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The Impact of Registration System Reform on the Growth Enterprise Market IPO Underpricing Rate

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Abstract: The Science and Technology Innovation Board (STAR Market) of the Shanghai Stock Exchange, founded in November 2018, has announced the commencement of a trial registration system. Introducing the registration system to facilitate the issuance of new shares is a crucial step towards enhancing the reform of China's capital market and its core institutions, representing a significant milestone. This study utilizes data from the primary stock exchanges and Growth Enterprise Markets in Beijing, Shanghai, and Shenzhen from 2018 to 2021. It employs the Difference-in-Differences (DID) model to empirically examine the effect of the registration system reform on the initial public offering (IPO) underpricing rate of the Growth Enterprise Market. The research findings indicate that implementing the registration system reform for the Growth Enterprise Market has led to an increase in the rate of IPO underpricing. An augmentation in return on total assets fosters a rise in the IPO underpricing rate, however, an escalation in issuance costs does not facilitate an increase in the IPO underpricing rate.

Keywords: IPO, registration system reform, growth enterprise market.

1. Introduction

The pricing of an Initial Public Offering (IPO) is a critical factor in determining the success of corporate financing and the potential profitability for investors. IPO underpricing is the term used by scholars to describe the situation where the initial price of newly issued shares is lower than the market price on the first day of trading. This phenomenon can negatively impact the efficiency of resource allocation in the capital market. China's capital market is currently experiencing a crucial phase of rapid growth, and the problem of underpricing in the IPO process is widespread. Enhancing IPO pricing efficiency and maximizing the market's involvement in resource allocation has emerged as a crucial concern. In response to this issue, the China Securities Regulatory Commission has enacted multiple regulatory rules to implement the registration system reform for stock issuance. This reform has been extended from the STAR Market and Growth Enterprise Market to the Beijing Stock Exchange and the A-share market, to gradually enhance the fundamental institutions of the capital market.

The IPO underpricing rate is commonly employed by researchers as a metric to assess the efficiency of IPO pricing [1]. The IPO underpricing rate quantifies the disparity between the initial offering price of a stock and its market price after being listed. The current body of research encompasses a multitude of studies that investigate the elements that contribute to IPO underpricing.

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However, the majority of these studies solely focus on analyzing the reasons for IPO underpricing via the lens of information asymmetry or investor emotion. This research utilizes pertinent data from the primary boards and Growth Enterprise Market in Beijing, Shanghai, and Shenzhen. It employs the Difference-in-Differences (DID) model to examine the influence of the registration system reform on the IPO underpricing rate of the Growth Enterprise Market [2-3]. Securities issuance must satisfy certain substantive standards established by securities regulatory agencies to achieve the issue qualification, which is granted only after approval. This results in significant issues of rent-seeking as a result of substantial mismanagement, and the illicit transfers of favors between underwriters and members of the review committee also fail to enhance openness in market information [4]. Within the registration system, the authority responsible for reviewing securities issues merely performs formal evaluations of the registration documents, refraining from making substantial assessments. The principle of prioritizing information disclosure necessitates that corporations reveal pertinent information regarding the issuing of securities before listing, hence mitigating the extent of information asymmetry prevalent in the market [5]. The implementation of the registration system will lead to increased information transparency, which will encourage issuers to set prices based on their worth. This will improve the efficiency of IPO pricing and reduce the extent of IPO underpricing. However, empirical evidence demonstrates that following the reform of the registration system, the degree of IPO underpricing in the Growth Enterprise Market has notably risen in comparison to the main board market. This suggests that the reduction in information asymmetry is not the determining factor in mitigating IPO underpricing [6].

This paper presents both theoretical and empirical evidence to support the full implementation of the registration system reform in China's capital market. It serves as a valuable reference for industry research and provides investors with valuable insights to evaluate investment opportunities and potential returns. Furthermore, it contributes to the overall healthy development of the market.

2. Analysis design

2.1. Sample selection and data sources

This paper covers the period of 2018 to 2021 and focuses on extracting pertinent data from the primary boards and Growth Enterprise Market in Beijing, Shanghai, and Shenzhen. The study utilizes the DID model to examine the effect of the registration system reform on the rate of underpricing for IPOs in the Growth Enterprise Market. Following an initial screening of the data and removal of any extreme values and data from companies listed on the Beijing Stock Exchange, a total of 1,266 data points are collected. The data utilized is obtained from the Wind and the GTA database. The DID model is employed to empirically investigate the IPO underpricing rate, with the registration system change serving as the temporal boundary.

2.2. Explanations of the variables

Dependent Variable. The IPO underpricing rate is measured using the ratio of the difference between the closing price on the issuance day and the offering price to the offering price.

Independent Variable. The DID model is used for empirical research, thus the dummy variable DID (DID=Treat*Post) is selected as the independent variable to measure the effect of the policy implementation. Both Treat and Post are dummy variables; Treat indicates whether the company is listed on the Growth Enterprise Market (1 if the company belongs to the Growth Enterprise Market, otherwise 0), and Post indicates whether the registration system reform has taken place (1 after the reform, 0 before the reform). In this study, the DID variable measures the impact effect of the registration system reform on the pricing of the Growth Enterprise Market.

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Grouping Variables. To study the impact of the registration system reform on the IPO underpricing rate in different samples, the samples are grouped according to the nature of corporate ownership (SOE) and the size of the stock (Lscs). For ownership nature, SOE is 1 if the enterprise is a state-owned enterprise, otherwise 0. For the size of the stock, stocks larger than the median market value are classified as large-cap stocks (Lscs=1) and those smaller than the median market value are classified as small-cap stocks (Lscs=0).

Control Variables. Based on the actual situation of the registration system reform and research needs, four variables are used as control variables: Return on Total Assets (ROA), Issuance Fees (LF), Market Index Return (MKT), and the Shareholding Ratio of the Top Three Shareholders (Top3).

2.3. Establishment of the model

This study utilizes a DID model to examine the effect of the registration system reform on the rate of underpricing in IPOs. The precise model is as outlined below:

$$IPO = \alpha + \alpha_1 DID_{it} + \alpha_2 Controls_{it} + yearFE + ProFE + \varepsilon_{it} \quad (1)$$

where IPO is the dependent variable IPO underpricing rate, DID_{it} means independent variable, $Controls_{it}$ illustrates all the control variables in this paper, yearFE is the year fixed effects, ProFE means the province fixed effects, and ε_{it} shows the regression error term.

3. Results and analysis

3.1. Descriptive statistics

Table 1: Descriptive statistics

Variables	Samples	Average	Standard Deviation	Minimum	Maximum	Median
IPO	1266	1.185	1.503	-0.273	19.426	0.440
DID	1266	0.085	0.278	0.000	1.000	0.000
SOE	1266	0.101	0.302	0.000	1.000	0.000
Lscs	1266	0.499	0.500	0.000	1.000	0.000
ROA	1266	0.093	0.075	-0.578	0.858	0.087
LF	1266	17.939	0.567	15.458	20.387	17.923
MKT	1266	0.000	0.011	-0.049	0.036	0.001
Top3	1266	0.558	0.148	0.000	0.971	0.561

3.2. Baseline Regression

Regression results for model (1) are conducted to study the impact of the registration system reform on the IPO underpricing rate. See Table 2 for regression results.

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Table 2: Regression results

Variables	1	2
	IPO	IPO
DID	0.587***	0.579***
	(3.59)	(3.56)
ROA		1.185**
		(2.14)
LF		-0.165**
		(-2.26)
MKT		2.512
		(0.68)
Top3		-0.790***
		(-2.82)
Constant	0.711***	4.064***
	(3.71)	(3.03)
Year	Yes	Yes
Province	Yes	Yes
Observations	1,266	1,266
R^2	0.097	0.109
F	4.131	4.193

Note: Values in brackets are t-values. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

According to the regression results in Table 2, Column 1 reports the regression results without adding control variables. The regression coefficient of DID is positive and significant at the 1% level. Column 2 reports the regression results after including control variables. The regression coefficient of DID remains positive and significant at the 1% level, indicating that the registration system reform for the Growth Enterprise Market increases the IPO underpricing rate. Regarding control variables, an increase in ROA promotes an increase in IPO underpricing rate. The regression coefficient of LF is significantly positive, suggesting that higher issuance fees are unfavorable for increasing IPO underpricing. MKT is not significant, and a higher shareholding ratio of the top three shareholders is unfavorable for increasing IPO underpricing rate.

3.3. Robustness Test

This study performs robustness tests on the baseline regression model using two methods. Firstly, the control variables are replaced by substituting ROA with ROE, and the model is re-regressed with the substituted variables. Secondly, the research sample is modified by winsorizing the dependent variable IPO underpricing rate by 1% at both ends and then the sample is re-regressed with the winsorized data to examine the reliability of the baseline regression results. The results of the robustness tests can be found in Table 3.

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Table 3: Robustness test

Variables	1	2
	Substitute Control Variables IPO	Change of Sample IPO
DID	0.586***	0.549***
	(3.60)	(3.87)
ROA		0.850*
		(1.76)
ROE	0.541	
	(1.52)	
LF	-0.164**	-0.105*
	(-2.25)	(-1.66)
MKT	2.641	2.367
	(0.72)	(0.74)
Top3	-0.766***	-0.863***
	(-2.74)	(-3.53)
Constant	4.067***	2.958**
	(3.02)	(2.53)
Year	Yes	Yes
Province	Yes	Yes
Observations	1,266	1,266
R^2	0.108	0.123
F	4.122	4.781

Note: Values in brackets are t-values. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

The robustness regression findings display two columns. Column 1 presents the robustness test outcomes following the replacement of control variables, while Column 2 showcases the robustness test results after modifying the study sample. The regression coefficients for the IPO underpricing rate, as observed in Columns 1 and 2 of the robustness tests, are both statistically significant and positively correlated at a significance level of 1%. Concerning control factors, the variable ROE does not exhibit statistical significance, whereas the regression results of the other control variables align well with the baseline regression. In general, the regression results align closely with the previous findings, and the robustness tests strengthen the dependability and persuasiveness of the regression conclusions previously stated. This suggests that the selected regression model in this investigation possesses significant explanatory capability and resilience.

4. Heterogeneity Analysis

This study aims to examine the effect of the registration system reform on the rate of underpricing in IPOs across various samples. The samples are categorized into groups depending on the type of corporate ownership (State-Owned Enterprises or SOE) and the size of the stock (Large-Scale Companies or Lscs). Refer to Table 4 to view the outcomes of the grouped regressions.

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Table 4: Heterogeneity analysis

Variables	1	2	3	4
	SOE		Lscs	
	IPO	IPO	IPO	IPO
DID	0.236	0.633***	0.692***	0.257**
	(0.26)	(3.84)	(2.69)	(2.05)
ROA	0.158	1.451**	1.905***	-1.142*
	(0.06)	(2.53)	(2.60)	(-1.96)
LF	0.129	-0.195**	-1.473***	0.028
	(0.51)	(-2.51)	(-11.10)	(0.43)
MKT	13.212	1.279	-0.125	0.384
	(0.81)	(0.34)	(-0.02)	(0.15)
Top3	-1.135	-0.847***	-1.540***	-0.232
	(-1.04)	(-2.78)	(-3.71)	(-0.98)
Constant	-2.527	4.640***	28.705***	0.105
	(-0.52)	(3.24)	(11.54)	(0.09)
Year	Yes	Yes	Yes	Yes
Province	Yes	Yes	Yes	Yes
Observations	128	1,138	632	634
R^2	0.205	0.122	0.293	0.186
F	0.833	4.248	7.072	3.777

Note: Values in brackets are t-values. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

The regression results for SOE samples are presented in Table 3, Column 1. The coefficient of DID is positive, however, it is not statistically significant. Based on the regression coefficient, it indicates that the reform of the registration system has a positive impact on the IPO underpricing rate of state-owned firms, although this effect is not statistically significant within this particular group. Column 2 shows the regression findings for samples of non-state-owned firms. The DID coefficient is statistically significant at the 1% level, suggesting that the registration system reform has a significant impact on increasing the IPO underpricing rate of non-state-owned enterprises. Column 3 displays the regression findings for samples of large-cap stocks. The DID coefficient is statistically significant at the 1% level, suggesting that the registration system reform has a significant impact on increasing the IPO underpricing rate of large-cap stock companies. Column 4 illustrates the regression findings for samples of small-cap stocks. The DID coefficient is statistically significant at the 5% level, suggesting that the registration system reform has a significant impact on increasing the IPO underpricing rate of small-cap stock companies. Upon comparing the regression results in Columns 3 and 4, it is apparent that the registration system reform has a more pronounced and statistically significant impact on the IPO underpricing rate of large-cap stock businesses in comparison to small-cap stock companies.

5. Conclusion

This paper analyzes IPO-related data from the main boards and Growth Enterprise Market of the Shanghai and Shenzhen Stock Exchanges between 2018 and 2021. The paper uses a double-difference DID model to analyze the effect of the GEM registration system overhaul on the rate of IPO underpricing. The initial regression results demonstrate that the GEM registration system reform has a beneficial effect on the rate at which IPO are underpriced, therefore negatively affecting the efficiency of IPO pricing on the GEM. An examination of heterogeneity shows that the

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reform has a positive impact on the rate of underpricing for IPO of state-owned companies (SOE). However, this effect is not statistically significant specifically for SOE. The revamping of the GEM registration system greatly reduces the underpricing rate for IPO of non-state-owned firms. In contrast, the reform has a greater impact on raising the rate of underpricing for IPO in large-cap stock businesses, as opposed to small-cap stock companies. The impact on small-cap equities, albeit notable, is comparatively less pronounced in comparison to the outcomes observed for large-cap companies.

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