A Research on IPO Pricing Efficiency under the Approval System and Registration System

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Abstract. This article examines China's evolving stock issuance system within its market-oriented economy, particularly focusing on the transition from the approval system to the registration system. The study evaluates the efficiency of Initial Public Offering (IPO) pricing under incomplete games, identifying high risks and uncertainties in the process. By analyzing 31 selected articles, the research categorizes IPO pricing efficiency based on the timeline of system transformation and explores three key influencing factors: macro-environmental factors, information factors, and role behavioral factors. The findings reveal minimal differences in the study of IPO pricing efficiency under different time intervals in the Chinese capital market. Moreover, the shift from the approval system to the registration system has positively impacted information disclosure, transmission speed, freedom, and individual responsibility in China's capital market. The article concludes with a summary of the organized content and suggests future research directions, emphasizing the importance of continuous guidance and optimization for resource allocation in China's capital market to foster healthy and stable development.

1 Introduction

The pricing of new shares is a core part of the stock issuance market, and whether it is reasonable or not directly affects the resource allocation efficiency of the stock market. However, in China, which has experienced many changes in the issuance system, its political factors often have a certain impact on the financial market, and also impact the relevant content of new stock issuance pricing to a certain extent. IPO pricing, an ex-ante judgment on the value of the stock, has Strong risks and uncertainties. Under different issuance systems, few scholars have paid attention to the differences and trend characteristics of the research results under the research topic "IPO pricing efficiency". Therefore, this article is based on the relevant issues under the approval system and registration system in China's stock issuance system. The research on IPO pricing efficiency was sorted out and compared, and the differences and trend characteristics of the research results under the two institutional backgrounds were explored. Through comparison, the reasons for its occurrence were deepened and corresponding suggestions were put forward.

In terms of literature screening, the author first searched important financial journals and important economic journals in Chinese and foreign databases one by one, and checked the titles or abstracts containing ipo pricing efficiency, market efficiency, arrival-based system, registration system, and based on the approval system and registration Divide the time when the system was implemented in China, and the time is limited to "January 1, 2004 to January 31, 2020" and "January 1, 2021 to September 30, 2023", and the filtering condition is "relative" "Strong theoretical foundation" or "empirical research", and were screened according to the number of citations of the papers, and 20 and 11 papers were determined respectively.

2 Overview of research on IPO pricing efficiency under the approval system

2.1 Research basis related to approval system

China's approval system was implemented from 1999 to 2019. Among them, before 2001, it was stipulated that allocation should be carried out by administrative methods, with strong planning intervention and lack of market autonomy and regulation. In 2001, it was changed to be recommended by the lead underwriter, independently voted by the issuance review committee and approved by the China Securities Regulatory Commission in accordance with market principles. method, the degree of marketization has improved. In 2004, China introduced the sponsor representative system, changing "gateway supervision" to "channel supervision", starting from the sponsor's own interests, through its relevant information on the issuer Disclosure and regulatory constraints, strengthening external supervision and self-discipline of issuers to better enter the market [1]. In the time span of the implementation of

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the system, it is not difficult to see that the period of the sponsorship system under the approval system had a more profound impact on China's capital market and accounted for a larger number of studies.

The foundation of China's approval system can be encapsulated as follows: Initially, the securities regulatory bodies possess the authority to reject applications for stock issuance. These regulatory entities conduct thorough assessments of the declaration documents, scrutinizing their comprehensiveness, accuracy, authenticity, and timeliness. The second aspect involves the pricing determination carried out by the lead underwriter. Collaboratively, the issuing company and the lead underwriter are tasked with defining the scale, method, and price of the issuance. Before preparing issuance application materials, the lead underwriter must provide one-year pre-issuance guidance to the issuing company; the third is the sponsor system. The sponsor must verify the issuance documents in accordance with the law, issue recommendation opinions to the China Securities Regulatory Commission, and conduct continuous supervision after listing. The sponsor is dedicated to protecting the interests of investors and helping to reduce market risks; the fourth is the inquiry system. That is, the issuing company and the lead underwriter can set an issuance price range, and then inquire with legal investors online first, and finally determine the issuance price based on the inquiry information.

The introduction of China's approval system has increased the rights and responsibilities of the lead underwriter, and the third-party perspective can more comprehensively measure the company's value and evaluate its development; secondly, companies determine the issuance scale based on capital operations, which has greatly improved Feedback and supplementation of corporate financial information; and the gradual shift from issuance review to mandatory information disclosure and compliance review, improving the degree of marketization. The implementation of the approval system is conducive to clarifying the rights and responsibilities of market regulatory entities and market participants, determining market mechanisms and improving resource allocation efficiency; the securities regulatory authorities encourage independent choice and innovation, establish and maximize the use of advantages, and ensure that securities issuers and underwriters A risk-taking mechanism.

2.2 Research on pricing efficiency under the approval system

Under the approval system, most studies analyze the factors of the issuance system, as Table 1 below shown. Wang Jin proposed that government intervention will restrict the operation of the market mechanism and reduce market efficiency and market liquidity [2]. Ni Xin further pointed out that the functional positioning of China's stock market is unclear, the separation of shares and the degree of administrative supervision of the stock market [3]. It has high characteristics and proposed that the boundary between the government and the market should be redefined; Weng Shichun found through differential comparative analysis that there is institutional ineffective supply in the changes in China's new stock issuance system, and proposed that the role of the system subject should be changed to realign the supply and demand relationship [4]. Yu Zengbiao and others compared the initial returns on the first day of listing of A-shares under different conditions and found that the market inquiry process under the approval system lacked substance and the degree of marketization has not improved [5]. Since then, Huang Yuncheng and others supported the adoption of the sponsor system [6]. The joint liability mechanism links the quality of the issuer and the interests of the sponsor, effectively improving the quality of information disclosure. Zhang Sining found for the first time through empirical comparison that the superiority of the approval system was not reflected in the market value of listed companies, and the reason was attributed to the path dependence in institutional changes [7]. Under the same conditions, Gu Xiujuan et al. starting from the PO premium rate, it supplemented and refined the results of Yu Zengbiao et al. [5, 8]. Zhang jian found through the stochastic frontier model that the behavior of lowering prices still exists in the current market, and the "window guidance" to strengthen the supervision of new stock issuance has actually led to Market imperfection once again reflects the reverse effect of government intervention on market efficiency [9].

Luo yang concluded for the first time that there is a negative correlation between the issuance system, issuance costs and IPO underpricing, affirming that the sponsor approval system is conducive to improving pricing efficiency [10]. Wen Yuchun systematically considered the issuance efficiency of new stock issuance prices on various types of information [11]. Once again recognized the improvement and optimization of the information content of the approval system: intrinsic value factors, market environment factors, and issuance factors have an increasing explanation rate for the impact on pricing trend, but the explanation rate of issuance factors is low and has no significant impact, and information asymmetry still exist. Wang Bing and others first focused on auditor reputation as an indirect external information factor, and found through multiple regression that auditor reputation significantly affects IPO depression [1]. Price rate, answered that audit fees are an important factor in issuance fees. Later, Chu Kejia expanded the scope of data and found that with the reform of China 's issuance system, the IPO underpricing rate gradually decreased, improving pricing efficiency [12]. At the same time, the conclusion that the degree of government intervention leads to higher levels of underpricing is further refined.

Table 1. Research on pricing efficiency under the approval system.

Literature index	Issuing time	Main research conclusions and contributions
Wang Jin	2002	Government intervention will affect market efficiency
Weng Shichun	2004	China's stock issuance system has ineffective supply
Yu Zengbiao, Liang Wentao	2004	The approval system has not alleviated the low price of A-share issuance
Ni Xin	2005	The functional positioning of China’s stock market is unclear and the market and government boundaries should be redefined
Zhang Sining	2006	Path dependence in institutional changes makes it difficult to exert the superiority of the institution
Gu Xiujuan, Men Yanshun	2010	The IPO pricing mechanism is a combination of legal person placement and secondary market investors; the underwriting method of full reimbursement is more efficient
Zhang Jian	2014	The inquiry system, there is still behavior of lowering the issuance price; the "window guidance" method reduces pricing efficiency.
Luo Yang	2014	Both the issuance system and issuance fees can significantly reduce the underpricing rate
Wen Yuchun	2009	The company's intrinsic value and market information factors largely affect and reflect pricing efficiency.
Wang Bing et al.	2009	Auditor reputation affects stock pricing efficiency
Chu Kejia, Zhang Haoyu	2019	Pricing controls have led to high levels of underpricing; capital raised, corporate bargaining power, positive market sentiment, and the company's own financial quality are positively related to the IPO underpricing rate

2.3 Research on factors affecting pricing efficiency under the approval system

The relevant literatures are summarized in Table 2 below. Duan Jindong and other information factors such as the issuance volume of new shares and the pre-issuance market sentiment reflected in the issuance price of new shares have confirmed that the pricing of new shares issuance has a certain information efficiency [13]. They used larger variables to supplement the conclusion of Zhang Renji and comprehensively reflected the stock issuance price has systematic and non-systematic information efficiency, and pointed out that the issuance price has limitations in reflecting factors related to the issuing company [14]. Chen Shenglan found for the first time that "manipulative accruals" in corporate financial accounting information have a significant negative impact on IPO underpricing [15]. It further explains the guiding role of issuing company information in the pricing of new shares. In terms of risk capital factors, Sun Jianhua based on the GEM, studied the Chinese market risk capital has no significant impact on IPO underpricing, denying Liu Yuanyuan’s conclusion [16, 17]. Monica et al. found that the differences in driving factors of initial returns, fair value and overreaction in different periods are due to regulatory changes [18]. Institutional changes change demand-driven to value-driven, so the increase in marketization will increase the influence of value information. Huang Yuqin and others found that under the conditions of excessive underwriting fee incentives and reputational risk constraints, the lack of incentives will lead to institutional investors taking more emotional behaviors [19]. The approval system increases the information supply to individual investors, increases the degree of inquiry and information asymmetry, and leads to low efficiency. Based on inquiry information, Tian Yejun and Zhang Yonglin believe that the inquiry process has the ability to reveal information, which helps in predicting the realization of new shares [20]. Zheng Kai and other studies confirmed that pricing efficiency is reflected in the degree to which the issue price reflects the company's intrinsic value, supporting the conclusion of Wen Yuchun, but at the same time found that this information is difficult to reveal at the risk level [11, 21]. Zhou Yaling combined the research on the Science and Technology Innovation Board and found that the financial indicators that reflect the company's intrinsic value have little correlation with the issuance price, and the level of market atmosphere will affect investor sentiment in the same direction [22]. The preparation period for the approval system is too long, supply exceeds demand. From the perspective of market role factors, Ba Shusong and others concluded that analysts improved the pricing efficiency of accrual profit information and conveyed pricing signals to company growth potential predictions, but the information response speed was too slow and efficient information transmission was difficult [23, 24]. Three years later, they added again: Analysts’ adjustment of the proportion of earnings behavior significantly reduced the deviation between expectations and actual performance, and timely supplemented the information content of listed companies. However, there was still a lack of rational

pricing mechanism, and investor sentiment factors still existed.

Table 2. Research on factors affecting pricing efficiency under the approval system.

Duan Jindong, Chen Haiming	2004	The issuance price of new shares has information efficiency; the information reflects relatively limited factors related to the issuing company.
Chen Shenglan	2010	The new stock pricing market makes full use of available financial accounting information: small and medium-sized investors can identify, to a certain extent, the issuing company's use of accounting control rights.
Sun Jianhua	2013	Venture capital has no significant impact on IPO underpricing in the Chinese market; factors that significantly impact pricing efficiency: first-day turnover rate, total asset size one year before issuance and earnings per share
Monica et al.	2021	Marketization of the issuance system can enhance information spillover effects
Huang Yuqin et al.	2013	The lower the degree of information reflected in the quotation behavior of institutional investors, the higher the degree to which the new stock pricing exceeds the company's reasonable value expectations under the underwriter's optimal choice; the worse the performance of the new stock after listing, the greater the possibility that investors will suffer from the "winner's curse"
Tian Yejun, Zhang Yonglin	2013	The hard constraints of the price range on the issuance price and the allotment policy limit the ability to reveal inquiry information.
Zheng Kai et al.	2014	Pricing efficiency is reflected in the degree to which the issue price reflects the company's intrinsic value; inquiry targets are more sensitive to the potential growth information of the issuing company and are less sensitive to market investor sentiment.
Zhou Yaling	2014	The level of market atmosphere will affect investor sentiment in the same direction.
Ba Shusong et al.	2015; 2018	Analysts have improved the market's pricing efficiency for accrual profit information, but the information response speed is slower; analysts' earnings adjustment behavior has significantly reduced the deviation between expectations and actual performance, and improved the information content

3 A review of research on IPO pricing efficiency under the registration system

3.1 Research basis related to registration system

The fundamental idea behind the reform based on registration is to entrust the market with the power of choice and restore pricing authority to investors. Unlike the approval system, this reform not only brings about changes in the review process but, more significantly, embodies the core principle of information disclosure. The entire process of issuing and listing stocks becomes more standardized, transparent, and predictable, emphasizing the empowerment of the market. Concurrently, the registration system places a strong emphasis on information disclosure, ensuring that the overall procedure for stock issuance and listing adheres to high standards of standardization, transparency, and predictability.

The important aspect of the registration-based reform lies in its emphasis on information disclosure, granting greater flexibility to the market, optimizing the resource allocation role of the capital market, and enhancing the pricing mechanism for market issuances. Under the registration system, the securities issuance review body merely performs a formal examination of the registration documents without making substantive judgments. If the disclosure approach is deemed appropriate, the securities regulatory body refrains from unfairly influencing the price or imposing other conditions on the securities issuance, unless there are valid reasons to reject registration, such as unconvincing prospects presented by the issuer.

3.2 Exploration of IPO pricing efficiency and its influencing factors under the registration system

Among the existing studies, for the convenience of data search and comparison, some studies focus on companies listed on the Science and Technology Innovation Board. Therefore, it can subdivide the selected literature according to whether it is based on data from companies listed on the Science and Technology Innovation Board (see Table 3 and Table 4). The study by Dong Xiuliang et al. compared the Science and Technology Innovation Board with the GEM whose positioning is similar to it, thus leading to the current problems of low IPO pricing efficiency and weak supervision [25]. This study proposed a model for testing the pricing efficiency of IPOs and used it to conduct data analysis, and finally concluded that although IPO pricing efficiency has not been very effectively improved in a short period of time, it has still increased. In particular, in the research of Zuo Xuan and others, they first defined the behavior of companies to improve the IPO approval rate by manipulating financials, beautifying book information and other behaviors as whitewashing behavior, and then explored the role of this behavior in the IPO pricing process [26]. By establishing a regression model to compare the data, it finally came to the conclusion that whitewashing behavior reduces the efficiency of IPO pricing. In the study of Zhang Mengyuan, a comparative study was conducted using

company data on both the Science and Technology Innovation Board and the GEM [27]. The IPO pricing efficiency was measured by calculating the IPO underpricing rate, from the registration system itself and stock issuance. The possible impact was discussed from two major aspects: the role of scale and winning rate, and it was concluded that the increase in investor enthusiasm and corporate R&D intensity led to an increase in the IPO underpricing rate, while the increase in supply and demand levels led to an increase in the underpricing rate. Yin Jinwei analyzed data through the establishment of a stochastic frontier model, also compared the Science and Technology Innovation Board with the GEM, and concluded that the IPO pricing efficiency of the Science and Technology Innovation Board is lower than that of the GEM [28].

Table 3. Research based on data from companies on the Science and Technology Innovation Board.

Literature index	Research methods	Main research conclusions/contributions
Dong Xiuliang et al.	Empirical Research	The rise in underwriting fees has led to a decline in IPO pricing efficiency, and rising investor sentiment has led to an increase in IPO pricing efficiency, while company quality has played a smaller role; after the implementation of the registration system, the overall efficiency of IPOs has not been effectively increased.
Zuo Xuan et al.	Empirical Research	There is a phenomenon of whitewashing in the current market, which reduces the efficiency of IPO pricing.
Zhang Mengyuan	Empirical Research	The registration system as a whole and through different paths have an impact on the IPO underpricing rate and increase the IPO underpricing rate.
Yinjinwei	Empirical Research	In the Science and Technology Innovation Board market, due to the scarcity of companies that can be used for pricing comparisons, the low-income characteristics of technology-based companies engaged in R&D in the early stages, and the limited pricing capabilities and lack of moral restraint of various market participants, the IPO pricing efficiency is lower than that of the GEM., the overall pricing efficiency is low.

The rest of the literature does not only focus on the Science and Technology Innovation Board, but expands the scope of research sample selection to other boards and even the entire market. Zhang Yuxin and others focused on the GEM and mainly studied the impact of the level of information disclosure on IPO pricing efficiency [29]. Through modeling research, they concluded that while the IPO pricing efficiency improves, the level of information disclosure is related to intermediaries. The pricing effect of these two factors in the IPO pricing process has also been enhanced. In the research of Chen Shuai, by establishing a stochastic frontier model and a double difference model for data analysis, he concluded that the IPO pricing efficiency in the GEM market has not improved as expected, but it has considerable development potential [30].

Table 4. Research not based on data from companies on the Science and Technology Innovation Board.

Literature index	Research methods	Main research conclusions/contributions
Zhang Yuxin et al.	Empirical Research	The efficiency of IPO pricing has been improved, while the level of information disclosure and the role of the pricing effect of intermediaries have also been improved.
Chen Shuai	Empirical Research	Since the industry scope of the Science and Technology Innovation Board is significantly smaller than that of the GEM and the registration system of the GEM is later than that of the Science and Technology Innovation Board, the IPO pricing efficiency has shown a slight decrease on the GEM; however, with the economic recovery, it has gradually improved and formed a virtuous cycle. the trend of.

By reading and extracting keywords that appear repeatedly in the literature, it can find that although there are differences in specific choices, the three factors of underwriter selection, investor sentiment, and company quality are actually relatively widely used. Among them, the quality of the company plays a smaller role while the underwriter plays a more important role and has a relatively large impact.

In addition, during the literature search process, it is not difficult to find that a considerable number of researchers have focused their main research scope on the Science and Technology Innovation Board. In the current lack of relevant literature research, it cannot conclude that there is some inevitable relationship between the two.

4 Conclusion

In short, the IPO underpricing rate is a relative indicator commonly used to measure the efficiency of IPO pricing . Various factors in market operations will affect the trend of this difference to a certain extent - a high underpricing rate means a large deviation between the issue price and the company's actual value, and the IPO pricing efficiency is low, and vice versa.

Using the basic classification logic of factor analysis, it divides influencing factors into three categories: information factor level, behavioral factor level and macro-environmental level. Because of the inherent flaws of the approval system, early research mainly focused on this and was more inclined to point out some of the negative impacts of the approval system on the

market. The degree of attention paid to external factors under the registration system is much greater than that under the approval system - which solves some of the inherent information problems of the approval system - and the more transparent information of listed companies increases the focus on external factors. Overall, there is a consistent conclusion on institutional reform: too much government intervention will reduce IPO pricing efficiency, that is, the registration system can improve IPO pricing efficiency, affirming the promotion effect of increased marketization on the Chinese market; simplification of listing procedures and Enhanced information disclosure improves the freedom and speed of information in the market, strengthens the responsibilities of underwriting institutions, and promotes the improvement of investor capabilities. Therefore, it can be concluded that the registration system has improved the quality of information disclosure due to the "checking" of multiple parties and changes in the degree of attention to external factors. However, an honest and law-abiding market environment has not yet been fully formed, perhaps because the weakening degree of government intervention and the interweaving of multiple relationship chains of interests have allowed the growth of some "opportunistic" behaviors.

By comparing the factors that appear repeatedly under the study of the two systems, explore the reasons why they can always affect the market. Even in studies of different years and topics, the same variables still exist. However, there is still a lack of research on how these variables themselves affect IPO pricing efficiency under different systems. Driven by interests, how can the objective fairness of the market be further improved? Compared with the approval system, the registration system has become more market-oriented and information disclosure has expanded horizontally and vertically. Does it mean that supervision can be appropriately relaxed for the Chinese market? Further strengthening and stimulating the allocation role of the market deserves further study. Whether the information efficiency of information disclosure itself is efficient, whether there are certain types of information tendencies and avoidances in the information content in the market, whether the reform of the registration system can completely get rid of the path dependence of the approval system, and the impact of different information on different systems under different systems. The impact of new stock pricing still deserves further discussion.

Authors Contribution

All the authors contributed equally and their names were listed in alphabetical order.

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