INSTITUTIONAL BIDDING IN IPO ALLOCATION: EVIDENCE FROM CHINA

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Keywords: Dispersion, Divergence of opinion, Institutional investors, Initial public offering, IPO underpricing, China, Auction
JEL classification: G20, G24

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Institutional Bidding in IPO Allocation: Evidence from China*

Abstract

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1. Introduction

Initial Public Offerings (IPOs) typically experience large positive first-day returns in all the world's major capital markets (Ritter and Welch, 2002; Ljungqvist and Wilhelm, 2003; Lowry, Officer, and Schwert, 2010; Choi, Lee, and Megginson, 2010), and this phenomenon is also known as underpricing (Baron, 1982; Rock, 1986; Welch, 1989). Empirical evidence suggests that Chinese IPOs may show the highest levels of underpricing globally, and have done so since the first post-Revolution stock market opened in China in 1990. Since that date, the Chinese IPO market has experienced rapid development, with the total market value of listed Chinese companies growing from virtually zero to 62.75 trillion RMB (US$10.27 trillion) in May 2015. For example, 2010 alone witnessed 347 IPO listings, including the initial offering of the Agricultural Bank of China and Everbright Bank raising almost 490 billion RMB (US$73.92 billion) in the domestic A-share market[1]. Unsurprisingly, because of its rapid growth and the peculiar valuation patterns demonstrated, China's IPO market has attracted great interest from academics, practitioners and policy makers.

China's system for launching IPOs has three remarkable distinctions from the general U.S. book-building system. First, rather than having discretion, the IPO underwriting process in China is heavily supervised by, and subject to the approval system of, the China Securities Regulatory Commission (CSRC) that regularly issues guidelines [2] governing the listing process that IPO firms and underwriters as well as institutional bidders must follow. Therefore, many believe it is a highly distorted underwriting system.

Second, in an information acquisition model, underwriter control of allocations through a traditional book-building system serves as a mechanism to induce institutional investors to reveal private information about IPO firms (Benveniste and Spindt, 1989; Benveniste and Wilhelm, 1990) [3], allowing underwriters to price IPO stocks efficiently. In this model, institutional investors are expert at producing information on the worthiness of IPO companies and are thus assumed to play an important role in the IPO process, and many consider the U.S. IPO allocation method as the best practice. China's underwriting system for IPO allocation, however, follows a dirty multi-unit uniform price auction[4] approach in the sense that everyone pays the same offer price that is determined by the institutional bids

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[1] See http://www.reuters.com/article/china-privateequity-idUSTOE70904E20110110.

[2] This official guidance often involves asking issuing companies to refrain from overpricing, raising "excess" capital, and selling shares currently held by existing stakeholders. Underwriters and institutional investors consider such guidance to be de facto interference that often surpresses the offering prices of new IPO stocks.

[3] Alternatively, Chemmanur (1993) argues that IPO firm insiders underprice their shares to induce outsiders to produce costly information, while Derrien (2005) suggests that initial IPO returns result from market mispricing of the offer price or closing price of shares.

[4] In a multi-unit uniform price auction, bidders could bid for multi-units of the shares, and when auction is closed, winning bidder pay the uniform offer price, independent of their bidding price, to get the shares. If the offer price can be set lower than the market clearing price, it is known as a "dirty" auction or as "leaving something on the table". See Jagannathan, Jirnyi and Sherman (2015) regarding the use of dirty auctions for IPOs.

but can be set lower than the market clearing price, and there is no allocation discretion. Critics of this feature are concerned that institutional investors play no role in and/or produce no valuable information in IPOs but they rather strategically inflate their bids to receive an allocation of shares. In addition, unlike most countries have used strict sealed-bid procedures where no one knew the bids until after the auction had closed, the ability of the underwriter to observe the bids as they are submitted in China IPO is an interesting feature, which may potentially create information leakage and sharing, thus reducing the bidders' incentive of information production.

Third, China's IPO auction system is also a hybrid auction since it combines a price-setting tranche (an auction conducted in the offline stage where only institutional investors are allowed to participate) with a separate tranche that allows investors, mostly retail investors, to place orders without specifying a price (the public pool in the online stage). Schnitzlein, Shao and Sherman (2015) offer experimental and theoretical evidence that the auction method for IPOs may be improved through the use of hybrid auctions with separate retail tranches or 'public pools' which increase proceeds, lower price volatility, reduce price error and reduce the incentive for small bidders to free ride by submitting extremely high bids, thus facilitating information production.

Although Degeorge, Derrien, and Womack (2010) empirically document that auctions can be an effective alternative to book-building procedures in that, compared with traditional book building, demand in an auction is more elastic, indicating that institutional investors reveal private information relevant to IPO valuation during IPO bidding process. Taking China's three special IPO features into consideration, it seems still unclear whether institutional investors' bids carry valuable information in IPOs.

In this paper, we take advantage of a large proprietary database, directly from Shenzhen Stock Exchange, containing detailed information on institutional bids (bidding time, bidding price, bidding quantity, and bidding institutions and their locations) for each IPO in China over the July 2009-November 2012 period and empirically examine, for the first time in the literature to the best of our knowledge, the informational role of institutional investors in *IPO bidding and allocation process*. This is in sharp contrast to Chemmanur, Hu, and Huang (2010), where the informational role of institutional investors in *Post-IPO trading* is investigated. In particular, we focus on the dispersion in institutional investors' bidding price which--as Imhoff and Lobo (1992), Barron, Kim, Lim, and Stuerke (1998), Barron and Stuerke (1998), and Diether, Malloy, and Scherbina (2002) all show--is an appealing proxy for investors' divergence of opinion.

While divergence of opinion among investors is generally believed to play an important role in asset pricing, both theoretical predictions and empirical implications of divergence of investors' opinion on asset prices remain conflicted. On one hand, Miller (1977) takes divergence of opinion as a measure of heterogeneous beliefs and argues that when investors disagree on value and the short-sale constraints are binding during a firm's public trading phase, the most pessimistic investors are driven out of the market and the most optimistic investors set stock prices, thus an IPO *is priced at a premium*. If future pricing efficiency can be assumed, then divergence of opinion prior to the IPO implies a lower future return. We refer to this as the *divergence of opinion premium hypothesis*. Alternatively, divergence of opinion among investors prior to the IPO may reflect valuation uncertainty or estimation risk resulting from limited information (Barry and Brown, 1986). In this case, divergence of opinion should lead to a positive risk premium (Varian, 1985; Merton, 1987; Abel, 1989; Epstein and Wang, 1994). This is because an increase in valuation uncertainty contributes to raising the required rate of return on the stock by *discounting its current market price* (given future pricing efficiency is constant), relative to its true value, as a compensation for investors bearing the risk. We refer to this as the *divergence of opinion discount hypothesis*.

Note that both hypotheses directly link the divergence of opinion to the current market price, and further imply a direct relationship between divergence of opinion and future equity return when future pricing is assumed to be efficient. This is subtle but important for IPO underpricing, which is measured by first-day return and defined as the ratio of the closing price of the stock on its first trading day less the offer price, divided by its offer price, since the offer price and the first-day closing price could be jointly affected and determined by divergence of opinion. Clarifying this caveat can help us to clearly identify the real economic mechanism behind the relation between divergence of opinion and IPO underpricing. Specifically, the offer price is set by a dirty multi-unit uniform price auction where both most optimistic and pessimistic investors can freely and fully express their opinions by submitting extremely high or low price, respectively, and directly affect the final offer price in that all institutional bids are aggregated to determine the offer price. Therefore, during this bidding and allocation stage, *divergence of opinion premium hypothesis* may not hold since its sufficient condition of only optimistic investors determining the offer price cannot be satisfied. However, *divergence of opinion discount hypothesis* may dominate and govern the offer price setting in that valuation uncertainty or estimation risk would obviously matter in this stage given no prior trading history and limited financial information of these completely new shares,. We thus hypothesize that institutional bidding dispersion is negatively related to IPO offer price.

On the first trading day, the short sale constraints are explicitly binding, and it seems that first-day closing price would be priced at a premium and the *divergence of opinion premium hypothesis* should dominate, since the valuation uncertainty or estimation risk may be resolved to some extent through trading. Nevertheless, there is another possibility that China's special institutional background and investors' structure may prevent the divergence of opinion from impacting the first-day closing price. First, the allocated institutions are subject to a three-month lockup provision (718 out of 783 IPOs in our sample period are affected) and the allocated shares cannot be sold within three months post-IPO, but there is a tight price limit range for the new shares' first trading day. Second, online retail investors account for most of the trading volume on the first trading day, but these investors cannot obtain the offline institutional investors' bidding information (373 out of 783 IPOs in our sample period are affected) or might underreact to this information even after they can obtain it in their first-day trading. As a matter of fact, due to the scarcity and high average underpricing of China IPOs, retail investors are always sentiment driven and rush to trade the new shares with limited attention to a firm's fundamentals and institutional bidding information. These will make the information contained in the institutional investors' divergence of opinion cannot be timely and effectively impounded into the market in such a short trading period. Therefore, the divergence of opinion may not necessarily predict the first-day closing price. This logic leads us to hypothesize that institutional bidding dispersion will either be positively correlated or uncorrelated with the IPO's first-day closing price. Combined with the first hypothesis, we predict that institutional bidding dispersion is positively related to IPO underpricing.

If the *divergence of opinion discount hypothesis* dominates IPO pricing in the long run, valuation uncertainty or estimation risk resulting from limited information should be gradually resolved through post-IPO trading, through which new information will be incorporated into market prices, and the previously discounted price should rebound back to the true value and lead to a lower future return. We refer to this as the *uncertainty resolution* channel. Alternatively, if the *divergence of opinion premium hypothesis* dominates IPO pricing in the long run, as short sale restrictions ease and additional firm information becomes available, short-term overvaluation might be corrected prices should approach fundamental value. We refer to this as the *overvaluation correction* channel. Therefore, no matter which channel is operant, we hypothesize that institutional bidding dispersion will be negatively related to the IPO firm's long run stock performance.

Fundamentally, given the limited information nature of IPO firms, institutional bidders rely heavily on a firm's historic operating performance to form their bidding strategies, and a large divergence of opinion may convey a large disagreement among institutional investors and a bad signal on the firm's future operating performance. As the institutional investors have been recognized to play important roles in corporate governance (Gillan and Starks, 2000), investment behaviour (Bushee, 1998) and corporate operating performance (Cornett et al, 2007), significant disagreement among institutional investors would also reduce market participants' confidence in the firm and affect the company's financing capacity and investment efficiency, negatively impacting the firm's future operating performance. We thus hypothesize that institutional bidding dispersion will be negatively related to the IPO firm's long run operating performance. We also follow Garfinkel and Sokobin (2006) to naturally hypothesize that institutional bidding dispersion is positively related to IPO price volatility and first-day share turnover. To test these hypotheses, we construct several measures of each IPO's opinion divergence using institutional bidding price dispersion.

According to Ritter (2011) and Ritter and Welch (2002), in their comprehensive reviews of the IPO literature, IPO bidding and allocation is an underexplored area because of data unavailability. We strive to fill this gap and uniquely contribute to the literatures by compiling a large IPO allocation dataset for China based on proprietary bidding data for 783 IPOs listed from 2009 to 2012 on the Shenzhen Stock Exchange (SZSE). Since the IPO bidding and allocation system are open exclusively to qualified institutional investors, we then use the bidding prices of institutional investors to construct several clean measures of opinion dispersion for each IPO. These measures — unlike those in the existing literature such as Houge, Loughran, Suchanek, and Yan (2001), which are based on *ex post* IPO market trading data and probably contaminated by the look forward bias that cannot reflect *ex ante* opinion dispersion — provide unbiased estimates of institutional opinion dispersion.

Consistent with our prior expectation, divergence of opinion is positively correlated with the first-day share turnover, and the results also show that divergence of opinion negatively predicts the offer price but uncorrelated with the first-day closing price, and this leads to a strong and robust direct relationship between opinion divergence among institutional bidders and IPO underpricing. The results clearly indicate that institutional bid divergence is positively associated with IPO first-day returns not by overvaluing the first-day close price, but by discounting the offer price through the valuation uncertainty and estimation risk channel, given Chinese IPOs' special institutional background and investors' structure. This channel suggests the source of the predictive power of the institutional bidding dispersion. In addition, since the *divergence of opinion discount hypothesis* dominates IPO pricing, institutional bidding dispersion is negatively related to three-month stock return as we find, and this is not through an *overvaluation correction* channel, but through an *uncertainty resolution* channel. Furthermore, institutional bidding dispersion is negatively predictive of one year post-IPO operating performance. Not only do these measures of institutional bidding dispersion have predictive power for underpricing and post-IPO performance, but the economic channels identified constitute a significant contribution to the literature, as this is some of the first direct evidence that institutional bids carry private information about IPO companies.

To address the endogeneity concern that unobserved IPO firm qualities may be correlated with dispersion and IPO first-day return or post-IPO performance, we run instrumental variable (IV) regressions using the relative underwriter valuation range deflated by the midpoint valuation price as our instrument. The underlying rationale is that this measure is unrelated to first-day returns but related to opinion dispersion, meaning that the narrower the range, the smaller the dispersion. The findings from our baseline regressions remain robust in the IV regressions. The results also remain robust for alternative dispersion measures.

To better understand the economic mechanisms behind our main results, we conduct several cross-sectional tests to exploit settings where the positive effect of opinion divergence on IPO first-day returns is predictably larger. We consider issuing firms' information environment. Prior literature documents that the expected underpricing of an IPO increases with the *ex ante* valuation uncertainty about its value (Beatty and Ritter, 1986; Megginson and Weiss, 1991). Since our measure of opinion divergence among bidders naturally captures a unique component of the *ex ante* uncertainty of the issue from institutional investors' perspective, we conjecture that the positive effect of opinion dispersion on IPO first-day returns is mainly driven by issues with greater ex ante uncertainty. Following the literature, we use offer size, time lag between offering and listing, and underwriter reputation to proxy for the *ex ante* uncertainty about an IPO. The results are clear and consistent across various proxies: the relation between opinion divergence and IPO underpricing is much more pronounced when the issuing firms' *ex ante* uncertainty is high. Furthermore, we find the heterogeneity of investor type matters in information production, and among six types of investors that we considers, domestic brokerage firm and fund management firm show outstanding information production ability since their divergence of opinions exhibit the strongest forecasting power in determining IPO underpricing. To examine whether and how institutional bidders' characteristics affect their information production, we study more closely the bid-level data and find that the timing of the bid and the frequency as well as the type of the bidder, matter in the pricing of IPOs, as does the geographic distance between bidders and the IPO firm. This represents a direct micro-level evidence for the source of information that contained in the institutional bids. The results lend further support to our baseline regressions.

To further address potential endogeneity problems, we take advantage of a natural experiment, a CSRC-implemented regulatory change in the IPO share allocation rule for institutional investors. Specifically, prior to November 5, 2010, IPO share allocation in China followed a *pro rata* system in which allocations were proportional to bidding volume; after this date, the allocation rule switched to a lottery system.[5] This mandatory regulatory change further discourages the institutional investors to simply bid a superficially high price for IPO shares in the allocation process without revealing private information by simultaneously increasing the allocated bidders' potential risk and return. We find that this

[5] The qualified bids that institutional investors submit above the final offer price enter a lottery system through which shares are allocated by underwriters via random drawing. In this lottery, shares are allocated through a formula that multiplies the total subscription volume by a lottery ratio, with the ratio indicating the percentage of subscribed capital that will eventually obtain a share. In addition, the CSRC allows for no discrimination against any investors (e.g., the size of subscription and identity) in the offline lottery process. Specifically, the CSRC requires that the issuing firms and their lead underwriters should notarize the lottery processes to ensure that share allocation is on a fair basis, which alleviates the concern about any potential selection bias of the successful subscribers.

regulatory change has caused the institutional bidder to bid more cautiously and led to a significant drop in institutional dispersion while considerably augmenting its effect on IPO first-day returns. This finding suggests that institutional investors have improved their information production in the post-change period, which has made underpricing more pronounced.

Our paper also makes a useful contribution to a large body of literature examining IPOs in general and a smaller corpus studying the Chinese capital market in particular. Within this latter stream, Banerjee, Dai, and Shrestha (2011) find that Chinese IPOs have high initial returns of 57.14%, while Wei (2004) and Chi and Padgett (2005) document initial first-day return averages over 100%. Chan, Wang, and Wei (2004), Chen, Firth, and Kim (2004), Chen, Firth, and Xu (2009), Firth, Lin, and Zou (2010), and Chen, Shi, and Xu (2014) further show that such returns are influenced by institutional environment, government, and ownership. In the broader literature, Berkman, Col, and Fu (2010) associate IPOs with securities market regulation and investor protection, while Dorn (2009) uses when-issued trades of IPOs in Germany to show the importance of retail investor sentiment. None of these studies, however, examines IPO share allocations or studies the impact of institutional investors' opinion divergence on post-IPO performance. Our research thus contributes to understanding how institutional opinion dispersion impacts the IPO market in general.

The remainder of the paper is organized as follows: Section 2 profiles the unique institutional setting of the IPO market in China, after which section 3 describes the data and variables. Section 4 presents the findings on the relation between IPO underpricing and the dispersion measure. Section 5 examines the predictive power of the dispersion measure on firms' post-IPO performance, and section 6 concludes.

2. Institutional Setting

The Chinese IPO market is notorious for high first-day returns that precede poor post-IPO performance, such as the average first-day returns of 247% or 145% in A shares traded on, respectively, the Shanghai and Shenzhen Stock Exchanges (Yu and Tse, 2006). Many blame these high initial returns on speculation or noise trades by retail investors; useful overviews of IPO underpricing in general and the development of the Chinese IPO market in particular are presented in Ritter (2011) and Ljungqvist (2004), respectively. We investigate these issues using a proprietary IPO dataset similar to those used by Cornelli and Goldreich (2001, 2003) and Jenkinson and Jones (2004) to examine actual orders and allocations in the European book building process. Unlike these work, however, we concentrate on opinion divergence among institutional investors in a dirty multi-unit uniform price auction. Our proprietary sample of institutional bids thus includes all IPO companies that have gone public from July 2009 to November

2012 on the Shenzhen ChinNext Board and Shenzhen SME Board, both of which were established to allow small or growth firms to list shares and raise funds.

Although the IPO process in China is always regulated by the CSRC, this agency has implemented many reforms to improve its approval-based system. For example, before June 2009, the CSRC implicitly put a price-earnings ratio cap of 30 for IPOs, meaning that the offering price could not be set over 30 times the firm's earnings per share. This limit obviously made IPO pricing highly inefficient. On June 11, 2009, therefore, the CSRC implemented its landmark *Guiding Opinions on Further Reforming and Improving the Issuance System of New Shares*, which removed the implicit restrictions on the price-earnings ratio. This major reform marks the beginning of our sample period, during which two other important regulatory reforms were implemented for offline institutional participants. The first was a November 5, 2010 alteration that changed the offline IPO share allocation rule from a *pro rata* to a lottery system. Because of this change, 373 IPOs in our full sample follow the *pro rata* system for offline share allocation, with all institutional bidders whose bidding price is above the final offer price receiving allocated shares from the lead underwriter proportional to their bidding quantity.[6] The remaining 410 IPOs follow the lottery system in which winning institutional bidders are assigned IPO shares in random drawings. The second reform, implemented on May 25, 2012, removed the three-month lockup period provision imposed on offline institutional bidders, affecting 65 IPOs toward the end of our sample period. Taken together, these discrete and substantial regulatory changes constitute a near perfect natural experiment, which we exploit to examine how information is incorporated into asset pricing.

The typical IPO auction process in China proceeds as follows: An IPO firm chooses an investment bank as the lead underwriter, which is responsible for pricing, selling, and organizing the new issue. The lead underwriter[7] then invites all qualified institutional investors from a huge candidate list of IPO bidders maintained by the Securities Association of China (SAC) to bid. The lead underwriters can also recommend institutional investors to participate in the IPO auction after November 5, 2010 and can recommend individual investors to participate in the IPO auction process after May 25, 2012. However, the size of these two types of bidders is trivial relative to other types of institutional investors. During our sample period from 2009 to 2012, the hybrid auction operates in offline and online tranches separately, and the shares available to offline institutional investors in China generally do not exceed 50% and

[6] Whereas both offline and online share allocation procedures allow investors to buy IPO shares at the offer price, offline share allocation only allows institutional investors to bid, while online share allocation mainly targets retail or individual investors who are merely offer price takers.

[7] Only one IPO has two underwriters; the other 782 IPOs in our sample have one underwriter each.

sometimes can be as low as 20% of the total issuing shares.[8] The lead underwriters solicit subscription orders from participating institutional investors over a certain period of time, typically two working days. Institutional investors can submit multiple subscription orders, which carry information on the number of shares to purchase and the price they are willing to pay. To encourage participating institutional investors to bid more cautiously, the lead underwriter also provide bidders with its IPO valuation range and a detailed IPO valuation report for reference.[9] The issuing firm and the lead underwriter decide on the offering price after collecting subscription information in the offline process. The underwriter then allocates shares to the institutional investors that submit bid prices above the final offer price until all the shares are allocated. As previously emphasized, because the allocation rule is set by the CSRC, underwriters in Chinese IPOs, unlike those in U.S. IPOs, have no discretionary power in IPO share allocation. Rather, as discussed above, allocations followed a *pro-rata* system proportional to the bidding volume prior to November 5, 2010, and then switched to a lottery system.

3. Data and Variables

Our proprietary bidding and allocation data set covers IPOs from the Shenzhen Stock Exchange (SZSE), one of the two major stock exchanges in mainland China. Our primary sample comprises the entire population of 783 Chinese firms listed on either the Shenzhen Small and Medium Enterprises (SME) Board (428 listings) or the ChiNext Board (355 listings) between July 2009 and November 2012, which account for 88.5% of all IPOs listed in China during this period.[10] This time period is selected for two reasons: First, it takes full advantage of the China's first market-orientated new share issuance reform. Second, during this time window, the other key regulations on IPO pricing were kept relatively stable, with all IPOs using a dirty multi-unit uniform price auction.[11] The cut-off date of November 2012 takes into account that the CSRC suspended the Chinese IPO market in November 2012 for regulatory transition. Although it reopened in January 2014, the IPO allocation rules subsequently varied too sharply and frequently to be suitable for empirical research. Each order book contains detailed IPO bidding information, including number of bidders; bidder name, type (e.g., domestic brokerage firms, fund management firms, financial firms), and geographic location; date and time of bid submission;

[8] On April 28, 2012, the CSRC amended its policy on institutional investors and required the offline rationing ratio to be no less than 50 % of the total issued shares. Later, on December 13, 2013, the CSRC further increased this ratio to more than 60% for small issuers and more than 70% for large issuers.

[9] The complete IPO valuation report is only provided to bidding institutional investors.

[10] There were only 102 IPOs on the Shanghai Stock Exchange from July 2009 to November 2012, which adopted a different IPO allocation system. Thus, the Shenzhen Stock Exchange is a more appropriate representative of China IPO reform started from June 2009.

[11] A partial auction mechanism with unique Chinese characteristics **[WLM—what does this mean?]** was initially introduced by the China Securities Regulatory Commission (CSRC) in January 2005 and then subsequently altered and enforced in June 2009.

andbidding price and quantity. It also lists the final offer price and the number of actual shares allocated to each institutional bidder after close of the bidding period. We extract the lead underwriter's IPO valuation range data from its private valuation report in which the underwriter's pricing method, logic and evidence are thoroughly illustrated. This valuation report is only provided to institutional bidders and is not posted publicly. In practice, due to the limited information for new IPO firms, bidders rely heavily on this valuation report to form their bidding strategies.

We obtain the IPO firm financials, issue-specific characteristics, underwriter information, and stock market conditions directly from the Chinese Stock Market Accounting Research (CSMAR) and Wind databases. Whenever information is missing or incomplete in either database, we manually search for the IPO prospectus for these data. To further identify the source of information content of institutional bids, we also use geographic coordinates to calculate the direct and indirect flight distance and Euclidian distance between the issuing firm and each institutional bidder in every IPO.

3.1. Dispersion Measures

Because analyst forecast dispersion is amply documented in the finance and accounting literature as a strong predictor of future stock returns, it is widely used as a proxy for differences in opinion among investors. For example, Diether, Malloy, and Scherbina (2002) show the dispersion in analysts' earnings forecasts to be very useful for the formulation of profitable trading strategies because stocks with high analyst forecast dispersion are associated with a future return discount, especially in small firms. They attribute this negative relation to market frictions resulting from a lack of consensus among investors that limits the short sales of pessimistic investors and temporarily drives stocks into overpricing. Johnson (2004), on the other hand, after developing a simple rational asset pricing model in which dispersion proxies for the unpriced information risk arising from unobservable asset valuations, argues that higher estimation risk leads to higher stock price and subsequently lower expected returns for levered firms with risky debts.

It should also be emphasized that institutional investors are sophisticated and often have an informational advantage over individual investors around various corporate events. Indeed, the extant literature documents that institutional investors outperform individuals, either because institutions have some unique private information that individuals do not have or because they can better interpret readily available public information. For example, Field and Lowry (2009), in their analysis of institutional holdings in newly public firms, demonstrate that firms attracting the highest levels of institutional investment significantly outperform those with the lowest levels. They attribute institutional investors' superior returns to their ability to better interpret public data. By similarly focusing on the role of institutional investors in equity issuances, Chemmanur, He, and Hu (2009) and Chemmanur, Hu, and

Huang (2010) show that institutions systematically possess private information that enables them to realize superior returns over individual investors in both IPOs and SEOs.

Given the popularity of analyst forecast dispersion as a proxy for risk and uncertainty in the literature, we first use institutional investors' bidding price information to construct a simple measure of their heterogeneous beliefs in the pre-IPO market and then relate this variable to subsequent IPO underpricing. Following Diether, Malloy, and Scherbina (2002), we define the dispersion in analysts' earnings forecasts as the standard deviation of earnings forecasts across all analysts, scaled by the absolute value of the mean EPS forecast. We then measure the degree of heterogeneous beliefs among institutional investors in the offline IPO sale stage as their bidding price dispersion, defined as the ratio of the cross-sectional standard deviation of institutional investors' bidding prices in the offline subscription process scaled by the mean bidding price:

$$STD = \frac{\sqrt{\frac{\sum_{i=1}^{N}(p_i - \bar{p})^2}{N-1}}}{\bar{p}}$$

where p_i is the bidding price from institutional bidder *i* and $\bar{p}$ is the average bidding price among all the *N* institutional bidders in an IPO. The dispersion in investors' bidding prices is a forward-looking measure that takes into account institutional bidders' heterogeneous beliefs about the issuing firm's quality and future profitability. We also construct two alternative dispersion measures, *MAD*, the mean absolute deviation of the bidding price surrounding the mean bidding price scaled by the mean bidding price, and *STD weighted,* the bidding price dispersion among institutional investors weighted by their bidding volume.

3.2. Summary Statistics

Following existing IPO literature, we define IPO first-day underpricing as the ratio of the stock's closing price on its first trading day less the offer price to its offer price. Panel A of Table 1 reports the summary statistics of our primary analytic variables, all of which are defined in Appendix A. As the panel shows, the average IPO first-day underpricing for the entire sample of IPO firms is 36.84%, with a median value of 27.19%. Meanwhile, an increase in the dispersion level of institutional IPO bidders from the 10^{th} percentile to the 90^{th} percentile almost doubles the degree of heterogeneous beliefs among them.

In terms of general characteristics, our sample firms are on average 8.33 years old at the time of the IPO, the average time gap between offering and listing is 16.6 days, and the average issue size is 1,061 million RMB (170 million USD using 2010 exchange rate), with a median of 625 million RMB (101 million USD). On average, there are 71 qualified institutional bidders participating in the offline share allocation process for any one IPO, with an average offline oversubscription rate of around 107. About 50% of our sample firms receive financing from either venture capital or private equity before going public. As noted previously, 373 IPOs participated in the pro-rata system and 410 in the lottery system, while institutional bidders in the 718 IPOs offered before May 25, 2012 faced a three month lockup period for the offline shares obtained during the bidding process.

****** Insert Table 1 about here ******

Panel B of Table 1, which reports the Spearman correlation matrix for the primary analytic variables, shows an insignificant correlation coefficient of -0.01 between IPO underpricing and the *STD* dispersion measure. It also indicates that underpricing is significantly higher for IPOs with a smaller offer size and a longer time gap between offering and listing, as well as for IPOs that attract more institutional bidders. Graphing the number of IPOs and average IPO underpricing on a quarterly basis, however, reveals that both measures fluctuate significantly over time (see Figure 1). The number of IPOs ranges from 83 in 2010Q2 to only four in 2012Q4. IPO underpricing also fluctuates but generally shows a decreasing trend, partly because of the CSRC's implementation during our sample period of various regulations aimed at improving IPO pricing efficiencies. Toward the end of our sample period in 2012Q4, the quarterly number of IPOs drops dramatically while IPO underpricing spikes to an extremely high level. This somewhat surprising trend is probably due to the CSRC's temporary ban on IPOs in the mainland China IPO market after November 2012, just before which investor enthusiasm for the relative scarcity of new shares in the secondary market pushed the first-day underpricing to an unreasonable new height.

****** Insert Figure 1 about here ******

4. Dispersion and IPO Underpricing

The first of our multivariate analyses of the explanatory power of institutional dispersion for IPO underpricing is a baseline regression using ordinary least squares (OLS). To address endogeneity concerns, we run an instrumental variable estimation in which the ratio of the lead underwriter's IPO valuation band to the midpoint of the valuation band is the instrument. Using these estimations, we show that our findings are robust to two alternative measures of bidder dispersion in the pre-IPO market. We also run subsample regressions based on issuers' pre-IPO information environments to identify how these amplify the effect of institutional bidders' heterogeneous beliefs on IPO underpricing. Finally, we use the natural experiment of the November 2010 share allocation reform to test the robustness of our findings.

4.1. Baseline Results

As in the existing IPO literature, we control for a rich set of firm and issue characteristics that may affect IPO offer price, first-day closing price and underpricing. For example, like Ritter (1984), Beatty and Ritter (1986), and Carter and Manaster (1990), we consider firm age, offer size, underwriter reputation, and the time gap between offering and listing as measures of the issuing firm's ex-ante uncertainty. To control for overall market conditions at the time of the IPO, we follow McGuinness (1992) by also including Shenzhen A-share composite index returns over one month prior to the listing date. We capture the profitability of the issuing firm by including return on equity (ROE) for the last fiscal year preceding the IPO, and use the offline share oversubscription rate and number of institutional participants in the offline share subscription stage to control for the aggregate premarket demand for the issue. Because both venture capital (VC) and private equity (PE) sponsors are subject to reputation concerns, we then include an indicator variable to flag issuers backed by either VC (Megginson and Weiss, 1991) or PE. We also use an indicator variable to differentiate IPOs listed on the ChiNext Board from those listed on the SME Board and include two separate indicator dummy variables to capture the effects of the two major IPO regulatory reforms introduced by the CSRC during our sample period. In all regression specifications, we include industry (based on CSRC classifications) and year fixed effects to account for potential industry and time trends. Following Petersen (2009), we compute heteroskedasticity-adjusted standard errors clustered at the industry level.

Our baseline OLS regression is specified as follows:

$$\begin{aligned} IPO\ Initial\ Return = {} & \alpha + \beta_1 * Dispersion + \beta_2 Firm\ age + \beta_3 Offer\ size \\ & + \beta_4 Time\ gap + \beta_5 ROE + \beta_6 Index\ return + \beta_7 Oversubscription \\ & + \beta_8 Log\ \#\ Institutions + \beta_9 VC/PE\ dummy + \beta_{10} Allocation\ dummy \\ & + \beta_{11} Lockup\ dummy + \beta_{12} ChiNext\ dummy + \beta_{13} Lead\ reputation + \varepsilon \qquad (1) \end{aligned}$$

The baseline regression results regarding the impact of opinion dispersion on offer price, first-day closing price and underpricing are reported in Table 2. These results show a positive relationship between bidding price dispersion and IPO first-day returns across all regression specifications that are significant at the 1% level. We further notice that the bidding dispersion is significantly negatively related to offer price but uncorrelated with first-day closing price. It implies that the bidding dispersion affects underpricing by discounting the offer price through the channel of compensating investors for bearing valuation uncertainty and estimation risk resulting from the limited information nature of IPO firms. In terms of economic magnitude, the coefficient estimates in column (4) suggest that a one standard deviation increase in the bidding price dispersion measure translates into a 5.28 percentage point (=1.57*0.0336) increase in the IPO first-day return. This outcome represents an economically significant 14.33% increase in first-day underpricing relative to the average first-day underpricing of 36.84% in our full sample. The significant positive relation between IPO underpricing and the *allocation dummy* indicates that the CSRC's 2010 share allocation reform reduced IPO underpricing.

****** Insert Table 2 about here ******

Among the other control variables, smaller issues and those with a longer time gap between offering and listing are associated with greater underpricing, as is a better overall pre-IPO stock market performance. Consistent with Cornelli and Goldreich (2003), issues that can attract higher premarket demand, as proxied by a higher oversubscription rate and more institutional participants, tend to have higher underpricing. On the other hand, issues listed on the ChiNext Board are significantly more likely to experience lower underpricing. We also find that VC or PE backed IPOs do not experience significantly larger underpricing. Overall, our baseline results suggest that IPO-related opinion divergence among institutional investors in the pre-IPO market has strong predictive power for IPO underpricing.

4.2. Instrumental Variable Approach

The positive relation reported in the baseline regressions may reflect one or both of two competing explanations: opinion divergence among bidders may in fact be based on some private information about the IPOs or it may be driven purely by the endogenous matching between institutional bidders and IPO firms. That is, if unobservable variables are simultaneously driving the relation between bidders' opinion divergence and IPO first-day returns, then the observed relation reflects the endogenous nature of the bidder's opinion divergence rather than any private information about first-day returns, thereby biasing the OLS estimates. We address this possible endogeneity between bidders' premarket opinion divergence and subsequent IPO underpricing by estimating a two-stage least square (2SLS) regression in which the ratio of the lead underwriter's IPO valuation band to the valuation band midpoint, $2 \times \left(\frac{\mathrm{Prc_H} - \mathrm{Prc_L}}{\mathrm{Prc_H} + \mathrm{Prc_L}}\right)$, instruments for this divergence, as measured by the bidding price dispersion *STD*. To be a valid instrumental variable (IV), this ratio should satisfy the following requirement: it must be correlated with the bidding price dispersion but be uncorrelated with the IPO first-day return. We choose this instrument because a tighter valuation band leaves less room for bidding price variation, resulting in relatively smaller bidding price dispersion. On the other hand, because this relative measure contains little direct information on price discovery, it is unlikely to directly influence the underpricing of a particular IPO.

****** Insert Table 3 about here ******

Panels A and B of Table 3 report the results of the first- and second-stage IV regressions, respectively. In the first-stage regression, the ratio of the lead underwriter's IPO valuation band to the valuation band midpoint is used as an IV for our dispersion measure *STD*. In the second-stage regression, we replace the dispersion measure *STD* with its predicted value from the first stage, the *Fitted STD*, and re-estimate the baseline regression. The first-stage results (Panel A) indicate that the proposed instrument is positively and significantly correlated with the bidding price dispersion *STD*, confirming that a tight valuation range helps reduce biding price dispersion. The second-stage results (Panel B) then show that the instrumented bidding price dispersion *Fitted STD* also remains positive and significant at the 1% level, suggesting that IPOs with a higher level of premarket bidder opinion divergence subsequently experience larger underpricing. Collectively, our 2SLS analysis confirms that the positive relation between bidder opinion divergence and IPO first-day return is unlikely to be driven by endogeneity.

4.3. Alternative Dispersion Measures

We further test the robustness of our main dispersion measure by constructing two alternative measures of IPO-related bidder opinion divergence. Consistent with prior accounting literature (Jacob, Lys, and Neale, 1999; Barniv, Myring, and Thomas, 2005), our first alternative dispersion measure *MAD* is the simple average of the cross-sectional unsigned mean absolute deviation of individual bidding price from the mean bidding price, scaled by the mean bidding price. Specifically, we calculate *MAD* using the following formula in which p_i is the bidding price from institutional investor *i* and $\bar{p}$ is the mean bidding price among all the *N* institutional investors participating in the offline share subscription process of an IPO:

$$MAD = \frac{\frac{1}{N}\sum_{i=1}^{N}|p_i - \bar{p}|}{\bar{p}}$$

Our second alternative measure, *STD weighted*, takes into account the importance of bidders' opinions about an IPO in the whole bidder group by weighting each institutional bid according to bidding quantity. Hence, *STD weighted*, formulated as shown below, gives larger bids greater weight relative to smaller bids:

$$STD\ weighted = \frac{\sqrt{\frac{\sum_{i=1}^{N} w_i (p_i - \bar{p}_w)^2}{\frac{(N-1)\sum_{i=1}^{N} w_i}{N}}}}{\bar{p}_w}$$

where p_i is the bidding price from institutional investor *i* and $\bar{p}_w$ is the average bidding price weighted by corresponding bidding quantity among all the *N* institutional investors participating in the offline share subscription process of an IPO.

****** Insert Table 4 about here ******

Table 4 presents the regression results using the two alternative dispersion measures, with specifications (1) and (3) including neither industry nor year fixed effects, but specifications (2) and (4) containing both. Here, using *MAD* and *STD weighted*, we obtain quantitatively and qualitatively similar outcomes to the baseline results shown in Table 2. Across all regression specifications, both alternative dispersion measures are significantly and positively correlated with IPO first-day underpricing at the 1% levels. In unreported analysis, we show that our main findings are thus robust to using alternative measures of opinion divergence among bidders and remain robust when we test them using *price update*, defined as the percentage difference between the midpoint of the lead underwriter's IPO valuation range and the final offer price (Aggarwal, Prabhala, and Puri, 2002), with market-adjusted IPO first-day returns as the dependent variable. They also hold when we exclude financial firms or the four IPOs with extremely high underpricing levels in the last quarter of our sample period, either separately or simultaneously.

In addition, there might be some potential concern for the strategic over-bidding of institutional investors in the offline IPO process. As such, their opinion dispersion might be biased and not informative. However, the allocation mechanism in China helps mitigate such motives of related institutional investors. First, providing a high bid price can be costly for institutional investors since the offer price is set by aggregating all the bids, and the high bid could systematically pull the offer price to a higher level so that all institutions have to buy the shares at relatively inflated offer prices and suffer high probability of the market price falling below the offer price due to the three-months lockup provisions, thus incurring large losses. Second, investors have to deposit enough cash to cover their bid value into a special saving account when submitting bids, with the deposit frozen until the offline allocation process is completed. Because institutional investors must borrow or liquidate their current investment portfolios to raise funds to participate in the offline process and short-term Chinese interest rates often jump in advance of big IPOs, this implies a very large participation cost in the form of committed and frozen liquidity. Finally, as a further robustness check, we calculate our opinion dispersion measure by removing the top 10% of bids with the highest bid price quotations and re-estimating the baseline regressions. We find that our main results remain qualitatively unchanged.[12]

4.4. Cross-Sectional Analysis

We conduct two additional sets of cross-sectional analyses: the first identifies the role of information asymmetry in the relation between opinion divergence among IPO bidders and subsequent IPO underpricing, and the second assesses the heterogeneity in the predictive power of opinion divergence across different bidder categories given the availability of information on institutional bidder type.

4.4.1. Impact of Ex-ante Uncertainty on the Dispersion-Underpricing Relation

Because of prior evidence that IPO underpricing increases with ex-ante uncertainty about issue value (Beatty and Ritter, 1986; Megginson and Weiss, 1991), we predict the effect of opinion dispersion on IPO first-day returns to vary across uncertainty levels. For example, Mok and Hui (1998) find that a lengthy time gap between the offering and listing of Chinese A-share IPOs increases *ex-ante* issuer uncertainty. To test this assumption, we partition the full sample into subgroups based on issuer *ex-ante* uncertainty as proxied by offer size, time gap between offering and listing, and underwriter reputation.

[12] In order to deter over-bidding behaviour, on 30 November 2013, the CSRC announced a new regulatory rule that requires issuers and lead underwriters to reject at least the top 10 percent of bids and their related subscriptions when setting the offering prices. The removed subscriptions are prohibited from participating in the offline allocation.

We then re-estimate the baseline regression in Equation (1) for each subgroup. The odd (even) number columns in Table 5 report the outcomes for the subsamples with greater (smaller) ex-ante uncertainty. We note first that the forecasting power of our dispersion measure is significant and positive across all subsamples, indicating that our results are not subject to a sample selection bias. Consistent with our cross-sectional prediction, the relation between institutional dispersion and the level of IPO underpricing is more pronounced in smaller IPOs, IPOs with a shorter time gap between offering and listing, and IPOs managed by less reputable underwriters. For example, in the subsample with a below median time gap (column 3), a one standard deviation increase in the dispersion measure translates into a 7.4% (=2.273*0.0326) increase in IPO first-day returns, whereas in the subsample with an above median time gap (column 4), the increase is only 1.79% (=0.527*0.0340). Overall, these results indicate that ex-ante issue uncertainty amplifies the effect of bidder opinion divergence on expected IPO first-day returns.

****** Insert Table 5 about here ******

4.4.2. Heterogeneity of Investor Type

Because Ke and Ramalingegowda (2005) demonstrate that different types of institutional investors possess different private information about firms' future earnings and return, we classify each institutional investor according to the registration type recorded by the Securities Association of China (SAC). The resulting categories are as follows: domestic brokerage firm (BF), fund management firm (FM), financial firm (FF), trust company (TC), insurance company (IC), or qualified foreign institutional investor (QF). We then construct a dispersion measure for opinion divergence within each bidder category and explore the heterogeneity in this divergence's predictive power across categories. Because brokerage firms and fund management firms have their own equity research teams and expertise in generating IPO information, we expect divergence in BF to have the most information content and thus the strongest forecasting power in determining IPO underpricing, followed by divergence in FM.

Table 6 reports the regression results for the separate bidder categories, with *STD_BF* representing the dispersion measure among domestic brokerage firms; *STD_FM*, fund management firms; *STD_FF*, financial firms; *STD_TC*, trust companies; *STD_IC*, insurance companies; and *STD_QF*, qualified foreign institutional investors. For all regression specifications, we use the same set of control variables and include industry and year fixed effects. Consistent with our expectations, we find that opinion divergence within the brokerage firm and fund management firm categories has the strongest predictive power for IPO underpricing. We find no strong relation, however, between IPO underpricing and opinion divergence within the remaining bidder categories (financial firms, trust companies, insurance companies, or qualified foreign institutional investors). Overall, therefore, our findings support the existence of a considerable amount of heterogeneity in the predictive power of opinion divergence across different bidder categories.

****** Insert Table 6 about here ******

4.5. The Importance of Share Allocation Reform

The November 2010 reform of offline share allocations represents an exogenous shock that forced all 410 subsequent IPOs in our sample to use a lottery rather than a *pro rata* system. Prior to the reform, 373 IPOs had followed the *pro rata* rule that all institutional bidders with a bidding price above the offer price receive shares proportional to their bidding quantity. According to the CSRC's guideline, this reform was supposed to enhance the role of institutional investors in IPO price discovery by encouraging them to bid more cautiously and thus produce less biased bidding prices in the offline share subscription process. The mandatory adoption of this share allocation reform thus serves as a natural experiment that allows us to investigate the information role of institutional IPO investors. It is also important to understand the consequences of the reform. To do so, we perform two sets of empirical analyses: the first determines whether and how the share allocation reform has affected such bidding behaviors as dispersion among the offline institutional bidders; the second assesses the impact of this exogenous regulatory shift on the relation between the opinion divergence of institutional bidders and IPO underpricing.

Panel A of Figure 7 reports the results of a univariate test comparing IPO variables before and after the share allocation reform. The average IPO underpricing after the change is 24.65%, much lower than the 50.24% underpricing before it. Opinion divergence among institutional investors, as proxied by their bidding price dispersion, also drops 6.15%. This reduction is significant at the 1% level. Panel B then reports the multivariate regression results that use opinion divergence of each type of institutional investors, *STD*, as the dependent variable. The variable of interest is the *Allocation dummy*, which takes a value of one for IPOs that follow a lottery allocation system and zero for those adopting the pro-rata allocation system. We find that *Allocation dummy* is negatively and significantly related to the *STD* dispersion measure, suggesting that the CSRC's share allocation reform has been effective in lowering opinion dispersion among institutions.

****** Insert Table 7 about here ******

We next investigate how the new allocation rule affects the relation between investor opinion divergence and IPO first-day returns. Specification (1) in Table 8 includes an interaction term *STD* × *Allocation dummy* to gauge the interaction effect between share allocation reform and the dispersion measure on IPO underpricing. The coefficient of the interaction term is positive and significant. This finding indicates that the relation between opinion dispersion and IPO underpricing is more pronounced after the share allocation reform. In specifications (2) and (3), we split the sample into two groups based on the allocation rule change and run the same regression separately on each. Comparing the outcomes for the two subgroups clearly shows that the allocation rule change has amplified the effect of investor opinion divergence on IPO underpricing. For example, after the rule change (3), a one standard deviation increase in the dispersion measure translates into a 7.7% increase in IPO underpricing versus only a 3.2% increase before the change (2). The empirical evidence from the regulatory change as a natural experiment thus suggests that the relation between opinion dispersion and IPO initial return is not caused by omitted variables or endogeneity problems.

****** Insert Table 8 about here ******

5. Dispersion and Post-IPO Firm Performance

Having identified the relation between institutional bidding dispersion and IPO pricing efficiency, we now examine whether such dispersion is predictive of subsequent IPO stock returns and post-IPO operating performance.

5.1. Dispersion and Post-IPO Stock Performance

Our primary measures for post-issue firm stock price performance are one-, three-, and six-month post-IPO buy-and-hold returns (BHRs), which are calculated based on monthly stock returns beginning with the first month after the IPO listing date. Cumulative abnormal returns (CARs) are the cumulative difference between the monthly return of a particular IPO and the monthly return of the corresponding value-weighted market index. Because institutional bidders in the 718 IPOs listed before May 2012 are subject to a three-month lockup provision, however, we expect that the overall predictive pattern of opinion divergence on stock performance will differ between bidders before and after this date. Specifically, the provision will prevent the opinions of the constrained bidders from being too quickly impounded into stock prices because they cannot trade shares obtained offline within the lockup period, meaning that such information can only be reflected in the stock price after the lockup provision expires to be effective. In contrast, the opinion divergence among bidders who are not constrained by the provision after May 2012 can be expected to predict one-month short-run stock performance because their opinions can be fully revealed immediately after trading starts.

According to panel A of Table 9, which presents the summary statistics for the post-issue one-, three-, and six-month firm stock performance measured as BHRs and CARs, respectively, newly listed firms on average exhibit negative BHRs over the six-month post-issue period. To assess the predictive power of premarket bidder opinion divergence for subsequent post-issue stock performance using full sample IPOs and IPOs with and without the three-month lockup provision, we use the baseline regression specification but include the corresponding holding period market index returns. We first note from panel B of Table 9 that the association between bidder opinion divergence and BHRs three months post IPO is negative and significant at the 1% level but becomes insignificant one month and six months post IPO, seemingly confirming our main argument.[13]

****** Insert Table 9 about here ******

Since many IPOs in our sample are subject to the three-month lockup provision, we also run subsample regressions that explicitly separate out the effect of the lockup provision on the predictive pattern of bidder opinion divergence on post-issue stock performance. Consistent with our expectations, the estimates in columns (4) to (6) show that the opinions of bidders subject to the three-month lockup provision can only predict stock performance beginning three months post IPO, indicating that bidder opinion divergence contains private information about post-issue stock performance that can only be impounded into stock price once the lockup period expires. In terms of economic magnitude, for example, the coefficients in column (5) indicate that a one standard deviation increase in the dispersion measure translates into a 44.96% decrease from the mean value of the three-month BHRs. Finally, the results in columns (6) to (9) suggest that bidders' divergent opinions can predict BHRs one month post issue but that the effect, with a t-value of -1.52, is not significant. This finding confirms that the divergent opinions of bidders without the three-month lockup provision can be immediately reflected in stock returns. In an unreported analysis, we obtain similar results using CARs as measures of stock performance. Overall, then, consistent with the *uncertainty resolution* channel, our results strongly suggest that the premarket divergence of bidder opinions does indeed contain private information about post-issue stock performance, whose rapid impoundment into stock prices is hindered by the lock-up provision.

5.2. Dispersion and Post-IPO Operating Performance

We next examine whether our dispersion measure can also forecast long-run post-IPO firm operating performance and, if so, how. Following previous studies, we proxy such performance by one-, two-, and three-year post-issue returns on equity (ROE) and returns on assets (ROA). According to the descriptive statistics in Panel A of Table 10, firm operating performance declines over the three-year post-issue period, with ROE dropping from 8.21% in the one-year post-issue period to 7.68% two years post issue, a 6.46% reduction. Consistent with Jain and Kini (1994), we also find that issuing firms exhibit a decline in post-issue operating performance relative to their pre-issue levels. To better assess this decline and identify the relation between it and premarket bidder opinion divergence, we use the baseline specification to perform regressions with corresponding one-, two-, and three-year ROE and ROA as dependent variables while controlling for the same holding period stock market index returns. The variable of interest is the dispersion measure *STD*, and we also include industry and year fixed effects for all regressions. As shown in Panel B of Table 10, consistent with prior expectation, the coefficient

[13] We also control for firm- and issue-level characteristics but omit the coefficients here to save space.

estimates in specifications (1) and (4) indicate a strongly significant and negative relation between the one-year post-issue operating performance as measured by ROE and ROA and the premarket divergence of opinions among bidders.

****** Insert Table 10 about here ******

In addition to being statistically significant, our findings are meaningful in terms of economic magnitude. For example, the estimates for specification (1) reveal that a one standard deviation increase in our dispersion measure translates into a 2.54% decrease in firm operating performance relative to the average one-year post issue operating performance measured by ROE. We also find not only that the predictive power of divergent bidder opinions is weakened and only marginal significant for the two-year post-issue operating performance measures but that for three-year post-issue performance, the relation totally disappears (specifications (3) and (6)). Taken together, our results suggest that bidder opinion divergence (as measured by their bidding price dispersion) has strong predictive power mostly for one-year post-issue firm operating performance.

5.3. Bidder Characteristics and Bid Price Accuracy

To examine whether and how institutional bidder characteristics affect bid price accuracy, thereby identifying the informed bidders in an IPO, we measure bid price inaccuracy as the percentage difference between the bid price and final offer price. The first bidder characteristic that may influence IPO pricing is the geographic distribution of both bidders and IPO firms, as suggested by the tendency for local investors to be better informed about a firm's prospectus than nonlocal investors. For example, Baik, Kang, and Kim (2010), find that local investors outperform nonlocal investors in informed trading by exploiting their informational advantages. On the other hand, Hong, Kubik, and Jeremy (2005) demonstrate that local investors behave similarly toward a particular stock within the same time period, even when the company of interest is located far away. This latter finding suggests that information about firm quality may also be spread by word of mouth over a geographically interconnected investor network. Recognizing both possibilities, we use the mean distances between the bidder and IPO firm and between the bidder and other bidders as proxies for the extent of private information a bidder has about the IPO. We expect that the distance measure should be positively correlated with bid price inaccuracy. Following Cornelli and Goldreich (2001), we also examine other bid characteristics, including bid size, timing, and bidder type and frequency of participation, each of which has separate implications for IPO pricing efficiency.

According to the extant literature, large bidders are better informed and large bids are favored by underwriters in IPO allocation (Cornelli and Goldreich, 2001). Late bids might be more informative than early bids because of the time needed for information spillovers to materialize. We therefore include a dummy variable indicating whether the bid is submitted relatively early or not. We also create a dummy variable to proxy for regular bidders who may be better at pricing IPOs either because of greater pricing experience or more precise private information gleaned from their close business relations with the underwriters. Additionally, because bidders with strong in-house equity research departments (e.g., brokerage and fund management firms) and superior information acquisition and production abilities may predict the IPO offer price more precisely and bid more wisely, we introduce a bidder type dummy that explicitly controls for the effect of investor type heterogeneity on IPO pricing. We then identify the determinants of bid price inaccuracy by running different specifications of the following regression:

$$\begin{aligned} Bid\ price\ inaccuracy = \ & \alpha + \beta_1 * Distance + \beta_2 Largest\ bid + \beta_3 Second\ largest\ bid \\ & + \beta_4 Early\ bid + \beta_5 Late\ bid + \beta_6 High\ frequency \qquad (2) \\ & + \beta_7 Medium\ frequency + \beta_8 Bidder\ type + \varepsilon \end{aligned}$$

Here, the dependent variable is *Bid price inaccuracy*, defined as the percentage deviation between individual bid prices and the final offer price. For invalid bids with a bid price below the offer price, we measure bid price inaccuracy as the maximum price deviation among all bids within an IPO. Several independent variables capture different bidder characteristics: *Distance* is constructed as the natural logarithm of the arithmetic mean of the flight distance between the IPO firm and the bidder and the average flight distance between the bidder and all other bidders as a group. We also directly calculate the Euclidian distance between bidder and IPO firm and among bidders based on their geographic coordinates as well as flight distance. *Largest bid (Second largest bid)* is a dummy equal to one if the bid size is in the fourth (third) size quartile for that IPO, and *early bid (late bid)* is a dummy equal to one if the bid submission time falls in the first (fourth) quartile. We also split bidders into three categories based on the frequency distribution of their past IPO participation, with *High frequency (Medium frequency)* equal to one if the total number of IPOs participated in is in the third (second) tercile during our full sample period. Finally, *Bidder type* again categorizes bidders into domestic brokerage firms (BF), fund management firms (FM), financial firms (FF), trust companies (TC), insurance companies (IC), and qualified foreign institutional investors (QF). For this bid level analysis, however, we add in two more bidder types: qualified large individual bidders (ID) and institutional bidders (II) independently recommended by the lead underwriter. It should be noted that our earlier analysis (section 4.4.2) does not assess the impact of these two groups' divergent opinions on IPO underpricing because dispersion measures for these categories are very rare at the IPO level. Finally, to alleviate concerns that the above variables may not capture unique issue characteristics, the regression also includes issue level fixed effects with standard errors clustered at this level.

Panel A of Table 11 reports the estimates of the OLS regressions in which the dependent variable is the continuous measure of bid price inaccuracy as defined earlier. Consistent with our expectations, both the primary and alternative distance measures are positively and significantly correlated with bid price accuracy at the 1% level. This finding suggests that geographic proximity between bidder and IPO firm, as well as between bidder and other bidders as a group, facilitates bidder information acquisition and/or production, thereby helping them to improve IPO pricing efficiency. In terms of economic magnitude, all else being equal, the coefficient estimates in column (2) suggest that a one standard deviation decrease in the distance measure leads to a 1.18% (=0.027*0.436) improvement in the accuracy of IPO pricing. The coefficients on the two bid size variables are statistically insignificant, confirming that bid size is not a proxy for information about IPO pricing. The coefficient of the dummy variable for early (late) bids, however, is positive (negative) and significant, suggesting that late bids contain more private information about IPO offer price than early bids. As might be expected, both high frequency and medium frequency bidders are better informed than infrequent bidders. We also note interesting differences among bidders from different industries: consistent with the information production or business relation assumption discussed earlier, among those recommended by the lead underwriter, financial firms (FF), fund management firms (FM), trust companies (TC), and institutional investors (II) seem to have a considerable information advantage over insurance companies (IC) and individual investors (ID).

****** Insert Table 11 about here ******

We test the robustness of these results using a probit model in which the left-hand side dependent variable is a dummy variable indicating whether the bid price is above the offer price or not (see panel B). Interestingly, the bid characteristics that were statistically significant in the OLS regression continue to be significant in the probit model. Their signs, however, differ. For example, the proxies for frequent bidders have positive coefficients in panel A but become negative in panel B, which seems rational given that an unreasonably high bid price impairs the efficiency of IPO pricing but increases the likelihood of a bid price above the final offer price. Overall, the signs and significances of the estimated coefficients in both the OLS regressions and probit models strongly suggest that several bidder characteristics, including bidder type and bidder participation frequency, contain private information about IPO pricing.

5.4. Dispersion and First-day Trading Patterns

We first examine the forecasting power of the divergence of opinions among investors on a variety of IPO related characteristics such as first-day turnover, post-issue return volatility, offline oversubscription rate and the likelihood of closing price falling below offer price. Specifically, turnover is defined as the proportion of first-day trading volume to the number of IPO shares offered. Return volatility is calculated as the annualized 30-day volatility of market adjusted returns from the IPO listing date. Offline oversubscription is defined as the natural logarithm of the ratio of total offline subscription from institutional investors divided by the number of shares allocated to institutional investors. The FBO dummy is an indicator variable that takes on a value of one if the first-day closing price falls below the offer price and otherwise 0. As discussed before, the premarket divergence of opinions among bidders captures a unique component of *ex ante* uncertainty about an issue. Following this logic, we expect that issues with a higher level of divergence of opinion exhibit both greater first-day turnover and greater one-month return volatility. In contrast, we expect that the dispersion measure should have a negative impact on offline oversubscription rate in the sense that valuation uncertainty and estimation risk will reduce the market demand. Also, we expect that the dispersion measure should have a negative impact on the likelihood of the closing price falling below the offer price since the valuation uncertainty will tend to discount the offer price and the binding short-sale constraints on the first trading day will tend to raise the closing price *ex-ante*.

****** Insert Table 12 about here ******

Table 12 reports the regression results on the predictive power of the premarket divergence of opinions among bidders for subsequent IPO fist-day turnover, one-month return volatility, offline oversubscription rate and the likelihood of closing price below offer price, respectively. As before, we use the same set of control variables and include industry and year fixed effects for all regressions. Specifications (1) to (3) use ordinary least squares (OLS) regressions while Specification (4) employs a probit model using the FBO dummy as dependent variable. Consistent with expectations, our results reveal that divergence of opinions among investors is positively and significantly related to first-day turnover and post-issue return volatility. Our results also indicate that, on average, issues with greater divergence of opinions about their quality are less oversubscribed from offline bidders and are less likely to have a first-day closing price fall below its offer price. In terms of economic magnitude, we find that a one standard deviation increase in the dispersion measure increases the first-day turnover and one month post-issue return volatility by 2.39% and 8.85% from their mean values, respectively. Likewise, holding other control variables constant, a one percent increase in the dispersion measure decreases the oversubscription rate by 2.71% and the likelihood of closing price falling below offer price by 0.79%. This is both economically and practically significant.

In sum, our findings suggest that our measure of premarket divergence of opinions among bidders also has strong predictive power in determining other IPO related characteristics such as first-day turnover ratio, one-month post-issue return volatility, offline oversubscription rate and the likelihood of closing price falling below offer price.

6. Conclusions

This study explores the information content of institutional bids using a large and proprietary sample of Chinese IPO data that contains unique and detailed information on bids and allocations from July 2009 through November 2012. We find that institutional bid dispersion is positively related to IPO first-day returns by discounting the offer price as a compensation for investors' bearing valuation uncertainty and estimation risk. Trade turnover is negatively predictive of IPO firms' operating performance one year post IPO and stock returns three months post IPO, suggesting that the bids of institutional investors carry private information about IPO valuations. Our baseline results remain robust for alternative dispersion measures and to using IV regressions that control for the endogeneity problem by instrumenting bidder opinion divergence as the ratio of the lead underwriter's IPO valuation range to its midpoint as well as to the natural experiment of a November 2010 regulatory change in the share allocation process. We further find that this latter shift from a *pro rata* to a lottery rule has a significant impact on dispersion: in the post-reform period, institutional investors bid with more information, resulting in a stronger relation between institutional dispersion and IPO underpricing. Our research thus not only sheds new light on the efficiency of the IPO allocation process in China but highlights the importance of institutional factors and regulatory reforms in the IPO market of the world's largest emerging economy.

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Appendix A: Variable Definitions

Variables	Definition
Panel A: Measure of dispersion	
Dispersion Measure (STD)	Defined as the ratio of the cross-sectional standard deviation of institutional investors' pre-IPO bidding price to the absolute value of the mean bidding price.
Dispersion Measure (STD weighted)	Dispersion in institutional investors' bidding price weighted by their bidding volumes.
Dispersion Measure (MAD)	Defined as the mean absolute deviation of the bidding price surrounding the mean bidding price scaled by the mean bidding price.
Panel B: IPO and firm characteristics	
First-day Return	Defined as the ratio of the closing price of the stock on its first trading day less the offer price to its offer price.
Turnover	The proportion of trading volume to the number of IPO shares.
FBO dummy	An indicator variable equal to one if the IPO first day closing price falls below the offering price.
Return Volatility	Annualized 30-day volatility of market adjusted returns from the IPO listing date.
Firm age	Log (# of years between founding and offering).
Firm size	Log (Pre-issue book value of total assets in Millions RMB Yuan).
Offer size	Log (# of shares offered times offer price in Millions RMB Yuan).
Time gap	Log (1+ # of days between listing and offering).
ROE	Return on equity calculated for the latest fiscal year prior to IPO.
Index return	One month market return prior to IPO.
Oversubscription	Log (ratio of total offline subscription from institutional investors divided by the number of shares allocated to institutional investors).
Log # Institutions	Log (1+ # of institutional participants).
VC/PE dummy	An indicator variable equal to one if the firm is backed by VC or PE, and zero otherwise.
Allocation dummy	An indicator variable equal to one if the IPO filing date is later than 5 November 2010 when the CSRC changed the offline IPO share allocation rule from pro rata basis to lottery basis.
Lockup dummy	An indicator variable equals to one if the IPO filing date is after 25 May 2012 when the CSRC removed the three-month lockup period provision imposed on the institutional participants in the offline shares subscription.
ChiNext dummy	An indicator variable equal to one if the firm is listed in the Shenzhen ChiNext Board and zero if it is listed in the SME Board.
Lead reputation (#)	Log (1+total number of IPOs the lead underwriter has managed prior to the current IPO).
Panel C: Bidder and bid characteristics	
Bid price inaccuracy	% difference between bid price and offer price.
Distance	Log (average of flight distance between bidder and IPO firm and average flight distance between bidder and all other

	bidders).
Distance (alternative)	Log (average of Euclidian distance between bidder and IPO firm and average Euclidian distance between bidder and all other bidders based on their geographical coordinates)
Largest (2^{nd} largest) bid	A dummy variable that takes on a value of one if the bid size is in the fourth (third) size quartile within an IPO.
Early (Late) bid	A dummy variable that equals to one if the bid submission time falls in the first (fourth) quartile within an IPO.
High (Medium) frequency	A dummy variable set to one if total # of IPOs the bidder participated in is in the third (second) quartile during full sample period.
Bidder type	Dummy variables indicating bidder type: Brokerage firms (BF), fund management (FM), financial firms (FI), trust companies (TC), insurance companies (IC), qualified foreign institutional investors (QF), individual bidders (ID) and institutional bidders (II) independently recommended by the lead underwriter.

Table 1: Descriptive Statistics. This table summarizes our IPO sample, which consists of 783 Chinese IPOs listed in Shenzhen SME Board or Shenzhen ChiNext Board between 10 July 2009 and 2 November 2012. Panel A reports mean, median, standard deviation, 10^{th}, 25^{th}, 75^{th}, and 90^{th} percentile of the main variables used in this paper. Panel B reports the Spearman correlation matrix where ***, **, and * indicate 1%, 5%, and 10% statistical significance levels respectively.

Panel A: Summary Statistics

Variable	N	Mean	Median	SD	P10	P25	P75	P90
Initial return	783	0.3684	0.2719	0.4540	-0.0374	0.0768	0.5236	0.8547
Turnover	783	0.7101	0.7700	0.2039	0.3600	0.6300	0.8500	0.8900
STD	783	0.1557	0.1516	0.0336	0.1172	0.1330	0.1737	0.2022
MAD	783	0.1228	0.1202	0.0278	0.0903	0.1041	0.1383	0.1607
Firm age (Log)	783	1.8899	2.1058	0.7520	0.7747	1.3641	2.4122	2.7188
Offer size (Log)	783	6.4992	6.4378	0.6049	5.8171	6.0808	6.8416	7.2714
Time gap (Log)	783	2.4850	2.4849	0.2515	2.1972	2.3026	2.6391	2.7726
ROE	783	0.2370	0.2237	0.1220	0.1113	0.1620	0.2887	0.3632
Index return %	783	-0.2970	-0.3088	7.5257	-8.8330	-6.0113	4.8580	9.6056
Oversubscription (Log)	783	3.3804	3.4898	1.1758	1.7750	2.5055	4.3037	4.8250
Log # institutions	783	4.1662	4.1744	0.4636	3.5264	3.8067	4.5433	4.7791
VC/PE dummy	783	0.4994	0	0.5003	0	0	1	1
Allocation dummy	783	0.5236	1	0.4998	0	0	1	1
Lockup dummy	783	0.0830	0	0.2761	0	0	0	0
ChiNext dummy	783	0.4534	0	0.4981	0	0	1	1
Lead reputation	783	3.5230	3.9703	1.2949	1.6094	2.5649	4.5850	4.8283

Panel B: Spearman Correlation Matrix

ID	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Initial return	1.00													
2	STD	-0.01	1.00												
3	Firm age	-0.05	-0.08**	1.00											
4	Offer size	-0.27***	-0.05	-0.14***	1.00										
5	Time gap	0.16***	0.15***	-0.18***	0.09**	1.00									
6	ROE	-0.20***	0.01	-0.05	0.05	-0.16***	1.00								
7	Index return %	0.47***	-0.06	-0.01	0.03	0.12***	-0.14***	1.00							
8	Oversubscription	0.48***	-0.13***	-0.25***	0.06*	0.30***	-0.25***	0.13***	1.00						
9	Log # institutions	0.44***	-0.17***	-0.24***	0.23***	0.25***	-0.27***	0.16***	0.88***	1.00					
10	VC/PE dummy	-0.02	-0.09***	-0.02	0.02	-0.02	-0.07**	0.04	-0.04	-0.03	1.00				
11	Allocation dummy	-0.37***	-0.15***	0.35***	-0.19***	-0.47***	0.21***	-0.22***	-0.73***	-0.68***	0.06*	1.00			
12	Lockup dummy	-0.16***	-0.07**	0.17***	-0.19***	-0.12***	0.12***	-0.09***	-0.13***	-0.14***	0.04	0.29***	1.00		
13	ChiNext dummy	-0.03	-0.10***	0.00	-0.27***	-0.03	0.16***	0.00	-0.09**	-0.19***	0.14***	0.14***	0.06*	1.00	
14	Lead reputation	-0.13***	-0.12***	0.08**	0.05	-0.11***	0.06*	-0.03	-0.22***	-0.18***	0.13***	0.24***	0.10***	0.01	1.00

Figure 1: Number of IPOs and Average Underpricing. This figure depicts the number of IPOs and average underpricing on a quarterly basis for our full IPO sample which consists of 783 firms listed in Shenzhen SME board or the ChiNext board during the period of 2009Q3 to 2012Q4. The blue bars show the number of IPOs for each quarter and the red line shows the quarterly average IPO underpricing.

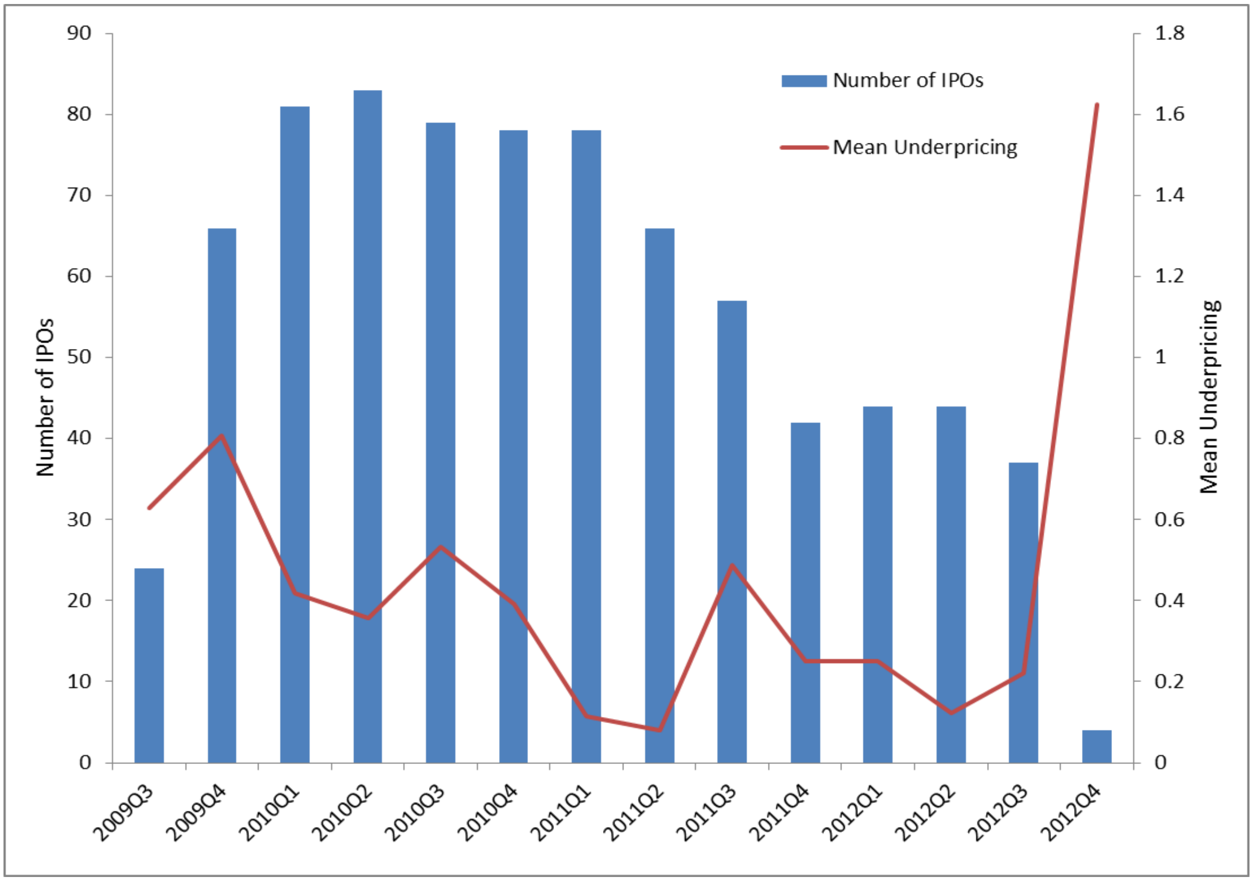

Table 2: Impact of Opinion Dispersion on Offer Price, First-day Closing Price and Underpricing – Baseline Regression. The dependent variable are the offer price (1), first-day closing price (2) and IPO first-day return (3), defined as the ratio of the closing price of the stock on its first trading day less the offer price to its offer price. The variable of interest is dispersion measure *STD* defined as the ratio of the cross-sectional standard deviation of institutional investors' bidding price in the offline subscription process to the mean bidding price. Variable definitions are given in Appendix A. Reported are coefficients and *t*-value calculated using the industry clustered standard errors. ***, **, and * indicate 1%, 5%, and 10% statistical significance levels respectively.

	Offer price	First-day Closing price	Underpricing
	(1)	(2)	(3)
STD	-24.4284*	-10.8202	1.5737***
	(-2.18)	(-1.09)	(4.93)
Firm age	0.7853	1.2757*	0.0079
	(1.23)	(2.08)	(0.77)
offer size	12.2120***	11.2396***	-0.2129***
	(19.88)	(12.84)	(-15.36)
Time gap	-0.3808	1.8457	0.1043***
	(-0.31)	(0.68)	(3.56)
ROE	28.4994***	39.4188***	0.0245
	(25.00)	(17.13)	(0.86)
INDEX21_shenA	-0.0322**	0.4541***	0.0213***
	(-2.52)	(19.93)	(16.64)
Oversubscription	-0.1422	1.9116***	0.1414***
	(-0.56)	(5.04)	(6.31)
Log # institutions	4.5183***	9.0264***	0.1310***
	(13.32)	(12.18)	(6.31)
VC/PE dummy	0.0655	0.1107	-0.0071
	(0.06)	(0.12)	(-0.34)
Allocation dummy	1.8077**	5.9966***	0.2291***
	(2.22)	(3.96)	(17.44)
Lockup dummy	-0.8586	-2.7209	-0.0839
	(-0.88)	(-1.14)	(-1.32)
ChiNext dummy	7.5146***	8.7562***	-0.0676***
	(13.92)	(18.03)	(-3.28)
Lead reputation	-0.0845	-0.3859	0.0070
	(-0.40)	(-1.12)	(1.60)
Constant	-74.0747***	-92.3623***	0.2402
	(-10.20)	(-6.71)	(1.61)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
N	783	783	783
adj. R^2	0.446	0.416	0.384

Table 3: Dispersion and IPO Underpricing – Instrumental Variable Approach. This table reports results from 2SLS instrumental variable regressions, where the relative ratio of lead underwriter's IPO valuation range to the midpoint of valuation range, i.e., $2 \times (\frac{Prc_H - Prc_L}{Prc_H + Prc_L})$ is used as an instrumental variable for the bidding price dispersion, i.e. *STD*, defined as the ratio of the cross-sectional standard deviation of institutional investors' bidding price in the offline subscription process to the mean bidding price. The dependent variable is the IPO initial return, defined as the ratio of the closing price of the stock on its first trading day less the offer price to its offer price. Variable definitions are given in Appendix A. Reported are coefficients and *t*-value calculated using the industry clustered standard errors. ***, **, and * indicate 1%, 5%, and 10% statistical significance levels respectively.

Panel A: First-stage regression Dependent variable: STD		*Panel B: Second-stage regression* Dependent variable: First-day return	
Price band ratio	0.0545***		
	(6.97)		
		Fitted STD	6.8883***
			(5.89)
Firm age	-0.0012**	Firm age	0.0122
	(-2.26)		(1.10)
Offer size	-0.0042**	Offer size	-0.1882***
	(-2.46)		(-15.11)
Time gap	0.0123***	Time gap	0.0307
	(6.11)		(1.72)
ROE	0.0013	ROE	0.0182
	(0.19)		(0.79)
INDEX21_shenA	-0.0004***	INDEX21_shenA	0.0235***
	(-8.09)		(28.70)
Oversubscription	-0.0091***	Oversubscription	0.1907***
	(-5.58)		(14.52)
Log # institutions	-0.0246***	Log # institutions	0.2573***
	(-7.48)		(6.05)
VC/PE dummy	-0.0020	VC/PE dummy	0.0044
	(-1.37)		(0.18)
Allocation dummy	-0.0288***	Allocation dummy	0.3829***
	(-10.05)		(10.22)
Lockup dummy	0.0001	Lockup dummy	-0.0828
	(0.04)		(-1.27)
ChiNext dummy	-0.0093***	ChiNext dummy	-0.0170
	(-11.36)		(-0.53)
Lead reputation	-0.0025***	Lead reputation	0.0207***
	(-7.92)		(3.19)
Constant	0.3057***	Constant	-1.4056***
	(20.35)		(-3.52)
Industry FE	Yes	Industry FE	Yes
Year FE	Yes	Year FE	Yes
N	783	*N*	783
adj. R^2	0.246	adj. R^2	0.376

Table 4: Alternative Dispersion Measures and IPO Underpricing. The dependent variable is the IPO initial return, defined as the ratio of the closing price of the stock on its first trading day less the offer price to its offer price. The variables of interest are the alternative dispersion measures *MAD* and *STD weighted*, where *MAD* is defined as the mean absolute deviation of the bidding price surrounding the mean bidding price scaled by the mean bidding price and *STD weighted* is calculated as the biding price dispersion among institutional investors weighted by their bidding volume. Variable definitions are given in Appendix A. Reported are coefficients and *t*-value calculated using the industry clustered standard errors. ***, **, and * indicate 1%, 5%, and 10% statistical significance levels respectively.

	Dependent variable: First-day return			
	(1)	(2)	(3)	(4)
MAD	2.0272***	1.9612***		
	(4.86)	(4.46)		
STD weighted			1.4750***	1.4530***
			(4.84)	(4.71)
Firm age	0.0153	0.0081	0.0160	0.0085
	(1.01)	(0.79)	(1.05)	(0.84)
Offer size	-0.2140***	-0.2128***	-0.2163***	-0.2148***
	(-14.53)	(-15.96)	(-14.33)	(-15.95)
Time gap	0.1240**	0.1044***	0.1280**	0.1076***
	(3.06)	(3.51)	(3.03)	(3.49)
ROE	-0.0211	0.0248	-0.0270	0.0193
	(-0.77)	(0.90)	(-0.99)	(0.63)
INDEX21_shenA	0.0211***	0.0213***	0.0210***	0.0213***
	(19.86)	(16.65)	(20.06)	(16.89)
Oversubscription	0.1417***	0.1408***	0.1422***	0.1415***
	(5.71)	(6.30)	(5.60)	(6.19)
Log # institutions	0.1855***	0.1350***	0.1725***	0.1219***
	(4.85)	(6.43)	(4.15)	(5.21)
VC/PE dummy	-0.0036	-0.0070	-0.0045	-0.0083
	(-0.15)	(-0.33)	(-0.18)	(-0.38)
Allocation dummy	0.1711***	0.2288***	0.1686***	0.2280***
	(4.39)	(16.13)	(4.46)	(17.48)
Lockup dummy	-0.1158*	-0.0867	-0.1138*	-0.0831
	(-2.13)	(-1.37)	(-2.06)	(-1.30)
ChiNext dummy	-0.0644**	-0.0682***	-0.0625**	-0.0658***
	(-2.98)	(-3.30)	(-3.03)	(-3.29)
Lead reputation	0.0093	0.0077	0.0082	0.0067
	(1.65)	(1.73)	(1.42)	(1.48)
Constant	-0.1492	0.2230	-0.0667	0.3079**
	(-1.07)	(1.51)	(-0.43)	(2.32)
Industry FE	No	Yes	No	Yes
Year FE	No	Yes	No	Yes
N	783	783	783	783
adj. R^2	0.379	0.385	0.377	0.383

Table 5: Dispersion and IPO Underpricing – Cross-sectional Analysis. This table reports regression results using subsamples based on offer size, time gap and lead underwriter reputation respectively. The dependent variable is the IPO initial return, defined as the ratio of the closing price of the stock on its first trading day less the offer price to its offer price. The variable of interest is dispersion measure *STD* defined as the ratio of the cross-sectional standard deviation of institutional investors' bidding price in the offline subscription process to the mean bidding price. Variable definitions are given in Appendix A. Reported are coefficients and *t*-value calculated using the industry clustered standard errors. ***, **, and * indicate 1%, 5%, and 10% statistical significance levels respectively.

	Dependent variable: First-day return					
	Offer Size		Time Gap		Underwriter Reputation	
	Small	Large	Short	Long	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)
STD	1.5751***	0.8507***	2.2730***	0.5274*	2.6365***	0.9433***
	(3.91)	(4.97)	(4.11)	(2.12)	(4.47)	(3.37)
Firm age	-0.0003	0.0194***	-0.0126	0.0139	0.0242	-0.0009
	(-0.01)	(3.18)	(-0.73)	(1.31)	(1.19)	(-0.07)
Offer size	-0.5993***	-0.0283	-0.1974***	-0.2566***	-0.3038***	-0.1494***
	(-6.92)	(-1.61)	(-9.83)	(-6.54)	(-10.25)	(-8.48)
Time gap	0.2011***	0.0090	-0.3300***	0.0774	0.0880	0.0685**
	(7.11)	(0.18)	(-3.61)	(0.92)	(0.89)	(2.44)
ROE	-0.1501**	0.0344	0.0954*	-0.0959**	0.2779**	-0.1135*
	(-2.47)	(1.04)	(1.90)	(-2.33)	(2.46)	(-2.20)
INDEX21_shenA	0.0279***	0.0152***	0.0219***	0.0187***	0.0198***	0.0223***
	(9.69)	(22.59)	(24.76)	(9.37)	(11.52)	(16.57)
Oversubscription	0.1635***	0.0952***	0.1683***	0.1082***	0.1924***	0.0625**
	(3.28)	(22.91)	(9.72)	(3.57)	(7.75)	(2.53)
Log # institutions	0.1632***	0.1273***	0.1575***	0.1459***	0.2057***	0.1621***
	(3.61)	(5.06)	(4.40)	(7.18)	(4.82)	(3.22)
VC/PE dummy	-0.0282	0.0001	-0.0249	-0.0047	-0.0414**	0.0140
	(-0.78)	(0.01)	(-0.99)	(-0.21)	(-2.62)	(0.39)
Allocation_ dummy	0.3685***	0.1123***	0.1739***	0.3263***	0.2638***	0.2298***
	(12.07)	(4.11)	(11.14)	(12.48)	(9.02)	(14.65)
Lockup dummy	-0.0366	-0.0823**	-0.0565	-0.2215***	-0.0190	-0.1770**
	(-0.58)	(-2.89)	(-0.77)	(-5.47)	(-0.27)	(-3.05)
ChiNext dummy	-0.1425***	-0.0297	-0.1257***	-0.0319	-0.1521***	0.0059
	(-4.37)	(-1.25)	(-7.92)	(-1.41)	(-4.57)	(0.28)
Lead reputation	0.0389***	-0.0110**	0.0214***	-0.0077	0.0589***	-0.0156
	(7.81)	(-2.54)	(4.34)	(-0.47)	(4.51)	(-1.64)
Constant	2.3038***	-0.5130*	0.7093***	0.9742***	-0.2811	0.3455*
	(4.25)	(-2.11)	(4.63)	(3.94)	(-1.43)	(1.89)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	393	390	493	290	397	386
adj. R^2	0.428	0.387	0.385	0.407	0.373	0.455

Table 6: Dispersion and IPO Underpricing by Bidder Category. The dependent variable is the IPO initial return. The variable of interest is the dispersion measure STD defined as the ratio of the cross-sectional standard deviation of institutional investors' bidding price in the offline subscription process to the mean bidding price. We calculate bidding price dispersion for each different type of institutional investors separately. Specifically, STD_BF is the dispersion measure calculated among domestic brokerage firms; STD_FM is the dispersion measured using only fund management firms; STD_FF is calculated among financial firms; STD_TC refers to the dispersion among trust companies; STD_IC is measured using insurance companies only; and STD_QF is the dispersion measured among qualified foreign institutional investors (QFIIs). Variable definitions are given in Appendix A. Reported are coefficients and t-value calculated using the industry clustered standard errors. ***, **, and * indicate 1%, 5%, and 10% statistical significance levels respectively.

	Dependent variable: First-day return					
	(1)	(2)	(3)	(4)	(5)	(6)
STD_BF	1.4043***					
	(9.65)					
STD_FM		1.1918***				
		(4.27)				
STD_FF			0.6083*			
			(2.16)			
STD_TC				0.2672		
				(1.71)		
STD_IC					0.0745	
					(0.96)	
STD_QF						0.0486
						(0.16)
Firm age	0.0053	0.0089	0.0100	0.0088	-0.0268***	0.0254
	(0.45)	(0.97)	(0.66)	(0.86)	(-3.37)	(0.43)
Offer size	-0.2176***	-0.2111***	-0.2258***	-0.2229***	-0.2289***	-0.1278
	(-16.83)	(-14.66)	(-15.95)	(-17.26)	(-29.33)	(-0.95)
Time gap	0.1021***	0.1290***	0.1124***	0.1287***	-0.2101***	0.3824**
	(3.80)	(4.80)	(3.79)	(4.40)	(-7.59)	(2.75)
ROE	0.0314	0.0170	-0.0172	-0.0104	0.0813*	-0.6813
	(1.11)	(0.53)	(-0.54)	(-0.37)	(1.88)	(-1.34)
INDEX21_shenA	0.0214***	0.0212***	0.0210***	0.0208***	0.0233***	0.0300**
	(19.44)	(16.65)	(12.76)	(16.72)	(25.83)	(3.29)
Oversubscription	0.1369***	0.1394***	0.1476***	0.1350***	0.1920***	0.3244***
	(7.24)	(5.97)	(4.33)	(5.30)	(8.10)	(7.50)
Log # institutions	0.1268***	0.1227***	0.0942**	0.1120***	0.0542*	0.5607**
	(6.03)	(6.58)	(2.30)	(3.61)	(2.06)	(2.86)
VC/PE dummy	-0.0062	-0.0082	-0.0157	-0.0227	-0.0554***	0.1248
	(-0.29)	(-0.37)	(-0.66)	(-1.03)	(-4.63)	(0.97)
Allocation dummy	0.2088***	0.2346***	0.1943***	0.1978***	0.1745***	-0.0018
	(18.53)	(15.96)	(9.62)	(14.03)	(10.20)	(-0.01)
Lockup dummy	-0.0796	-0.0917	-0.1513***	-0.1261*	0.0282	0.0000
	(-1.34)	(-1.54)	(-4.06)	(-1.84)	(0.71)	(.)
ChiNext dummy	-0.0848***	-0.0769***	-0.0820***	-0.0710**	0.2287	0.0636
	(-3.44)	(-3.73)	(-3.19)	(-2.84)	(1.07)	(0.57)
Lead reputation	0.0048	0.0063	0.0044	0.0045	0.0242***	-0.0009
	(1.05)	(1.71)	(0.82)	(1.11)	(6.97)	(-0.04)
Constant	0.3552**	0.2835	0.5906***	0.5770***	1.1869***	-4.2271*
	(2.78)	(1.70)	(4.63)	(5.04)	(6.56)	(-2.17)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	783	783	709	730	414	86
adj. R^2	0.384	0.383	0.374	0.377	0.341	0.321

Table 7: Impact of Share Allocation Reform on Dispersion. This table presents regression results on the impact of share allocation reform on the divergence of opinions about an IPO among institutional bidders. Panel A reports summary statistics of main variables before and after the share allocation reform by the CSRC in 5 November 2010 and compares the mean differences. Panel B reports the regression results. The dependent variable is the dispersion measure *STD*, which is defined as the ratio of the cross-sectional standard deviation of institutional investors' bidding price in the offline subscription process to the mean bidding price. The variable of interest is the *Allocation dummy*, which equals to one if the IPO filing date is after than 5 November 2010 when the CSRC changed the offline IPO share allocation rule from a pro-rata system to a lottery system. We use baseline regression specifications and variable definitions are given in Appendix A. Reported are coefficients and *t*-value calculated using the industry clustered standard errors. ***, **, and * indicate 1%, 5%, and 10% statistical significance levels respectively.

Panel A: Impact of Share Allocation Reform on Dispersion - Univariate Tests

	Allocation Dummy = 0 (Pro-rata basis)		Allocation Dummy = 1 (Lottery basis)		0 vs. 1 (Pro-rata vs. Lottery)	
	N	Mean	N	Mean	Diff	T-stat
IPO Initial Return	373	0.5024	410	0.2465	-0.2559	-8.21***
STD	373	0.1609	410	0.1510	-0.0099	-4.16***
Firm age	373	1.6203	410	2.1351	0.5147	10.17***
Offer size	373	6.6104	410	6.3979	-0.2125	-4.98***
Time gap	373	2.5977	410	2.3824	-0.2153	-13.23***
ROE	373	0.2160	410	0.2561	0.0401	4.65***
Index return (%)	373	1.2780	410	-1.7299	-3.0079	-5.70***
Oversubscription	373	4.2545	410	2.5851	-1.6693	-28.14***
Log # institutions	373	4.4937	410	3.8683	-0.6254	-25.51***
VC/PE dummy	373	0.4665	410	0.5293	0.0628	1.76*
ChiNext dummy	373	0.3780	410	0.5220	0.1439	4.08***
Lead reputation	373	3.2946	410	3.7307	0.4361	4.77***

Panel B: Impact of Share Allocation Reform on Dispersion - Multivariate Tests

	Dependent variable: STD			
	(1)	(2)	(3)	(4)
Firm age	-0.0009	-0.0006	-0.0010	-0.0008
	(-1.43)	(-1.45)	(-1.41)	(-1.57)
Offer size	-0.0048***	-0.0047***	-0.0048***	-0.0046***
	(-4.09)	(-4.46)	(-3.20)	(-3.11)
Time gap	0.0151***	0.0147***	0.0141***	0.0138***
	(6.13)	(6.77)	(6.50)	(7.10)
ROE	-0.0004	-0.0013	0.0030	0.0012
	(-0.07)	(-0.23)	(0.53)	(0.19)
INDEX21_shenA	-0.0004***	-0.0004***	-0.0004***	-0.0004***
	(-8.63)	(-9.20)	(-7.08)	(-7.09)
Oversubscription	-0.0089***	-0.0091***	-0.0092***	-0.0093***
	(-5.51)	(-5.87)	(-5.39)	(-5.61)
Log # Institutions	-0.0219***	-0.0209***	-0.0251***	-0.0238***
	(-5.53)	(-6.42)	(-6.07)	(-7.04)
VC/PE dummy	-0.0021	-0.0021	-0.0021	-0.0022
	(-1.50)	(-1.44)	(-1.54)	(-1.52)
Allocation dummy	-0.0339***	-0.0341***	-0.0276***	-0.0289***
	(-16.42)	(-15.78)	(-12.84)	(-9.61)
Lockup dummy	-0.0018	-0.0020	0.0014	-0.0002
	(-0.73)	(-0.83)	(0.57)	(-0.09)
ChiNext dummy	-0.0099***	-0.0095***	-0.0098***	-0.0095***
	(-9.49)	(-11.09)	(-9.66)	(-11.03)
Lead reputation	-0.0026***	-0.0026***	-0.0026***	-0.0026***
	(-7.83)	(-8.26)	(-7.47)	(-8.35)
Constant	0.3054***	0.2883***	0.3280***	0.3097***
	(19.59)	(21.64)	(21.47)	(21.20)
Industry FE	No	Yes	No	Yes
Year FE	No	No	Yes	Yes
N	783	783	783	783
adj. R^2	0.233	0.238	0.234	0.238

Table 8: Share Allocation Reform, Dispersion and IPO Underpricing. The dependent variable is the IPO initial return, defined as the ratio of the closing price of the stock on its first trading day less the offer price to its offer price. The dispersion measure *STD* is defined as the ratio of the cross-sectional standard deviation of institutional investors' bidding price in the offline subscription process to the mean bidding price. *Allocation Dummy* equals to one if the IPO filing date is later than 5 November 2010 when the CSRC changed the offline IPO share allocation rule from pro rata basis to lottery basis. In column (1) we include interaction term between *Dispersion* measure and the *Allocation dummy* in our baseline regression. In column (2), we report baseline regression results using the subsample firms with pro-rata share allocation (i.e., *Allocation dummy* = 0). Results in column (3) describe regression output for subsample firms with lottery share allocation (i.e., *Allocation dummy* = 1). Variable definitions are given in Appendix A. Reported are coefficients and *t*-value calculated using the industry clustered standard errors. ***, **, and * indicate 1%, 5%, and 10% statistical significance levels respectively.

	Dependent variable: First-day return		
	Full Sample	Allocation dummy = 0	Allocation dummy = 1
	(1)	(2)	(3)
STD	0.9593**	0.9903***	2.2825***
	(2.70)	(5.09)	(6.26)
STD × Allocation dummy	1.0917***		
	(4.52)		
Firm age	0.0070	0.0008	0.0073
	(0.66)	(0.05)	(0.79)
Offer size	-0.2153***	-0.2332***	-0.2002***
	(-16.07)	(-11.56)	(-13.15)
Time gap	0.1125***	0.1481***	-0.0452
	(3.81)	(7.13)	(-1.17)
ROE	0.0217	-0.1103***	0.1718***
	(0.78)	(-4.10)	(5.31)
INDEX21_shenA	0.0211***	0.0220***	0.0181***
	(16.81)	(20.14)	(16.18)
Oversubscription	0.1415***	0.1015***	0.1711***
	(6.44)	(6.26)	(7.55)
Log # Institutions	0.1276***	0.2082***	0.1464***
	(6.14)	(6.06)	(4.04)
VC/PE dummy	-0.0049	-0.0014	-0.0254
	(-0.23)	(-0.05)	(-1.55)
Allocation dummy	0.0654		
	(1.78)		
Lockup dummy	-0.0774	0.0000	-0.1163
	(-1.20)	(.)	(-1.58)
ChiNext dummy	-0.0700***	-0.0160	-0.1364***
	(-3.14)	(-0.49)	(-5.42)
Lead reputation	0.0068	0.0010	0.0229***
	(1.46)	(0.16)	(5.81)
Constant	0.3519**	0.2036	0.2748
	(2.49)	(0.93)	(1.71)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
N	783	373	410
adj. R^2	0.385	0.359	0.302

Table 9: Dispersion and Post-IPO Stock Performance. This table reports regression results with post-IPO stock performance measured as the one-, three- and six-month buy and hold returns (BHRs) as dependent variables. BHRs are calculated using monthly stock returns starting from the first month after the IPO listing date. Cumulative abnormal returns (CARs) are measured as the cumulative difference between monthly return of IPO and corresponding monthly return of value-weighted market index. Panel A presents summary statistics of post-IPO stock performance measures. Panel B reports regression results with corresponding stock performance measures as dependent variables. Specifically, the first three columns report results using all sample IPOs. The last six columns reports results using IPOs with and without three-month lockup provision respectively. The variable of interest is dispersion measure *STD* defined as the ratio of the cross-sectional standard deviation of institutional investors' bidding price in the offline subscription process to the mean bidding price. In all regression specifications, we control for firm and issue specific characteristics. However, we don't report their coefficient estimates to save space. Variable definitions are given in Appendix A. Reported are coefficients and *t*-value calculated using the industry clustered standard errors. ***, **, and * indicate 1%, 5%, and 10% statistical significance levels respectively.

Panel A: Summary Statistics of Post-IPO Stock Performance

Variable	N	Mean	Median	SD	P10	P25	P75	P90
BHR_1m	783	-0.62%	-1.72%	15.81%	-18.42%	-11.31%	8.47%	17.96%
BHR_3m	783	-2.58%	-6.22%	21.84%	-26.51%	-17.63%	9.07%	26.46%
BHR_6m	783	-2.07%	-8.81%	29.72%	-34.37%	-22.77%	14.82%	35.54%
CAR_1m	783	-0.60%	-2.36%	12.84%	-13.67%	-8.05%	4.50%	14.58%
CAR_3m	783	-2.43%	-3.90%	17.77%	-23.13%	-13.85%	7.16%	19.61%
CAR_6m	783	-0.58%	-4.02%	23.85%	-29.20%	-17.56%	13.87%	31.20%

Panel B: Impact of Dispersion on Post-IPO Stock Performance

	Full sample IPOs			IPOs with three-month lockup provision			IPOs without three-month lockup provision		
	BHR_1m	BHR_3m	BHR_6m	BHR_1m	BHR_3m	BHR_6m	BHR_1m	BHR_3m	BHR_6m
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
STD	-0.0108	-0.2874**	0.0062	0.0224	-0.3457***	0.0441	-0.2079	0.4062	-0.0883
	(-0.11)	(-2.85)	(0.04)	(0.19)	(-3.29)	(0.42)	(-1.52)	(1.07)	(-0.09)
Market return 1m	1.3131***			1.3230***			1.6429***		
	(30.56)			(33.10)			(5.68)		
Market return 3m		1.2037***			1.1917***			1.3181***	
		(22.87)			(22.57)			(3.86)	
Market return 6m			1.0864***			1.1041***			1.3820***
			(31.45)			(29.82)			(14.85)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	783	783	783	718	718	718	65	65	65
adj. R^2	0.372	0.407	0.366	0.387	0.414	0.373	0.116	0.271	0.261

Table 10: Dispersion and Post-IPO Operating Performance. This table reports regression results with post-IPO operating performance measured as the one-, two- and three-year ROE and ROA as dependent variables. Panel A presents summary statistics of post-IPO operating performance measures. Panel B reports regression results with corresponding operating performance measures as dependent variables. The variable of interest is dispersion measure *STD* defined as the ratio of the cross-sectional standard deviation of institutional investors' bidding price in the offline subscription process to the mean bidding price. Variable definitions are given in Appendix A. Reported are coefficients and *t*-value calculated using the industry clustered standard errors. ***, **, and * indicate 1%, 5%, and 10% statistical significance levels respectively.

Panel A: Summary Statistics of Post-IPO Operating Performance

Variable	N	Mean	Median	SD	P10	P25	P75	P90
ROE_1yr	783	8.21%	7.79%	2.89%	5.20%	6.29%	9.73%	11.62%
ROE_2yr	731	7.68%	7.50%	4.70%	3.18%	5.01%	10.16%	12.75%
ROE_3yr	544	6.45%	6.48%	8.55%	1.50%	3.72%	9.72%	13.28%
ROA_1yr	783	6.64%	6.29%	2.48%	3.95%	5.03%	7.88%	9.46%
ROA_2yr	731	6.03%	5.86%	3.69%	2.36%	3.77%	7.99%	10.20%
ROA_3yr	544	4.99%	4.83%	4.61%	1.06%	2.60%	7.32%	10.03%

Panel B: Impact of Dispersion on Post-IPO Operating Performance

	ROE_1yr	ROE_2yr	ROE_3yr	ROA_1yr	ROA_2yr	ROA_3yr
	(1)	(2)	(3)	(4)	(5)	(6)
STD	-0.0621***	-0.1029	0.0004	-0.0359***	-0.0565	-0.0040
	(-4.63)	(-1.60)	(0.01)	(-4.29)	(-1.23)	(-0.11)
Firm age	0.0005	0.0036**	0.0086***	-0.0003	0.0027**	0.0072***
	(0.90)	(2.53)	(6.25)	(-0.65)	(2.85)	(10.18)
Offer size	0.0085***	0.0107***	-0.0002	0.0087***	0.0100***	0.0075***
	(8.33)	(6.00)	(-0.05)	(11.22)	(9.85)	(4.82)
Time gap	0.0083***	0.0123	0.0423***	0.0083***	0.0114**	0.0299***
	(4.90)	(1.60)	(6.38)	(6.32)	(2.22)	(3.76)
ROE	0.0606***	0.0446***	0.0909***	0.0652***	0.0501***	0.0559***
	(10.41)	(4.20)	(3.55)	(10.61)	(8.26)	(5.83)
Market return 1yr	0.0087			0.0018		
	(1.14)			(0.28)		
Market return 2yr		0.0162***			0.0062**	
		(3.11)			(2.70)	
Market return 3yr			0.0228***			0.0100
			(4.08)			(1.78)
Oversubscription	0.0005	0.0051***	0.0107***	0.0014*	0.0037***	0.0048***
	(0.60)	(3.75)	(4.38)	(2.15)	(3.89)	(3.46)
Log # institutions	-0.0125***	-0.0117	-0.0091*	-0.0056***	-0.0018	0.0006
	(-7.99)	(-1.64)	(-1.81)	(-4.43)	(-0.42)	(0.17)
VC/PE dummy	-0.0047***	-0.0132***	-0.0109***	-0.0040***	-0.0109***	-0.0076***
	(-3.19)	(-7.27)	(-5.54)	(-3.17)	(-7.15)	(-5.68)
Allocation dummy	-0.0014	0.0016	0.0308***	-0.0004	0.0061***	0.0189***
	(-0.32)	(0.84)	(5.22)	(-0.12)	(4.77)	(9.83)
Lockup dummy	-0.0053***	-0.0154**	0.0000	-0.0046**	-0.0140***	0.0000
	(-3.59)	(-2.69)	(.)	(-2.71)	(-4.22)	(.)
ChiNext dummy	-0.0068***	-0.0037	-0.0124***	-0.0002	0.0026	-0.0021
	(-7.29)	(-1.31)	(-3.23)	(-0.15)	(1.35)	(-0.52)
Lead reputation	0.0010*	0.0023	0.0006	0.0011**	0.0018*	0.0014
	(1.89)	(1.68)	(0.33)	(2.41)	(1.80)	(1.31)
Constant	0.0598***	0.0320	-0.0220	0.0027	-0.0313	-0.0939*
	(3.76)	(0.48)	(-0.33)	(0.17)	(-0.78)	(-1.94)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	783	731	544	783	731	544
adj. R^2	0.258	0.098	0.042	0.247	0.101	0.105

Table 11: Bidder Characteristics and Bid Price Accuracy. This table reports results of regression analysis on the determinants of bid price accuracy. Panel A reports estimates of OLS regressions in which the dependent variable is the continuous measure of bid price inaccuracy, defined as the percentage difference between bid price and offer price. Panel B reports estimates of a probit model in which the left-hand side dependent variable is a dummy variable indicating whether the bid price is above offer price or not. Independent variables capture a variety of bidder characteristics such as the size of the bid, the timing of the bid, the participation frequency of the bidder, the type of the bidder as well as the distance measures between bidder and IPO firm and between bidders. We include issue level fixed effects for all specifications. Variable definitions are given in Appendix A. Reported are coefficients and t-values calculated using robust standard errors with clustering on issues. ***, **, and * indicate 1%, 5%, and 10% statistical significance levels respectively.

	Panel A: OLS regression		Panel B: Probit regression	
	Dependent variable: % difference between bid price and offer price		Dependent variable: 1 if bid price > offer price, otherwise 0	
	(1)	(2)	(3)	(4)
Distance	0.0259***		-0.0537***	
	(3.58)		(-3.55)	
Distance (alternative)		0.0270***		-0.0567***
		(4.19)		(-4.22)
Largest bid	0.0006	0.0005	-0.001	-0.0006
	(0.10)	(0.070)	(-0.07)	(-0.04)
Second largest bid	-0.0128	-0.0129	0.0271	0.0273
	(-1.34)	(-1.35)	(1.29)	(1.31)
Early bid	0.0328***	0.0331***	-0.0572***	-0.0577***
	(3.70)	(3.73)	(-3.00)	(-3.03)
Late bid	-0.0441***	-0.0441***	0.0849***	0.0849***
	(-4.82)	(-4.82)	(4.42)	(4.43)
High frequency	-0.0783***	-0.0782***	0.1834***	0.1834***
	(-2.69)	(-2.69)	(2.79)	(2.79)
Medium frequency	-0.0843***	-0.0844***	0.1891***	0.1894***
	(-3.21)	(-3.22)	(3.18)	(3.18)
Type_IC	0.111***	0.112***	-0.2485***	-0.2497***
	(7.49)	(7.50)	(-7.87)	(-7.89)
Type_FF	-0.0668***	-0.0665***	0.1181***	0.1175***
	(-6.57)	(-6.54)	(5.67)	(5.64)
Type_ID	0.0648	0.0657	1.2220***	1.2220***
	(0.37)	(0.38)	(15.48)	(15.52)
Type_FM	-0.0522***	-0.0518***	0.1042***	0.1033***
	(-5.29)	(-5.25)	(4.98)	(4.93)
Type_QF	-0.0641*	-0.0632*	0.1037	0.1018
	(-1.91)	(-1.89)	(1.53)	(1.50)
Type_II	-0.0639***	-0.0629***	0.1470***	0.1448***
	(-3.11)	(-3.07)	(3.28)	(3.28)
Type_TC	-0.119***	-0.119***	0.2487***	0.2491***
	(-10.28)	(-10.29)	(10.42)	(10.43)
Constant	0.704***	0.698***	-0.2608**	-0.2401**
	(12.68)	(13.75)	(-2.22)	(-2.23)
IPO FE	Yes	Yes	Yes	Yes
N	123,819	123,819	123,819	123,819
adj. R2	0.102	0.102	0.091	0.091

Table 12: Dispersion and Other IPO Characteristics. This table reports regression results using *Turnover*, *Return Volatility*, *Offline Oversubscription and the probability of IPO first-day closing price below its offer price (denoted as FBO dummy)* as dependent variables respectively. *Turnover* is defined as the proportion of first-day trading volume to the number of IPO shares offered. *Volatility* is calculated as the annualized 30-day volatility of market adjusted returns from the IPO listing date. *Oversubscription* is defined as the natural logarithm of ratio of total offline subscription from institutional investors divided by the number of shares allocated to institutional investors. *FBO dummy* is an indicator variable that takes on a value of one if the first-day closing price falls below the offer price and otherwise 0. The variable of interest is dispersion measure *STD* defined as the ratio of the cross-sectional standard deviation of institutional investors' bidding price in the offline subscription process to the mean bidding price. Variable definitions are given in Appendix A. Reported are coefficients and *t*-value calculated using the industry clustered standard errors. ***, **, and * indicate 1%, 5%, and 10% statistical significance levels respectively.

	OLS Regression			Probit
	Turnover	Volatility	Oversubscription	FBO dummy
	(1)	(2)	(4)	(3)
STD	0.5043**	0.2545**	-2.7083***	-5.3640***
	(2.80)	(2.30)	(-6.89)	(-7.35)
Firm age	0.0074	0.0038	0.0177*	-0.1332***
	(1.59)	(1.73)	(1.91)	(-3.16)
Offer size	-0.0977***	-0.0386***	-0.2697***	0.6822***
	(-5.97)	(-7.11)	(-16.67)	(4.10)
Time gap	-0.0031	0.0305***	-0.0086	0.4677***
	(-0.11)	(7.56)	(-0.31)	(2.86)
ROE	-0.0137	0.0143***	-0.0163	0.0499
	(-0.27)	(3.39)	(-0.24)	(0.12)
INDEX21_shenA	0.0073***	0.0037***	-0.0058**	-0.1014***
	(28.11)	(9.27)	(-3.03)	(-9.78)
Oversubscription	0.0459***	0.0266***		-0.4708***
	(9.46)	(3.17)		(-6.43)
Log # institutions	-0.0398***	0.0244***	1.6499***	0.1060
	(-4.30)	(3.98)	(44.54)	(1.00)
VC/PE dummy	-0.0093	-0.0020	0.0013	0.1604
	(-0.76)	(-0.40)	(0.03)	(1.22)
Allocation dummy	0.0878***	0.0946**	-0.6851***	-5.1771***
	(3.89)	(2.60)	(-15.63)	(-28.51)
Lockup dummy	0.0373*	-0.0081	0.5105***	0.8663***
	(1.87)	(-0.74)	(9.40)	(4.16)
ChiNext dummy	-0.0172	-0.0155**	0.0958***	0.1445**
	(-1.68)	(-2.69)	(6.09)	(2.49)
Lead reputation	0.0039	0.0016	-0.0163**	-0.0885***
	(1.19)	(1.51)	(-2.72)	(-2.75)
Constant	1.4062***	0.0292	-1.0947***	-10.4677***
	(18.29)	(0.59)	(-4.21)	(-12.65)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	783	783	783	766
adj. R^2	0.215	0.282	0.819	0.376