



Institutional Investor Cliques and IPO Underpricing under the Registration-Based IPO System

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Abstract. The high-price elimination mechanism under the registration-based IPO system facilitates quote clustering by institutional investors, which may impair IPO pricing efficiency. Using a sample of firms listed on China's STAR Market from July 2019 to June 2022, this study examines the relationship between institutional investor cliques and IPO pricing efficiency. We find that institutional investor cliques significantly increase underpricing and reduce IPO pricing efficiency. Channel tests show that both informed and uninformed institutions jointly subscribe to undervalued stocks, thereby lowering the lottery ratio and increasing underpricing, which provides empirical support for the "winner's curse" hypothesis. The effect is more pronounced in non-state-owned enterprises and firms with a high strategic placement ratio. This study explains the high underpricing on the STAR Market from the perspective of institutional cliques and offers practical implications for improving IPO pricing rules and enhancing resource allocation efficiency in the primary market.

Keywords: Institutional Investor Cliques, Registration-Based IPO Reform, IPO Underpricing.

1 Introduction

IPO underpricing—the phenomenon where the offer price is substantially lower than the initial trading price—varies across capital markets. China's long-standing approval-based system and government-guided pricing led to strong administrative intervention in primary market pricing. Two regulatory factors have historically interfered with IPO pricing efficiency. First, prolonged government control over IPO scale and pricing exposed investors to investment lock-in and wealth transfer risks [1]. Second, securities issuing institutions, due to their concentration of market share and pricing power, contributed to persistently high underpricing. To improve the listing system and enhance pricing efficiency, the Chinese government launched the STAR Market on July 22, 2019, implementing a registration-based IPO system. However, initial institutional designs under the registration system did not appear to improve pricing efficiency. According to Wind Database, from January to August 2021, 236 companies registered under the new system raised a total of RMB 176.5 billion, of which 39 raised more than

expected, 36 met expectations, and 161 fell short. The average offer price was RMB 25.88, with a mean P/E ratio of 32.04.

The failure to reasonably estimate firm value in IPOs is closely related to the Shanghai Stock Exchange STAR Market Stock Issuance and Underwriting Implementation Measures (2019), which established the following pricing rule: IPO pricing on the STAR Market follows an institutional inquiry system, where investors bid independently, issuers and underwriters negotiate the final offer price, and the proportion of the highest quotes to be eliminated must not be less than 10% of total bids. This high-price elimination rule reduces the marginal benefit of fundamental research for institutions. By colluding on bids, institutional investors can avoid elimination while capturing substantial IPO returns. Against this backdrop, whether institutional investor cliques affect IPO pricing efficiency warrants close scrutiny.

Given this, we manually collect institutional bidding data during the initial phase of China's registration system and use the skewness of institutional bids to measure clique formation. Our findings are threefold. (1) Institutional cliques are a significant driver of high underpricing. (2) High clique intensity reflects the joint selection of undervalued stocks by both informed and uninformed institutions; these stocks inherently offer higher returns, making high underpricing natural. Mediation analysis supports the "winner's curse" hypothesis. (3) The effect is stronger in non-SOEs, firms with high strategic placement ratios.

This study makes several contributions. First, it extends the literature on the determinants of IPO pricing efficiency under the registration system. While prior studies find that social media analyst coverage leads to higher initial returns [2,3], we examine institutional investor cliques, opening the "black box" of IPO pricing determinants under the registration system. Second, we enrich the literature on the economic consequences of institutional cliques. Prior work has focused on the impact of dense institutional networks on stock price crash risk [4]. In the IPO setting, we document a negative effect of institutional cliques on underpricing and provide an in-depth mechanism analysis based on the "winner's curse" theory. Third, we offer practical implications for policymakers to optimize IPO pricing rules. Our findings suggest that when regulators relax quote controls, the extent of institutional cliques decreases, providing insights for improving China's institutional investor structure and the book-building mechanism under the registration system.

2 Hypothesis Development

The IPO market is characterized by high information asymmetry. Under the registration system's early high-price elimination rule, the uncertainty of being included in the final allocation increases. Capable institutions can accurately assess issuer value by searching for private information, but independent action is costly, and the information reflected in their bids is easily imitated. For smaller institutions, "free-riding" through quote clustering may be a low-cost strategy. Prior research finds that informed institutions share private information to jointly influence portfolio firms' policy decisions, and inter-institutional cooperation reduces trading aggressiveness by lowering competition

[5]. Moreover, institutional networks vary in closeness; tightly connected groups enhance collective benefits through more frequent business collaboration.

Within tightly connected institutional networks, information sharing is more extensive, allowing low-cost dissemination of IPO-related information. Other groups unable to access this shared information face greater information asymmetry. The "winner's curse" theory posits that for undervalued stocks, both informed and uninformed investors will subscribe. Although such stocks have a lower lottery ratio, they offer higher investment returns. Conversely, for overvalued stocks, only uninformed investors subscribe, resulting in a higher lottery ratio but poor post-IPO performance, including the risk of breaking issue price. Information advantages allow informed investors to avoid overvalued stocks, creating a winner-take-all phenomenon. When high-quality firms go public, uninformed investors, to mitigate their information disadvantage, delay their price submissions and anchor on other institutions' bids, increasing quote similarity and density and reducing the lottery ratio. When low-quality firms go public, informed institutions refrain from bidding, leaving uninformed institutions without a pricing reference, reducing quote density and increasing the lottery ratio.

The core implication of the "winner's curse" is that when issuer value uncertainty is high, a high offer price may lead to insufficient subscription and offering failure[6]. Issuers voluntarily lower the offer price to compensate uninformed institutions, increasing the probability of successful listing. Lower offer prices attract more subscription funds but reduce the lottery ratio, generating a negative correlation between the lottery ratio and IPO underpricing [1]. Institutions form cliques around firms with high uncertainty to secure inclusion—firms that tend to be high-quality as screened by informed institutions, with strong growth potential. Therefore, if the higher IPO underpricing associated with institutional cliques reflects price compensation for more severe information asymmetry between institutional groups, then firms with higher clique intensity should exhibit both a lower lottery ratio and higher underpricing. Based on this, we propose:

Hypothesis 1 (H1): Institutional investor cliques increase IPO underpricing.

3 Empirical Design

3.1 Sample Selection and Data Sources

Given the launch of the STAR Market on July 22, 2019, and the Chinese regulator's restrictions on institutional clique behavior during IPO subscription starting in August 2022, our initial sample comprises firms listed on the STAR Market from July 22, 2019, to June 30, 2022. During this period, 431 firms listed on the STAR Market. Excluding financial firms, ST firms, and observations with missing data, we obtain institutional bidding data for 427 firms during the book-building phase. Independent variable data are manually collected from the Initial Public Offering and Listing on the STAR Market Issuance Announcement. Other data are from CSMAR and Wind Database. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate outlier influence.

3.2 Variable Definitions

Dependent Variable. We measure underpricing using Underprice1 and Underprice30. Given the removal of the first-day price limit on the STAR Market, if fully traded, the first-day closing price should approximate the stock's intrinsic value. First, we compute underpricing based on the first-day return (Underprice1). A smaller value indicates closer alignment between the offer price and intrinsic value (higher pricing efficiency); a larger value indicates greater deviation (lower efficiency). It is calculated as:

$$\text{Underprice1} = (P1 - P0) / P0 \quad (1)$$

We compute underpricing based on the closing price on the 30th trading day (*Underprice30*):

$$\text{Underprice30} = (P30 - P0) / P0 \quad (2)$$

Independent Variable. Our independent variable is institutional investor cliques. Following Fujitani et al. [7], we use the skewness of institutional bids (*Skew*) to measure clique intensity. Specifically, smaller *Skew* indicates more concentrated high bids (intense competition), while larger *Skew* indicates more concentrated low bids (severe price-crushing cliques).

Control and Mediating Variables. We control for investment opportunities, firm size, leverage, return on assets, ownership concentration, firm age, book value per share, earnings per share, underwriter reputation, audit quality, and market sentiment. To examine mechanisms, we use online lottery ratio, total lottery ratio, a dummy for seasoned equity offering (SEO) within two years post-IPO, and SEO size as mediating variables. To mitigate reverse causality, firm financial variables are lagged by one period.

3.3 Empirical Models

We estimate model (3) to test the effect of institutional cliques on underpricing:

$$\text{Underprice}_{i,t} = \beta_0 + \beta_1 \text{Skew}_{i,t} + \beta_j \text{Controls}_{i,t-1} + \text{Industry} + \text{Year} + \varepsilon_{i,t} \quad (3)$$

We use model (4) for mediation analysis, testing how institutional cliques affect underpricing through the winner's curse and signaling channels:

$$\text{ASYINFO}_{i,t} = \beta_0 + \beta_1 \text{Skew}_{i,t} + \beta_j \text{Controls}_{i,t-1} + \text{Industry} + \text{Year} + \varepsilon_{i,t} \quad (4)$$

where ASYINFO represents mediating variables: online lottery ratio (*Lottery1*), total lottery ratio (*Lottery2*), a dummy for SEO within two years (*Dum_SEO*), and SEO size (*SEO_Size*). All regressions include year and industry fixed effects, with standard errors clustered at the firm level. Except for Logit when the dependent variable is *Dum_SEO*, we use OLS model.

4 Empirical Analysis

4.1 Descriptive Statistics

Here we report the descriptive statistics of the core variables. The average first-day underpricing on the STAR Market is 1.479, with a maximum of 7.973, indicating a very high level. The average 30-day underpricing is 1.290 times. The mean Skew is 7.805, suggesting concentrated low bids and substantial clique formation. The standard deviation of Skew (18.464) indicates significant cross-IPO variation. UW (underwriter reputation) has a mean of 0.593, indicating that most firms choose large underwriters.

4.2 Institutional Investor Cliques and IPO Underpricing

Table 1 presents the results for model (3). Columns (1) and (3) include only year and industry fixed effects; Skew is positive and significant at the 1% level. Columns (2) and (4) add all control variables; the coefficients of Skew are 0.017 and 0.014, respectively, both significant at the 1% level. This indicates that institutional cliques reduce IPO pricing efficiency, supporting H1. Among controls, Size and Q are positively associated with underpricing, suggesting that larger and higher-growth firms experience greater deviation between offer price and intrinsic value. Eps is negatively associated with underpricing, indicating that more profitable firms receive fairer pricing. UW (underwriter reputation) is negatively associated with underpricing, suggesting that reputation mechanisms partially mitigate low pricing efficiency on the STAR Market.

Table 1. Institutional Cliques and IPO Underpricing

Variable	(1)	(2)	(3)	(4)
	<i>Underprice1</i>	<i>Underprice30</i>	<i>Underprice1</i>	<i>Underprice30</i>
<i>Skew</i>	0.017*** (3.829)	0.017*** (3.852)	0.014*** (3.510)	0.014*** (3.697)
<i>Controls</i>	No	Yes	No	Yes
Constant	1.014*** (47.403)	-3.332*** (-3.387)	0.644*** (32.995)	-5.346*** (-5.188)
Year & Industry	Yes	Yes	Yes	Yes
N	427	427	427	427
Adj-R ²	0.173	0.318	0.129	0.403

4.3 Robustness Tests

Instrumental Variable (IV) Approach. High-quality firms attract institutional cliques due to their higher post-IPO returns, raising reverse causality concerns. On

September 18, 2021, the Shanghai Stock Exchange revised the STAR Market issuance rules, reducing the high-price elimination ratio to 3%, thereby lowering the probability of high bids being excluded and potentially curbing cliques. Importantly, this policy change directly constrains institutional bidding but does not directly affect underpricing. We therefore use a policy dummy (Policy) as an IV, coded 1 if the IPO occurred after the policy change and 0 otherwise. Table 2 reports the IV results. Column (1) (first stage) shows that Policy has a significant negative coefficient (-15.891, $p<0.01$), indicating that the policy reduced cliques. The Cragg-Donald Wald F-statistic is 22.45, rejecting weak instruments. Columns (2) and (3) (second stage) show that Skew remains positive and significant (0.087 and 0.073, $p<0.01$), confirming the main finding.

Table 2. Instrumental Variable and PSM Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variable	First Stage	Second Stage	Second Stage	1:1 matching		Kernel matching	
	<i>Skew</i>	<i>Under-price1</i>	<i>Under-price30</i>	<i>Under-price1</i>	<i>Under-price30</i>	<i>Under-price1</i>	<i>Under-price30</i>
<i>Policy</i>	-15.891*** (-7.041)						
<i>Skew</i>		0.087*** (6.406)	0.073*** (5.744)	0.016*** (3.145)	0.012*** (2.944)	0.014*** (3.339)	0.011*** (3.150)
<i>Controls</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Constant</i>	-6.749 (-0.430)	-2.421 (-1.624)	-4.599*** (-3.463)	-5.820*** (-4.235)	-5.917*** (-4.696)	-3.748*** (-3.772)	-5.263*** (-5.157)
<i>Year & Industry</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	425	425	425	196	196	389	389
<i>Adj-R²</i>	0.161	0.358	0.424	0.388	0.439	0.296	0.395
<i>Kleiber- gen-Paap rk</i>		28.337 [0.000]	28.337 [0.000]				
<i>LM</i>		22.450	22.450				
<i>Wald F</i>							

Propensity Score Matching (PSM). To address self-selection bias (i.e., cliques may target inherently high-quality firms), we use PSM. We define the treatment group (High_Skew=1) as firms above the 75th percentile of Skew by year and the control group as others. Using 1:1 nearest-neighbor matching without replacement, we match on all controls. Results in Table 2 columns (4)-(5) show that Skew remains positive and significant. We repeat the analysis using kernel matching (bandwidth 0.01); columns (6)-(7) confirm the robustness of our findings.

4.4 Further Analyses

Channel Test. The "winner's curse" theory suggests that informed investors use their information advantage to select undervalued stocks, which attract both informed and uninformed investors, resulting in a low lottery ratio. Overvalued stocks attract only uninformed investors, resulting in a high lottery ratio. Uninformed investors "free-ride" by anchoring on informed institutions' bids, increasing quote density and reducing the lottery ratio. When informed investors abstain from overvalued stocks, uninformed investors lose their benchmark, increasing quote dispersion and the lottery ratio. We use online lottery ratio (*Lottery1*) and total lottery ratio (*Lottery2*) as dependent variables. Table 3 columns (1)–(2) show that *Skew* is significantly negative (1% and 10% levels), supporting the winner's curse hypothesis. Institutional cliques increase underpricing by lowering the lottery ratio.

The signaling theory of underpricing posits that high-quality firms deliberately underprice their IPOs to signal firm value, enabling subsequent low-cost equity financing. Low-quality firms cannot bear the cost of high underpricing and thus cannot imitate this strategy. If institutional cliques target high underpricing firms that are deliberately signaling, these firms should conduct large SEOs post-IPO. Table 3 columns (3)–(4) test the relationship between cliques and SEO activity. Using *Dum_SEO* and *SEO_Size* as dependent variables, the coefficients on *Skew* are significantly negative, indicating that cliques target firms with lower SEO scale—contrary to the signaling hypothesis. This rules out signaling as an alternative explanation.

Table 3. Mechanism Tests: Winner's Curse vs. Signaling

Variable	(1)	(2)	(3)	(4)
	Winner's Curse		Signaling	
	<i>Lottery1</i>	<i>Lottery2</i>	<i>Dum_SEO</i>	<i>SEO_Size</i>
<i>Skew</i>	-0.014*** (-3.255)	-0.008* (-1.841)	-0.015* (-1.920)	-0.028*** (-2.846)
<i>Controls</i>	Yes	Yes	Yes	Yes
Constant	-4.449*** (-3.138)	-5.910*** (-2.732)	-2.043 (-0.774)	-1.859 (-0.534)
Year & Industry	Yes	Yes	Yes	Yes
N	425	425	425	425
Adj-R ² /PseudoR ²	0.770	0.497	0.186	0.101
Model	OLS	OLS	Logit	OLS

Cross-Sectional Test. SOE IPOs often serve strategic objectives beyond financing, and SOEs may tolerate higher underpricing to signal strategic intent ("policy signaling"). Moreover, after privatization, the government still influences firm value through public policy, exposing investors to policy risk. Finally, deliberate clique-based

price-crushing may lead to insufficient proceeds for SOEs, slowing strategic goals and inviting government intervention. Therefore, non-SOEs face lower policy risk, creating conditions for cliques. Table 4 columns (1)-(2) report subsample tests by ownership type. Only in the non-SOE subsample (SOE=0) is the coefficient on Skew significantly positive.

Table 4. The cross-sectional test of equity nature and strategic investors

Variable	(1) <i>SOE=1</i> <i>Underprice1</i>	(2) <i>SOE=0</i> <i>Underprice1</i>	(3) <i>Strategy=1</i> <i>Underprice1</i>	(4) <i>Strategy=0</i> <i>Underprice1</i>
<i>Skew</i>	0.007 (0.655)	0.015*** (3.285)	0.018*** (3.196)	0.009 (1.608)
<i>Controls</i>	Yes	Yes	Yes	Yes
Constant	-4.385 (-1.074)	-3.167*** (-2.907)	-3.981*** (-2.704)	-2.568* (-1.841)
Year & Indus- try	Yes	Yes	Yes	Yes
N	34	391	269	158
Adj-R ²	0.560	0.314	0.345	0.281

The STAR Market introduces a strategic placement system, similar to the cornerstone investor system in Hong Kong and other markets. Strategic placement allows qualified strategic partners, financial institutions, executives, and employees to lock up shares for 24 months, and mandates that lead underwriters also subscribe. Strategic investors focus on long-term value, helping screen high-quality firms—a certification effect. Institutional investors capture this certification signal and form cliques around promising IPOs, increasing underpricing. We compute the annual-industry median strategic placement ratio; Strategy=1 if above the median. Table 4 columns (3)-(4) show that the effect is significant only in the high-strategic-placement group, indicating that the certification effect guides institutional cliques.

5 Conclusion and Implications

The registration-based IPO system replaces administrative control with market mechanisms to better serve the real economy. This study examines the relationship between institutional investor cliques and IPO underpricing. We find that driven by short-term interests, institutional cliques negatively affect pricing efficiency. Specifically: (1) Institutional cliques are a significant cause of high underpricing. (2) High clique intensity reflects the joint selection of undervalued stocks by both informed and uninformed institutions, which inherently yield higher returns; mediation analysis supports the winner's curse hypothesis. (3) The effect varies cross-sectionally, being more pronounced in non-SOEs, firms with high strategic placement ratios, and cases with low underwriting fees or high IPO proceeds. (4) Institutional cliques affect both

short-term and medium-term market performance and may exacerbate speculative trading.

Our findings offer several policy implications. First, regulators should strengthen supervision of institutional investors to prevent efficiency losses from short-termism. Regulating competitive behavior among institutions can improve the information content of bids, facilitating price discovery and accelerating the return of IPO prices to intrinsic values. Second, regulators should guide institutions to enhance research and asset management capabilities. For example, promoting mergers and acquisitions among fund companies can concentrate human and technical resources, improving IPO pricing accuracy. Third, listed firms should coordinate with underwriters to conduct effective roadshows, monitor real-time institutional bidding, and use economic incentives to encourage underwriter oversight of inquiring institutions.

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Disclosure of Interests

The authors have no competing interests to declare that are relevant to the content of this article.

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