02 radius matching to obtain the ATT value of 2.61, which passed the equilibrium test, and the regression results are shown in table 9 below, the main effects and conditional effects are consistent with the baseline regression results, and the model conclusion has high confidence.

Table 9. Endogeneity test.

| VARIABLES | (1) | (2) | (3) | (4) |
|-----------------|----------------------|---------------------|------------------------|------------------------|
| | UP | UP | UP | UP |
| <i>EDU</i> | 0.082*** (3.963) | 0.058*** (2.988) | 0.077*** (4.671) | 0.059*** (3.661) |
| <i>PB</i> | | | 0.029*** (5.837) | 0.031*** (6.210) |
| <i>Age</i> | | | -0.307*** (-3.349) | -0.145* (-1.769) |
| <i>capital</i> | | | 0.643*** (14.494) | 0.443*** (9.471) |
| <i>Lottery</i> | | | -1.333*** (-6.184) | -2.438*** (-5.849) |
| <i>Proceed</i> | | | -1.596*** (-28.601) | -1.232*** (-19.886) |
| <i>ROE</i> | | | -0.013*** (-3.075) | -0.022*** (-5.530) |
| <i>Constant</i> | 1.888*** (26.580) | 0.663*** (2.878) | 24.353*** (19.640) | 19.521*** (15.221) |
| Observations | 1,849 | 1,849 | 1,849 | 1,849 |
| R-squared | 0.008 | 0.318 | 0.374 | 0.511 |
| Industry FE | NO | YES | NO | YES |
| Year FE | NO | YES | NO | YES |

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

4.7 Heterogeneity analysis

4.7.1. Analysis of turnover rate

The difference in the first-day turnover rate implies a difference in investor sentiment in the market, affecting the IPO price underpricing rate. Therefore, the sample is divided into two groups according to the first-day turnover rate for regression analysis. The study by Pan Shengwen et al. (2020) shows that the higher the turnover rate, the more frequent the transactions are, indicating the higher investor sentiment and the solid speculative sentiment of investors at this time will intensify the "speculation" behavior, thus attracting more investors to the IPO, at this time, investors to a certain extent ignore the information of the enterprise itself, such as the value of the chairman's education in the IPO process, the lack of rational analysis of corporate information, more for the new shares of avid pursuit.

The positive effect of the chairman's education on IPO price underpricing is not significant in stocks with a high turnover ratio. In contrast, in stocks with a low turnover ratio, investors are more inclined to analyze corporate information rationally, so the positive effect of the chairman's education on IPO price underpricing is more significant. Under the frenzied market sentiment, it would be more effective for stocks with high turnover rates to mitigate the IPO price underpricing caused by the chairman's education by disclosing high-quality information and increasing the P/E ratio. The regression results in table 10 show that the chairman's education has a significant positive effect on

IPO price underpricing at the 5% level in the sample of low turnover stocks, while the negative effect of the P/E ratio is only found in the sample of high turnover stocks.

Table 10. Analysis of turnover rate.

| VARIABLES | Main effect | | Moderating effects | |
|------------------------|---------------------|----------------------|---------------------------|-----------------------|
| | High turnover rate | Low turnover rate | High turnover rate | Low turnover rate |
| | UP | UP | UP | UP |
| <i>EDU</i> | 0.0228 (0.0233) | 0.0713** (0.0325) | 0.0273 (0.0223) | 0.0827* (0.0449) |
| <i>PE</i> | | | 0.000888** (0.000445) | 0.0112 (0.0102) |
| <i>EDU</i> × <i>PE</i> | | | -0.000204** (9.10e-05) | 0.000624 (0.00277) |
| <i>Constant</i> | 13.59*** (1.428) | 24.33*** (2.356) | 13.47*** (1.425) | 24.28*** (2.361) |
| Observations | 1,021 | 1,022 | 1,021 | 1,022 |
| R-squared | 0.307 | 0.384 | 0.328 | 0.390 |
| Control FE | YES | YES | YES | YES |
| Industry FE | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

4.7.2. Analysis of whether the chairman is also the CEO

The chairman and the CEO are two critical roles in a company, so whether the chairman is also the CEO is an essential factor in the company's structure. There are advantages and disadvantages to having a chairman as a CEO, as it will centralize the power of both the chairman and the CEO and make decision-making more effective. However, it may also give the chairman too much power and thus make the internal supervisory body of the company ineffective. Investors' attention to the board's chairman will be amplified in this case. The chairman's education is one of the vital background information of the chairman that will be intensified, making investors intensify the matching relationship between the academic ability and workability of the chairman with high education, thus increasing the underpricing price rate of the IPO. In the case where the chairman is also the CEO, due to the increased investor attention, it will be more effective to mitigate the IPO price underpricing caused by the chairman's education by improving the quality of corporate information disclosure to increase the P/E ratio.

The regression results in table 11 show that the chairman's education significantly and positively affects IPO underpricing regardless of whether the chairman is also the CEO. However, the chairman's education significantly and positively affects IPO underpricing at the 5% level when the chairman is also the CEO and at the 10% level when the chairman is not also the CEO, so it can be seen that the main effect is more pronounced when the chairman is also the CEO. At the same time, the significant negative moderating effect of the P/E ratio exists only in the sample of firms where the chairman is also the CEO.

Table 11. Analysis of whether the chairman is also the CEO.

| VARIABLES | Main effect | | Moderating effects | |
|-----------------|----------------------|---------------------|---------------------------|-------------------------|
| | Part-time | No double duty | Part-time | No double duty |
| | UP | UP | UP | UP |
| <i>EDU</i> | 0.0631** (0.0293) | 0.0518* (0.0289) | 0.0684** (0.0287) | 0.0534* (0.0290) |
| <i>PE</i> | | | 0.00168** (0.000819) | 0.000707 (0.000642) |
| <i>EDU × PE</i> | | | -0.000425** (0.000205) | -0.000159 (0.000129) |
| <i>Constant</i> | 20.90*** (1.960) | 17.19*** (1.480) | 20.80*** (1.943) | 17.12*** (1.487) |
| Observations | 1,004 | 1,039 | 1,004 | 1,039 |
| R-squared | 0.468 | 0.427 | 0.478 | 0.430 |
| Control FE | YES | YES | YES | YES |
| Industry FE | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

4.7.3. Enterprise R&D investment analysis

Xu Xin et al. (2016) showed that with the increasing competition in the market, R&D activities had become a strategic investment for entrepreneurial firms to create new advantages and shape their core competitiveness [37]. Therefore, corporate R&D investment is essential information for investors to assess the intrinsic value of startups and has value relevance. Moreover, the study of Zeng Jianghong et al. (2021) found that the higher the level of R&D investment, the higher the difficulty of investor valuation, the level of risk prediction, and the risk of corporate issue failure, and R&D investment is also an important factor in measuring corporate strategy and value [38].

Therefore, companies with low R&D investment may be more likely to be perceived by investors that the high education of their chairman does not match their work experience, which may even affect the company's future development, thus causing a higher depression rate of IPO. While firms with high R&D investment make it more difficult for investors to value them, the positive impact of the chairman's high education on IPOs can be significantly mitigated if the quality of information disclosure is improved and, thus, the P/E ratio is increased. The regression results in table 12 show that the chairman's education significantly and positively affects IPO price underpricing at the 1% level in the sample of firms with low R&D investment. At the same time, the significant negative moderating effect of the P/E ratio exists only in the sample of firms with high R&D investment.

Table 12. Enterprise R&D investment analysis.

| VARIABLES | Main effect | | Moderating effects | |
|-----------------|------------------------|-----------------------|---------------------------|-------------------------|
| | High investment in R&D | Low investment in R&D | High investment in R&D | Low investment in R&D |
| | UP | UP | UP | UP |
| <i>EDU</i> | 0.0371 (0.0325) | 0.0664*** (0.0250) | 0.0412 (0.0318) | 0.0630** (0.0251) |
| <i>PE</i> | | | 0.000815* (0.000419) | 0.00486*** (0.00130) |
| <i>EDU × PE</i> | | | -0.000186** (8.61e-05) | -0.000577 (0.000399) |
| <i>Constant</i> | 17.43*** (2.189) | 16.31*** (1.276) | 17.29*** (2.201) | 16.48*** (1.282) |
| Observations | 1,021 | 1,022 | 1,021 | 1,022 |
| R-squared | 0.479 | 0.438 | 0.486 | 0.443 |
| Control FE | YES | YES | YES | YES |
| Industry FE | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES |

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

5. Research Conclusions and Implications

This paper investigates the effect of the chairman's education on the IPO price underpricing rate and considers the moderating effect of the corporate P/E ratio, concluding that: (i) the higher the chairman's education, the more difficult it is for investors to determine the actual value of the firm and the higher the degree of IPO price underpricing; (ii) by raising the P/E ratio, the firm reduces the information asymmetry between investors and issuers and mitigates the positive effect of chairman's education on IPO price underpricing rate; (iii) The positive relationship between the chairman's education and IPO price underpricing is more prominent in stocks with a low turnover rate, while the moderating effect of the corporate P/E ratio is more prominent in stocks with a high turnover rate; (iv) the relationship between chairman's education and corporate P/E ratio and IPO price underpricing is more prominent in firms where the chairman is also the CEO; (v) the positive relationship between chairman's education and IPO price underpricing is more prominent in firms with low R&D investment. The positive relationship between chairman's education and IPO price depression is more prominent among firms with low R&D investment. In contrast, the moderating effect of the P/E ratio is more prominent among firms with high R&D investment.

Accordingly, it is suggested that: (i) In order to enable investors to determine the actual value of the enterprise more accurately, enterprises can include in the disclosure of information on the educational background of the chairman of the board of directors the disclosure of information on the quality of teaching and educational resources of the chairman of the board of directors' graduation institutions, as well as strengthen the disclosure of information on the chairman's own business performance and business strategy, so that investors can fully judge the impact of the chairman's education on the chairman of the board of directors, which will be reflected in the fair value of the enterprise. The fair value of the enterprise, thus alleviating the high price underpricing rate of IPO. (ii) Firms can divert investors' excessive attention to the chairman's background information by separating the posts of chairman and CEO, thus alleviating the significant positive impact of the chairman's education on the IPO price underpricing rate. (iii) Firms can reduce the difficulty of valuation for investors by increasing R&D investment and demonstrating positive business strategies, thus mitigating the significant positive impact of the chairman's education on IPO price underpricing rate. (iv) At the regulatory level, a unified and complete information disclosure system should be established to alleviate the pricing problem caused by the information asymmetry between issuers and investors at the root and mitigate the high IPO price underpricing rate.

In this paper, based on the high-level ladder theory, only the educational information is selected as the primary research variable among the background information of the chairman, but in fact, other background information of the chairman, such as gender, age, values, personal experience, etc., can affect the corporate decision to some extent. These information also influences investors' judgment on the company's fair value in the capital market, so future research can try to synthesize all the background information of the board's chairman and explore its influence on the IPO price underpricing rate.

In addition, the chairman of the board is only one member of the executive team, and the crucial strategic decision-making behavior of the company is done by the executive team together.

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