5-2023

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J. Account. Public Policy 42 (2023) 107054

Contents lists available at ScienceDirect

J. Account. Public Policy

journal homepage: www.elsevier.com/locate/jaccpubpol

Full length article

Friends can help: The effects of relationship in the Chinese book-building process

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ARTICLE INFO

Article history:
Available online 10 January 2023

Keywords:
IPOs
Book-building
Relationship
Collusive bidding
China
G15 G24 G30 M41

ABSTRACT

Using detailed bidding information in Chinese IPO book-building process, we find that institutional investors who have a close relationship with the underwriter are more likely to participate in bidding and their bidding prices are higher, compared to other institutional investors. We also find that related institutional investors bid higher when the underwriter is more likely to need or receive their support. Further analysis suggests that related institutional investors gain some benefits for their support to the underwriter, including receiving more shares in profitable IPOs, better timing their exit from the IPO in the open market, and receiving more optimistic earnings forecasts or stock recommendations from analysts of the underwriter. Regarding the economic consequence, we show that the underwriter is more likely to revise the offer price upward if related institutions bid higher. The evidence overall indicates the existence of relationship-driven bidding in the Chinese book-building process.

1. Introduction

When a firm publicly issues shares for the first time (i.e., an IPO), there is great uncertainty regarding its intrinsic value. The book-building process is widely used to reduce information asymmetry and reveal the true value of the IPO firm. In a typical book-building process, an underwriter collects bids with quantity-price information from institutional investors for the IPO stock. The underwriter then constructs a demand schedule, based on which the underwriter sets the offer price and then distributes shares to institutional investors whose bidding prices are above the offer price.

Many studies have examined the interaction between the underwriter and institutional investors within the book-building process. Some papers (e.g., Benveniste and Spindt, 1989; Ljungqvist and Wilhelm, 2002; Sherman and Titman, 2002; Cornelli and Goldreich, 2003; Bertoni and Giudici, 2014) suggest that the underwriter can motivate institutional investors to provide private information through share allocation. Other studies, however, propose the agency conflict explanations and document that the underwriter may misuse the discretion of price setting and share allocation to benefit some institutional investors (e.g. Loughran and Ritter, 2002; Reuter, 2006; Ritter and Zhang, 2007; Jenkinson and Jones, 2009; Liu and Ritter, 2010; Goldstein et al., 2011; Chemmanur et al., 2018). Our paper follows the stream of agency conflicts.

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https://doi.org/10.1016/j.jaccpubpol.2022.107054
0278-4254/

Nomenclature

Variable	Definition
Bidding variables	
Bid	A dummy variable that equals one if an institutional investor participates in the book building and zero otherwise.
*Optimism*1	An institutional investor's bidding price divided by the middle point of the initial price range in the valuation report.
*Optimism*2	An institutional investor's bidding price divided by the quantity-weighted average bid from all participants.
Optimism_c	The average bidding optimism of institutions at the IPO firm level, measured as the quantity-weighted average bid of all institutions divided by the mid-point of the initial price range in the valuation report minus one.
Relationship variables	
*Relation*1	The trading commissions paid by an institutional investor in the 6-month period before the IPO, scaled by the total trading commission revenue of an underwriter, adjusted by the median value of all institutional investors.
*Relation*2	A dummy variable that equals one if at least one fund manager in the institutional investor has previously worked in the underwriter, and zero otherwise.
*Relation_c*1	The total amount of trading commissions paid by the bidding institutional investors, scaled by the total trading commission revenue of an underwriter.
*Relation_c*2	The natural logarithm of one plus the number of institutional investors who have at least one fund manager previously employed by the underwriter.
Control variables	
Fbig	A dummy variable that equals one if an institution is among the top 10 in terms of assets under management at the end of the quarter prior to the IPO, and zero otherwise.
UWR	A dummy variable that equals one if an underwriter is among the top 10 investment banks in terms of underwriting revenue in the year prior to the IPO, and zero otherwise.
MKT	Market return, calculated as the 10-day cumulative value-weighted market return before the book-building deadline.
NIPO	The natural logarithm of one plus the number of IPOs in the 10-day period before the book building deadline.
OVERSUB	The natural logarithm of the number of shares subscribed divided by the number of shares offered in the offline stage of an IPO.
CV	Standard deviation of all bidding prices from institutional investors, scaled by the mean of bidding prices.
Size	The natural logarithm of total assets of the IPO firm at the beginning of the IPO year.
ROE	Return on equity for the IPO firm at the beginning of the IPO year.
Lev	The ratio of total liabilities over total assets for the IPO firm at the beginning of the IPO year.
Growth	The ratio of revenue growth for the IPO firm in the year prior to the IPO.
DAC_D	A dummy variable that equals one if discretionary accruals of an IPO firm are greater than the median of all sample firms, and zero otherwise. Discretionary accruals are based on the performance-matched modified Jones model in Kothari et al. (2005).
List	A dummy variable that equals one if the IPO firm is listed on SME, and zero otherwise.

However, unlike prior studies, we do not focus on the underwriter's misuse of discretion for the benefit of institutional investors; instead, we explore whether institutional investors who have a close relationship with the underwriter[1] would bid higher to boost the IPO price for the benefit of the underwriter.

Our research question is motivated by the frequently-cited concerns of the regulators, the media and the practitioners on the relationship-driven bidding phenomenon in China. For example, in the press releases, the regulator (China Securities Regulatory Commission, i.e., CSRC) stated that institutional investors should provide bidding prices that fairly represent the intrinsic value of the firm, and any relationship-driven over-bidding should be prohibited. The Department for Investor Protection of the CSRC, in response to investors' inquiries, criticized collusive bidding and emphasized that such behavior should be penalized.[2] At "The Tenth International Forum of Investment Funds", both the head of the Shanghai Stock Exchange and the head of the Shenzhen Stock Exchange criticized the collusive bidding of institutional investors in the IPO process due to relationship effects.[3] In a survey of mutual fund companies conducted by Securities Times, an influential media in China, 48

[1] We refer these institutional investors as "related institutions" or "related institutional investors" thereafter.

[2] See https://www.csrc.gov.cn/pub/newsite/tzzbh/tzzfw/tzzbhtzzwd/201209/t20120903_214397.html.

[3] Mainland China has two stock exchanges: the Shanghai Stock Exchange and the Shenzhen Stock Exchange. Reports on this forum can be found at https://topic.eastmoney.com/FUND2011/.

percent of mutual fund managers indicated that they would bid higher prices for the reason of "give plum in return for peach"[4] or for "relationship or connection".[5] To further restrain collusive bidding, in April 2012, the CSRC released "The Guidelines for Further Deepening the Reform of IPOs" and officially stated that they would tighten the regulation and impose severe punishment to collusive bidding.[6] Despite the abundant anecdote evidence about the relationship-driven bidding phenomenon, no research has investigated this issue. Our study fills this gap by examining the detailed data on institutional investors' bidding behavior in the book-building process. Specifically, we examine whether related institutions are more likely to participate in the IPO bidding process and more importantly, whether related institutions, compared to unrelated institutions, will submit higher bidding prices to push up the offer price.

Underwriting fee is an important source of the revenue for investment banks, thus it is not surprising that investment banks have strong incentive to obtain more underwriting business in the IPO market. In this regard, institutional investors can provide certain help. First, the CSRC sets up a floor for the number of institutional investors that participate in the IPO book-building. The IPO will be discontinued if the number of bidding institutions is lower than the required floor number. Therefore, the underwriter may need more institutions to participate in the bidding to assure the success of IPO. Second, the underwriting fee structure in China is based on the offer price set in the book-building process and the reservation price set by the issuing firm. When the offer price is higher than the reservation price, the underwriter can charge additional incentive fee, which gives the underwriter the incentive to boost the offer price. Also, the ability to issue new shares at higher offer price can enhance the underwriter's reputation and help it gain more underwriting business, from both IPOs and SEOs, in the future. Since the underwriter is required to set the offer price based on institutional investors' bidding prices, the underwriter has strong incentive to request higher bidding prices from institutions.

However, not all institutional investors are willing to provide support to the underwriter. Prior research suggests that the relationship between economic agents can bind their interest and promote the caring for each other's interest, and sometimes induce collusion (e.g., Guan et al., 2016). Therefore, compared to other institutions, related institutions are more likely to form a collusive alliance with the underwriter. We thus predict that related institutions are more likely to participate in the book-building and if they do, they are more likely to bid higher prices to support the underwriter.

Our analysis is executed using a Chinese sample. Since the year of 2010, the CSRC requires underwriters to disclose detailed information, such as investor identities, bidding prices and quantities, to the public, which makes our analysis of institutional investors' bidding behavior feasible. Further, since China is characterized by "Guanxi" (relationship) and weak legal institutions, the relationship likely plays an important role in affecting economic agents' decisions. We hand collect data about the detailed bid information of institutional investors for IPOs launched during the period of November 2010 to April 2012. The relationship between institutional investors and the underwriter can be reflected in many different aspects and we use two proxies to measure the relationship. The first measure is business relationship, which is based on the trading commissions paid by the institutional investor to the underwriter. The second is social relationship, which is based on whether any fund manager of the institutional investor has previously worked for the underwriter. We find evidence consistent with our predictions. For participation likelihood, we find that related institutions are more likely to participate in the book-building process. Among participating institutions, for both the bid level and IPO firm level, we find that related institutions tend to submit higher bidding prices than unrelated institutions. The results suggest that related institutions may bid higher to support the underwriter.

An alternative explanation for the higher bidding from related institutions is that the underwriter may do the favor to related institutions by helping them bid a price above the offer price, so as to allow these institutions to be eligible for the allocation of profitable IPO shares. To distinguish this explanation from our argument, we perform several conditional analyses. We find that related institutions bid higher for IPOs with low profits, in cold market, with poor earnings quality issuers, and with high bargaining power underwriters. The results are much weaker for IPOs with high profits, in hot market, with good earnings quality issuers, or with low bargaining power underwriters. The results are more consistent with our argument that related institutions will provide support to the underwriter in the situations when the underwriter needs their help or has the bargaining power to request their support.

Bidding higher could be costly since related institutions may need to pay a higher price for the IPO shares. Given that the relationship between the underwriter and institutions is often mutually beneficial, we further investigate the possible quid pro quo for related institutions to bid higher. We find that related institutions (1) are allocated more shares from more profitable IPOs; (2) can better time their exit from the IPO in the open market; (3) can receive optimistic earnings forecasts or recommendations from the underwriter's analysts when they bid higher. The evidence suggests that related institutions are paid back for their bidding support to the underwriter.

Finally, we examine the economic consequence of the higher bidding from related institutions. We find that when related institutions bid higher relative to unrelated institutions, the underwriter is more likely to revise the offer price upward. This is consistent with the argument that related institutions will bid higher to help the underwriter boost the offer price. We also find some evidence that bidding optimism of related institutions relates to better stock performance during the lockup period but worse stock performance after the lockup expiration. Moreover, analysts affiliated with the underwriter tend to issue more optimistic forecasts during the lockup period for IPOs with optimistic bidding from related institutions but with poor

[4] This is a Chinese proverb, meaning people exchange gifts.

[5] The report can be found at https://epaper.stcn.com/paper/zqsb/html/2012–01/31/content_338082.html.

[6] See https://www.csrc.gov.cn/pub/newsite/flb/flfg/bmgf/fx/fxycx/201310/t20131016_236307.html.

post-IPO stock performance. These results indicate that related institutions may not incur loss from optimistic bidding, presumably due to the support from affiliated analysts to boost stock price in the lockup period.

Our paper contributes to the literature in the following ways. First, our paper provides new evidence that related institutions may give the favor to the underwriter during the IPO process. Previous studies mainly focus on the underwriter's misuse of its discretion on price setting and share allocation to cater to related institutions (e.g., Reuter, 2006; Jenkinson and Jones, 2009; Goldstein et al., 2011; Chemmanur et al., 2018). Using unique and detailed hand-collected bidding information, we document that the relationship with the underwriter is an important factor in determining institutional investors' bidding behavior, and related institutions will bid higher to support the underwriter. The relationship-driven bidding phenomenon has not been investigated in previous studies, and the finding in this paper can complement our understanding of the role of relationship in IPOs.

Second, the findings have important policy implications for China and potentially other countries. Although the research studying Chinese IPO market has documented information production in the IPO process, our evidence that related institutions may collude with the underwriter and bid higher prices confirms the concerns of the regulators and the practitioners. It enriches the literature on rent seeking during IPOs, and calls for further consideration in improving the design of the IPO process.

The rest of this paper is organized as follows. In Section 2, we provide an overview of China's book-building system and develop the hypotheses. Our data sources, research design and descriptive statistics are presented in Section 3. Our main regression results are discussed in Section 4. Section 5 includes additional analyses and robustness checks. Section 6 examines the economic consequences, and Section 7 concludes.

2. Institutional background and hypothesis development

2.1. The book-building process in China

The Chinese stock market was established in the early 1990s. Since then, the IPO issuance mechanisms have undergone many changes. Initially, the regulator used fixed price-earnings ratio to set the IPO offer price. Before the year of 1998, the offer price for all IPOs needed to achieve a P/E ratio of 15. From 1998 to 2005, the regulator allowed some variations in the price setting, but required a P/E ratio of 20 as the ceiling limit. It is obvious that the fixed P/E ratio method cannot effectively reveal the intrinsic value of IPO firms. To improve the effectiveness of IPO pricing process, the CSRC formally introduced the book-building process, which had been widely used around the world, in January 2005.

The book-building process in China has a number of special features. First, every IPO in China consists of offline rationing and online issuance, similar to the system adopted by the Hong Kong stock market. The offline rationing is only open to institutional investors who take part in the book-building process. The online issuance is open to individual investors and other institutional investors. While the shares available to offline institutional investors in Hong Kong are approximately 90 percent of the total new shares, in mainland China, the ratio was only 20 percent in most cases.[7] The limited number of shares offered offline can generate different incentives for institutional investors in the book-building process. Usually, institutional investors need to devote time and money to collect information about IPO firms, and they will subsequently get paid for such efforts with more shares allocated to them (Ljungqvist and Wilhelm, 2002; Cornelli and Goldreich, 2003; Bertoni and Giudici, 2014). However, in China, the number of shares institutional investors can get may be small, which restricts their incentive to execute research to find the intrinsic value of IPO firms. Thus, bidding prices submitted by institutional investors may not be informative. As Li et al. (2012) document, the dispersion in bids is quite high in China. For instance, among the bids submitted by the forty-two institutions in the book building of Guodian Qingxin Company (Stock code: 002573), the maximum bidding price is RMB67.5, which is four times of the minimum bidding price of RMB17.6. The large variance of bidding prices implies the existence of uninformative bidding.

Second, during our sample period, the new shares in China are allocated through a lottery mechanism. If the new shares are oversubscribed, the shares will be allocated by the lottery process to institutional investors whose bidding prices are higher than the offer price. Under this lottery system, the underwriter does not have the discretion to allocate the shares to institutions, but has the discretion of setting the offer price while the offer price must be set based on institutional investors' bidding prices. The critical influence of bidding prices on the offer price can generate the incentives and provide the room for these two parties to form a collusive alliance.

2.2. Hypothesis development

The literature has explored the dynamics in the standard book-building process of IPO price setting and share allocation. Some studies provide evidence from the information-gathering perspective in that book-building allows the underwriter to obtain information from informed institutional investors. To induce institutions to truthfully reveal information, the under-

[7] The ratio was 20 percent for our sample of IPOs on the SME board and the New Growth Enterprise Board. The ratio was 50 percent for the IPOs on the main board if issuing more than 400,000,000 shares. On April 28, 2012, the CSRC changed its policy and required the shares available to offline rationing be greater than 50 percent of total new shares. The latest regulation issued on December 13, 2013, further increased the percentage to be greater than 60 percent for small issuers and greater than 70 percent for large issuers.

writer offers institutional investors more share allocation when they indicate a willingness to purchase shares at a higher price (Ritter and Welch, 2002). For example, a number of book-building models such as Benveniste and Spindt (1989) and Benveniste and Wilhelm (1990), note that informed investors are given priority in the distribution of shares to reveal what they know to the underwriter. Sherman and Titman (2002) extend the theory and demonstrate that allocation discretion substantially decreases information asymmetry and improves pricing accuracy. Cornelli and Goldreich (2001, 2003), and Ljungqvist and Wilhelm (2002) provide empirical support for the predictions in these models. Research studying Chinese IPO market has also explored the information revelation mechanisms in the IPO process. For example, Gao et al. (2020) document that the offer price reflects the mean valuation of the typical investor rather than the opinion of optimistic investors, Cao et al. (2016) find bid dispersion can predict post-IPO stock return, and Jia et al. (2019) find that analysts produce useful information in their pre-IPO coverage.

Other studies offer agency conflict explanations for IPO price setting and share allocation. For example, Baron (1982) proposes that because the issuer cannot monitor the underwriter without cost, the issuer would permit some underpricing in price setting. Aggarwal et al. (2002) find that relative to individual investors, institutions are more favored in IPO allocation. Along this line, the relationship between participants involved in the book-building process and its impact on share allocation have received a lot of research attention. For example, Loughran and Ritter (2004) find that the underwriter allocates more hot and underpriced IPOs to institutional investors with whom they have a good relationship. Liu and Ritter (2010) find that the issuers whose top executives receive a hot IPO allocation are less likely to switch underwriters in the follow-on share offering. In addition, a few studies find that the underwriter may sacrifice the issuer's interests for the trading commissions from institutional investors. Reuter (2006) documents that the more commissions investors pay to the lead underwriter, the more shares of a hot IPO they receive. Consistent evidence is also reported in the survey study by Jenkinson and Jones (2009), who reports that the brokerage relationship with the underwriter is perceived to be the most important factor influencing share allocation. Besides share allocation, recent studies using Chinese data also examine the impact of business relationship on the underwriter's discretion on price setting. Chemmanur et al. (2018) find that Chinese IPO underwriters, with no discretion to allocate shares to favored investors, can favor commission-paying mutual funds by discounting offer prices to distribute the money left on the table to these investors. The evidence collectively indicates that granting discretion to the underwriter in the book-building process can create conflicts of interest and induce opportunistic behavior from the underwriter.

Despite the well-documented evidence on underwriters' role in the IPOs, the behavior of another important group of participants, i.e., institutional investors, largely remains unexplored. Also, prior studies basically show that the underwriter would take advantage of its discretion to benefit institutional investors, but whether institutional investors can also provide support for the underwriter is not clear. Given the importance of institutional investors' bidding on price setting and the IPO issuance, this lack of research results in an incomplete picture regarding the dynamics of the IPO process. Motivated by the abundant anecdote evidence about the relationship-driven bidding as discussed in the Introduction section, our study intends to investigate such bidding behavior of institutional investors. Specifically, our paper studies whether the relationship with the underwriter may induce collusive bidding from institutional investors in order to support the underwriter.

Underwriting fee is an important revenue source for investment banks, thus investment banks have incentives to obtain more underwriting business in IPOs. In this regard, institutional investors can provide certain help. First, the underwriter may need the support from institutions to assure the success of IPO issuance. The CSRC sets up a threshold for the number of institutional investors that participate in the IPO bidding. The IPO will be discontinued if this threshold requirement is not satisfied. Actually, two IPOs not meeting this requirement were discontinued in the year of 2012. Therefore, meeting this minimum participation requirement is necessary for the underwriter to earn the underwriting fee and maintain its reputation. The underwriter may need institutional investors to participate in the bidding process and submit their bids.

Second, the underwriter has incentive to set the offer price higher. One reason is that the amount of underwriting fee in China is determined by the offer price set in the book-building process and is more performance-related. The fee usually consists of two parts: the underwriter first charges a fixed underwriting fee; if the offer price is larger than the reservation price set by the issuer, the underwriter also charges a variable fee as a percentage of total IPO proceeds. The higher the offer price, the more proceeds the IPO can raise, thus the more variable fee the underwriter can earn. Based on the information from the largest commercial database in China, WIND, the variable part of underwriting fee can be as high as 13 percent of the IPO proceeds. The performance-based fee structure can generate a strong incentive for the underwriter to boost the offer price. Another important reason is that the reputation of issuing new shares at higher price can help the underwriter grab more underwriting business, both from IPOs and SEOs, in the future. Previous studies find that underwriters who issue IPO shares for lower prices will lose IPO market in the future (Dunbar, 1999) and their IPO clients are also more likely to switch to other underwriters for SEOs (Krigman et al., 2001).

Despite the incentive for price-boosting, the underwriter is constrained in setting the offer price because the CSRC requires that the underwriter should set the offer price based on the bidding prices submitted by institutional investors who participate in the book-building.[8] As a result, the level of offer price the underwriter can choose is determined by the level of bidding prices submitted by institutional investors. If bidding prices are low, the underwriter can only set a low offer price

[8] See, for example, "Administration Measures on Securities Issuance and Underwriting" (CSRC, 2006) and "Decision on Amending the Measures for the Administration of Securities Offering and Underwriting" (CSRC, 2010).

accordingly. In contrast, if bidding prices are relatively high, the underwriter is able to set the offer price at a higher level. Therefore, if the underwriter wants to set a higher offer price, requesting higher bidding prices from institutional investors is a convenient way. This is also consistent with the anecdotal evidence that some institutional investors received calls from the underwriter requesting to raise the bidding prices.[9]

Not all institutional investors are willing to provide the support to the underwriter, however, the relationship with the underwriter may incentivize institutional investors to do so. The relationship between economic agents can bind their interest and promote the caring for each other's interest, and the 'cozy' relationship can affect the agents' decision making and sometimes induce collusion. For example, prior research has documented business relationship or social relationship can affect auditors' audit quality (Guan et al., 2016), behaviors of analysts and mutual funds (Gu et al., 2019), firms' tax avoidance (Ling et al., 2017) and the underwriters' share allocation (Loughran and Ritter, 2004). Therefore, compared to other institutions, the institutions having a close relationship with the underwriter are more likely to form a collusive alliance with it. Moreover, different from other countries, the number of shares available in the offline rationing in China only accounts for 20 percent of total new shares, while the underwriting fee is based on the issuance proceeds of total new shares, which implies the majority of the cost due to increased offer price is born by unrelated institutions and individual investors. Although related institutions also have to pay more with higher offer price, the increased cost for them may be relatively small if considering the increased gain for the underwriter. This can further provide room for the underwriter and related institutions to collude in order to grab money from other investors, especially individual investors.

We predict that related institutions are more likely to participate in the book-building and if they do, are more likely to bid higher prices in favor of the underwriter. Our hypothesis is formally stated as follows:

Hypothesis: Ceteris paribus, related institutional investors are more likely to participate in the IPO bidding and more likely to submit higher bidding prices.

Several factors can potentially work against finding results for the higher bidding submitted by related institutions. First, bidding higher prices can increase the cost for institutional investors because they may have to buy the stock at the higher offer price. Second, besides setting a higher offer price to increase revenue and build up reputation, the underwriter may also have incentive to set a lower price to leave more money on the table for related institutions, and the underwriter can capture part of the money through future service commissions. Therefore, it is an empirical question whether related institutions would submit higher bidding prices than other investors.

3. Data and research design

3.1. Sample and data source

Our data period starts in November 2010 because the CSRC issued a new regulation to require IPO issuers and underwriters to disclose detailed information about institutional investors' bids during the book-building process. We hand collect institutional investors' bid data from the IPO firm filings of "Outcomes on Offline Rationing". We restrict our sample to IPOs on the SME board and the New Growth Enterprise Board (ChiNext) during the period of November 2010 to April 2012.[10,11]After deleting observations with missing values, we obtain a final sample of 291 IPOs and a total of 4774 bidding observations. Pre-IPO financial data and trading data in the secondary market come from the China Stock Market and Accounting Research (CSMAR) database. We obtain fund managers' work experience by reading their CVs downloaded from the CSMAR and WIND databases. The size of institutional investors is hand-collected from the quarterly reports of Asset Management Association of China. The WIND database provides the remaining data, such as brokerage fees.

3.2. Research design

3.2.1. Proxies for relationship

The relationship between institutional investors and the underwriter can be reflected in many different aspects. We capture the relationship from two aspects: business relationship and social relationship.

First, in China the underwriters are also brokerage firms and have various business with institutional investors (mostly mutual funds). For example, institutional investors need to rent seats in brokerage houses to execute trading, rely on the underwriters as the dominant channel to market their new funds, and also need the analysts from brokerage firms to cover the stocks they hold. Following Reuter (2006), our proxy for business relationship (*Relation*1) is based on trading commission

[9] See the article at https://m.nbd.com.cn/articles/2011–03-25/544133.html.

[10] The CSRC modified the rules on offline rationing in May 2012. The shares available to offline rationing increased from 20 percent of the newly issued shares to more than 50 percent. The number of shares for offline rationing might affect the cost associated with heightened offer price born by related institutions and thus their incentives to submit higher bidding prices. Therefore, we choose the period ending in April 2012 to ensure the consistency of offline rationing requirements during the sample period. In November 2012, the CSRC suspended the approval of all IPOs. Our results remain the same after including the 30 IPOs between May 2012 and November 2012.

[11] For IPOs on the SME board and ChiNext, it is a one-stage bidding process and the offer price is determined after the underwriter receives the bidding information. In contrast, for IPOs on the main board, it is a two-stage bidding process. The first stage is used to determine a price range, and the second stage is used to determine the offer price. We do not include IPOs on the main board because the two-stage bidding process makes the analysis more complicated. Also, the main board has different requirement for the percentage of new shares available for offline rationing.

information. Under the requirements of the China Security Law, fund management firms have to rent trading seats from brokerage firms in order to execute trading. These rents are paid as trading commissions. The selection of a broker and thus the payment of trading commissions can capture the closeness of business relationship between the fund management firm who is a potential bidding institution and the broker who can serve as an IPO underwriter. To construct the measure, we calculate the percentage of the trading commissions paid by an institution over the underwriter's total trading commission revenue in the 6-month period before the IPO,[12] and adjust it with the median percentage of all institutional investors. *Relation*1 measures whether an institutional investor allocates more commission fees to the underwriter relative to the average level. Higher value of *Relation*1 indicates closer relationship between the institutional investor and the underwriter. Although *Relation*1 is calculated based on the benefit flowing from the institution to the underwriter, as the relationship between the institution and the underwriter is often mutually beneficial, this measure can still capture the business relationship between them.

Second, the typical career path of a fund manager in China involves a few years of work in a brokerage firm as an analyst (An, 2012). Shared work experience plays a significant role in forming social connection, because social relations of dependence, nurturance, and mutual aid are cultivated and proactively maintained in workplaces (Peterson, 1985; McPherson et al., 2001). Marks (1994) reports that working in the same workplace can foster close relationships that go well beyond mere friendliness because of the frequent dyadic contact, easy access to each other and mutual recognition. We thus construct a measure of social relationship (*Relation*2) based on past work experience. We define *Relation*2 as an indicator equal to one if at least one fund manager in the institution has previously worked for the underwriter, and zero otherwise.

3.2.2. Bidding participation

We first examine whether the relationship with an underwriter affects the likelihood of an institutional investor to participate in the book-building of an IPO. We use the following Logit model:

$$\begin{aligned} Bid = {} & \alpha_0 + \alpha_1 Relation1(Relation2) + \alpha_2 Fbig + \alpha_3 UWR + \alpha_4 MKT + \alpha_5 NIPO + \alpha_6 Size + \alpha_7 ROE + \alpha_8 Lev + \alpha_9 Growth \\ & + \alpha_{10} DAC\_D + \alpha_{11} List + Year + Industry + Institution \end{aligned} \quad (1)$$

The dependent variable (*Bid*) takes the value of one if an institutional investor submits a bid for an IPO, and zero otherwise. *Relation*1 (*Relation*2) is our measure of relationship as discussed above. The analysis is performed at the bid level (i.e. each bid from an institution is treated as an observation). The coefficient α_1 in Equation (1) captures the effect of the relationship between an institution and the underwriter (*Relation*1 or *Relation*2) on the likelihood of the institution to participate in the book-building process (*Bid*).

Following prior research (e.g., Liu et al., 2011; Yu et al., 2013), we include a set of control variables. *Fbig* is the dummy variable measuring the size of an institutional investor, and equals one if the institution is among the top 10 in terms of the size of assets managed at the end of the quarter prior to the IPO and zero otherwise. *UWR* measures the underwriter's reputation, and equals one if an underwriter is among the top 10 investment banks in terms of underwriting revenue in the year prior to the IPO and zero otherwise. We construct two measures of market conditions before the IPO. *MKT* is calculated as the cumulative 10-day value-weighted market return before the book-building deadline. *NIPO* reflects the number of IPOs in the 10-day period before the book-building deadline, and is logarithm transformed. We also control the financial characteristics of IPO firm in the year prior to the IPO, including firm size (*Size*, logarithm of total assets), profitability (*ROE*, return on equity), leverage (*Lev*, the ratio of total liability over total assets), growth (*Growth*, the rate of revenue growth), and indicator for poor earnings quality (*DAC_D*, equals one if the discretionary accruals estimated from the performance-matched modified Jones model is greater than the sample median and zero otherwise). In addition, we control stock exchange the IPO firm will be listed, *List*, equal to one if an IPO is listed on the SME and zero otherwise. Finally, we control year, industry and institution fixed effects.

3.2.3. Bidding optimism

Bid level analysis.

To test whether related institutions are more likely submit higher bidding prices, we estimate the following model at the bid level for the sample of bidding institutional investors:

$$\begin{aligned} Optimism1(Optimism2) = {} & \beta_0 + \beta_1 Relation1(Relation2) + \beta_2 Fbig + \beta_3 UWR + \beta_4 MKT + \beta_5 NIPO + \beta_6 OVERSUB \\ & + \beta_7 CV + \beta_8 Size + \beta_9 ROE + \beta_{10} Lev + \beta_{11} Growth + \beta_{12} DAC\_D + \beta_{13} List + Year \\ & + Industry + Institution \end{aligned} \quad (2)$$

The dependent variable is the level of bidding price, *Optimism*1 or *Optimism*2, scaled by different benchmarks. *Optimism*1 is calculated as the institutional investor's bidding price deflated by the midpoint of the initial price range in the valuation report.[13] *Optimism*2 is calculated as the institutional investor's bidding price deflated by quantity-weighted average of the bids

[12] If an institutional investor does not pay any trading commissions to an underwriter, the percentage is set to be zero.

[13] Some institutions submitted different bidding prices for an IPO firm. For instance, ICBCCS submitted three different bids for the Dahuanong IPO (CODE: 300186) underwritten by China Merchants Security. If there are several bids from one institution, we use the demand quantity for each bidding price as the weight to calculate the weighted average bidding price for this institution.

from all institutional investors. The coefficient β_1 in Equation (2) captures the effect of the relationship (*Relation*1 or *Relation*2) on bidding optimism (*Optimism*1 or *Optimism*2). In Equation (2), we further control investor sentiment in the IPO process by over-subscription rate (*OVERSUB*) which is the logarithm of the number of shares subscribed divided by the number of shares offered, and bidding dispersion (*CV*) which is measured as the standard deviation of all bidding prices, standardized by the mean of bidding prices. Other controls are defined in Section 3.2.2.

IPO firm level analysis.

In addition to the analysis at the bid level, we also examine the effect of the relationship on bidding prices at the IPO firm level. Specifically, we run the following regression:

$$Optimism\_c = \theta_0 + \theta_1 Relation\_c1(Relation\_c2) + \theta_2 UWR + \theta_3 MKT + \theta_4 NIPO + \theta_5 OVERSUB + \theta_6 CV + \theta_7 Size + \theta_8 ROE + \theta_9 Lev + \theta_{10} Growth + \theta_{11} DAC\_D + \theta_{12} List + Year + Industry \quad (3)$$

Optimism_c is bidding optimism at the IPO firm level, measured as the quantity-weighted average bid of all institutions divided by the middle point of the initial price range in the valuation report minus one. The measures of the institution-underwriter relationship at the IPO firm level are *Relation_c*1 and *Relation_c*2. *Relation_c*1 is measured as the total amount of trading commissions from all institutional investors that submit bids, scaled by the underwriter's total commission revenue in the 6-month period before the IPO. *Relation_c*2 is measured as the logarithm of one plus the number of institutional investors who have at least one fund manager previously employed by the underwriter. These two variables measure the average relationship of all bidding institutions with the underwriter. The coefficient θ_1 in Equation (3) captures the firm level effect of the relationship (*Relation_c*1 or *Relation_c*2) on the level of bidding prices (*Optimism_c*). Other control variables are the same as discussed above.

3.3. Descriptive statistics

Table 1 presents summary statistics of main variables. We observe that the mean value of *Bid* is 0.269, indicating that 26.9 percent of institutional investors participate in the book-buildings. Among the institutions bidding in the IPOs, *Optimism*1 has a mean of 0.845, suggesting that the average bid from individual institutions is equal to 84.5 percent of the middle point of the initial price range in the underwriter's valuation report; *Optimism*2, which scales the bid from individual institution by the quantity-weighted average bid from all institutions, has a mean close to 1 by definition. The firm level optimism (*Optimism_c*) has a mean of −0.179, indicating that the weighted-average of bidding prices is 17.9 % less than the mid-point of the initial price range, consistent with the bid level statistic. The mean of *Relation*1 suggests that the deviation of a single institution's trading commissions from the median is 1.3 percent of the underwriter's total commission revenue. The mean of

Table 1
Summary Statistics of Main Variables. This table presents the summary statistics of main variables. The sample of 17,768 observations includes 17,768 IPO-institutions as the units of analysis, the sample of 4774 observations includes 4774 bids as the units of analysis, and the sample of 291 observations includes the 291 IPOs as the units of analysis. The sample period is from November 2010 to April 2012. The variables are defined in Appendix A.

Variable	N	Mean	Std. Dev.	Q3	Median	Q1
Bidding variables						
Bid	17,768	0.269	0.443	1.000	0.000	0.000
*Optimism*1	4774	0.845	0.217	0.987	0.836	0.686
*Optimism*2	4774	0.995	0.136	1.089	1.004	0.905
Optimism_c	291	−0.179	0.182	−0.073	−0.187	−0.311
Relationship variables						
*Relation*1	4774	0.013	0.023	0.021	0.008	0.000
*Relation*2	4774	0.099	0.299	0.000	0.000	0.000
*Relation_c*1	291	0.357	0.149	0.444	0.339	0.249
*Relation_c*2	291	0.683	0.727	1.386	0.693	0.000
Relation_c2_unlogged	291	1.615	2.107	3.000	1.000	0.000
Control variables						
Fbig	4774	0.335	0.472	1.000	0.000	0.000
UWR	291	0.405	0.492	1.000	0.000	0.000
MKT	291	−0.006	0.040	0.023	−0.007	−0.039
NIPO	291	2.406	0.390	2.639	2.398	2.303
NIPO_unlogged	291	10.856	4.016	13.000	10.000	9.000
OVERSUB	291	2.603	0.776	3.178	2.618	2.008
OVERSUB_unlogged	291	18.159	15.101	24.000	13.710	7.450
CV	291	6.934	1.423	7.770	6.846	5.901
Size	291	19.872	0.737	20.290	19.779	19.384
Size_unlogged (RMB million)	291	576.606	554.264	648.440	388.802	262.020
ROE	291	0.292	0.097	0.373	0.273	0.234
Lev	291	0.447	0.153	0.561	0.444	0.333
Growth	291	0.355	0.261	0.478	0.315	0.175
DAC_D	291	0.502	0.500	1.000	1.000	0.000
List	291	0.478	0.500	1.000	0.000	0.000

*Relation*2 is 0.099, suggesting that about 10 percent of institutions have fund managers previously working for the underwriter. On the IPO firm level, the commissions paid by bidding institutions account for 35.7 percent of the underwriter's total commission revenue (*Relation_c*1), and approximately 2 related institutions take part in the IPO (*Relation_c2_unlogged*).

The control variables are mostly on the IPO firm level except the indicator for big institution (*Fbig*) which is on the bid level. The mean of *Fbig* indicates that about 33.5 percent of bidding institutions are among the top 10 in terms of assets under management. As for IPO firm level variables, 40.5 percent of IPOs (*UWR*) are underwritten by a reputable underwriter, average 10-day market return before the book-building deadline is slightly negative (*MKT*), the IPO market is hot as there are on average 10 IPOs within this 10-day period (*NIPO_unlogged*), an IPO is on average over-subscribed by 18.159 times of the offered shares (*OVERSUB_unlogged*), the average standard deviation of all bidding prices is 6.934 (*CV*), the mean value of total assets (*Size_unlogged*) at the beginning of the IPO year is RMB576.6 million, the average pre-IPO performance (*ROE*) is 0.292, the average of *Lev* is 0.447, *Growth* has a mean of 35.5 percent, and slightly less than half of the IPOs are listed on the SME (47.8 percent).

4. Empirical results

4.1. Bidding participation

By estimating the Logit model in Equation (1), we examine whether the likelihood of bidding participation is affected by the relationship between the institutional investor and the underwriter. The results are presented in Table 2. The coefficients of both measures of relationship, *Relation*1 and *Relation*2, are positive and significant, suggesting that related institutions are more likely to participate in the book-building process.

4.2. Bidding optimism

4.2.1. Bid level analysis

Panel A of Table 3 shows the results from estimating Equation (2). The model tests the effect of relationship on bidding price at the bid level. The dependent variable is the deviation in an institutional investor's bidding price from the middle

Table 2
The Effect of Relationship on Bidding Participation. This table reports the results of estimating the effect of the relationship on bidding participation. The sample includes 17,768 IPO-institution observations within the period from November 2010 to April 2012. Variables are defined in Appendix A. The z-values (in parenthesis) are based on standard errors clustered by industry. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)
	Bid	*Bid*
*Relation*1	7.238***	
	(10.87)	
*Relation*2		0.244***
		(4.79)
Fbig	1.328***	1.470***
	(6.10)	(4.75)
UWR	−0.021	−0.022
	(-0.22)	(-0.23)
MKT	3.131***	3.122***
	(3.38)	(3.38)
NIPO	0.072	0.069
	(0.77)	(0.75)
Size	−0.014	−0.013
	(-0.15)	(-0.14)
ROE	0.180	0.175
	(0.71)	(0.68)
Lev	−0.643	−0.660*
	(-1.62)	(-1.70)
Growth	−0.035	−0.039
	(-0.24)	(-0.27)
DAC_D	−0.010	−0.009
	(-0.16)	(-0.16)
List	−0.030	−0.030
	(-0.63)	(-0.64)
Constant	−0.345	−0.255
	(-0.20)	(-0.14)
Year, Industry and Institution	Yes	Yes
N	17,768	17,768
Pseudo R^2	0.072	0.070

Table 3
The Effect of Relationship on Bidding Optimism.

Panel A: Bid level analysis
This panel reports the regression results from estimating the effect of relationship on bidding optimism. The sample includes 4774 bid level observations within the period from November 2010 to April 2012. Variables are defined in Appendix A. The *t*-values (in parenthesis) are based on standard errors clustered by industry. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)	(3)	(4)
	*Optimism*1	*Optimism*1	*Optimism*2	*Optimism*2
*Relation*1	0.162**		0.165***	
	(2.50)		(4.68)	
*Relation*2		0.061***		0.019**
		(5.40)		(2.52)
Fbig	0.042***	0.039***	−0.005	−0.006
	(3.81)	(3.52)	(-0.36)	(-0.45)
UWR	0.030	0.028	−0.004	−0.004
	(1.48)	(1.37)	(-0.71)	(-0.83)
MKT	0.052	0.032	−0.086	−0.092*
	(0.21)	(0.13)	(-1.61)	(-1.71)
NIPO	0.110***	0.107***	0.011	0.010
	(4.04)	(3.89)	(1.59)	(1.39)
OVERSUB	0.083***	0.086***	−0.008**	−0.007**
	(3.36)	(3.53)	(-2.15)	(-2.03)
CV	0.031***	0.031***	0.003*	0.003*
	(3.13)	(3.07)	(1.90)	(1.86)
Size	−0.005	−0.004	0.002	0.002
	(-0.27)	(-0.23)	(0.91)	(1.02)
ROE	−0.012*	−0.014**	0.006**	0.005*
	(-1.90)	(-2.18)	(2.21)	(1.96)
Lev	0.053	0.051	−0.019*	−0.020*
	(0.54)	(0.53)	(-1.68)	(-1.80)
Growth	−0.076	−0.072	0.004	0.005
	(-1.53)	(-1.45)	(0.41)	(0.49)
DAC_D	0.017	0.017	−0.002	−0.002
	(1.31)	(1.34)	(-0.40)	(-0.43)
List	−0.011	−0.010	0.008	0.009
	(-0.44)	(-0.44)	(0.95)	(0.98)
Constant	0.372	0.356	0.884***	0.879***
	(1.11)	(1.07)	(16.42)	(16.31)
Year, Industry and Institution	Yes	Yes	Yes	Yes
N	4774	4774	4774	4774
Adj. R^2	0.369	0.375	0.085	0.087

Panel B: IPO firm level analysis
This panel reports the regression results from estimating the effect of relationship on bidding optimism at the IPO firm level. The sample includes 291 IPOs within the period from November 2010 to April 2012. Variables are defined in Appendix A. The *t*-values (in parenthesis) are based on robust standard errors. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)
	Optimism_c	*Optimism_c*
*Relation_c*1	0.192***	
	(2.94)	
*Relation_c*2		0.062***
		(5.31)
UWR	0.015	−0.009
	(0.84)	(-0.53)
MKT	0.062	0.019
	(0.28)	(0.09)
NIPO	0.080***	0.065***
	(3.54)	(2.96)
OVERSUB	0.083***	0.110***
	(6.18)	(8.92)
CV	0.031***	0.030***
	(4.89)	(4.86)
Size	−0.019	−0.013
	(-1.09)	(-0.74)
ROE	0.000	0.000
	(0.34)	(0.35)
Lev	0.126*	0.099
	(1.71)	(1.39)

Table 3 (*continued*)

Panel B: IPO firm level analysis

This panel reports the regression results from estimating the effect of relationship on bidding optimism at the IPO firm level. The sample includes 291 IPOs within the period from November 2010 to April 2012. Variables are defined in Appendix A. The *t*-values (in parenthesis) are based on robust standard errors. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)
Growth	−0.086**	−0.064*
	(-2.19)	(-1.69)
DAC_D	0.007	0.005
	(0.44)	(0.28)
List	0.000	0.005
	(0.00)	(0.24)
Constant	−0.477	−0.606*
	(-1.39)	(-1.82)
Year and Industry	Yes	Yes
N	291	291
Adj. R^2	0.415	0.455

point of initial price range in valuation report (*Optimism*1), or from the quantity-weighted average bid of all participating institutions (*Optimism*2). The key independent variable, *Relation*1, has positive and significant coefficients of 0.162 (*Optimism*1) and 0.165 (*Optimism*2). This indicates that when the institution is closely related to the underwriter in terms of trading commissions, it tends to submit higher bidding price. If we assume that institutions with *Relation*1 in the top decile of distribution are related institutions, the coefficients suggest that their bidding prices are higher by RMB0.32 (*Optimism*1) or RMB0.27 (*Optimism*2) per share.[14] *Relation*2 is also positively and significantly related to bidding price, suggesting that the institution having fund managers previously employed by the underwriter is more likely to bid higher. The magnitude of coefficients indicates that related institutions' bidding prices are higher by RMB1.86 (*Optimism*1) or RMB0.48 (*Optimism*2) per share.[15] Overall, the results in Panel A of Table 3 suggest that related institutional investors are more likely to submit higher bidding prices.

4.2.2. IPO firm level analysis

Panel B of Table 3 reports the effect of the institution-underwriter relationship at the IPO firm level. *Optimism_c* captures the firm level bidding optimism relative to the mid-point of initial price range. *Relation_c*1 and *Relation_c*2 measure the average institution-underwriter relationship at the IPO firm level, based on trading commissions and past work experience, respectively. Consistent with the findings from the bid level analysis, the coefficients of *Relation_c*1 and *Relation_c*2 are significantly positive. The results suggest that when participating institutional investors are on average more closely related to the underwriter, the average bidding price at the IPO firm level is higher.

Overall, the findings at the IPO firm level and at the bid level are both consistent with our prediction on the effect of the relationship with the underwriter on institutional investors' bidding prices. In the following conditional analyses, since the conditional variables are measured at the IPO firm level, we focus on the IPO firm level to perform these analyses.

4.2.3. Conditional analyses

The above results suggest that related institutions support the underwriter by bidding higher prices. However, there is an alternative explanation. During our sample period, the new shares in China are allocated by lottery to institutional investors whose bidding prices are above the offer price. If the underwriter can provide information about the IPO and help related institutions to bid a price above the offer price, related institutions are more likely to be eligible for the lottery and thus get the new shares. This argument may imply that related institutions on average bid higher prices than unrelated institutions. In contrast to our argument that related institutions provide support to the underwriter, this alternative explanation implies the underwriter provides support to related institutions.

We note that our argument and the alternative explanation are not exclusive to each other and can co-exist in the IPO market. Since institutions and the underwriter have a close relationship, in some IPOs the benefit may flow from institutions to the underwriter while in other IPOs the benefit may flow from the underwriter to institutions.

To distinguish these two explanations and provide further support to our argument, we perform several conditional analyses. First, the alternative explanation assumes that institutions would compete for the new shares, therefore it will predict the existence of bidding optimism when IPOs are more attractive or profitable. In contrast, our argument predicts the existence of bidding optimism when IPOs are less attractive or profitable, and therefore the underwriters need the support from

[14] The mean of *Relation*1 for institutions in the top decile of *Relation*1 is 0.064. Therefore, the coefficients can be translated into RMB0.32 higher (=0.162*0.064*30.51, where 30.51 is the sample mean of the mid-point of the initial price range), or RMB0.27 higher (=0.165*0.064*25.15, where 25.15 is the sample mean of the quantity-weighted average bid).

[15] RMB1.86 is calculated using the coefficient 0.061 multiplied by 30.51 (i.e., the sample mean of the mid-point of the initial price range), and RMB0.48 is calculated by multiplying the coefficient of 0.019 with 25.15 (i.e., the sample mean of the quantity-weighted average bid).

related institutions. We use 1) IPO profitability, 2) market condition at IPOs, 3) earnings quality of issuers as conditional variables, and examine the optimism of related institutions in different conditions. Second, the direction of favor between the underwriter and institutional investors may depend on the bargaining power of the underwriter. The alternative explanation predicts bidding optimism when the underwriter has relatively low bargaining power, and therefore has incentive to cater to related institutions' need; by contrast, our argument predicts bidding optimism when the underwriter has strong bargaining power, and therefore related institutions have stronger incentive to support it. We perform a conditional analysis based on the size of underwriters as large underwriters have higher bargaining power than small underwriters.

To execute the conditional analyses, we partition our sample in the following ways: (1) IPO profitability: an IPO with cumulative market-adjusted return in the 3-month lockup period higher than the sample median is classified as high profit IPO, otherwise it is classified as low profit IPO; (2) IPO market: if the 10-day cumulative market return before an IPO's book-building deadline is higher than the sample median, the IPO is classified as hot market IPO, otherwise it is classified as cold market IPO; (3) Earnings quality of issuers: if discretionary accruals of an issuer calculated from performance-matched modified Jones model is higher than the sample median, then the IPO is classified as IPO with poor earnings quality issuer; otherwise, it is classified as IPO with good earnings quality issuer; (4) Underwriter bargaining power: if the underwriter is among the top 10 investment banks in terms of underwriting revenue in the year prior to the IPO, then the IPO is classified as IPO with high bargaining power underwriter, otherwise it is classified as IPO with low bargaining power underwriter.

We estimate Equation (3) in each subsample formed according to these four partitioning approaches and present the results in Table 4. In Columns (1) and (2), the relationship is measured using trading commissions (*Relation_c*1). We find that related institutions bid significantly higher for IPOs with low profits (Panel A), in cold market (Panel B), with poor earnings quality issuers (Panel C), or with high bargaining power underwriters (Panel D); however, related institutions show no optimism in their biddings for IPOs with high profits, in hot market, with good earnings quality issuers, or with low bargaining power underwriters. The evidence is consistent with our argument that related institutions will submit higher bidding prices to support the underwriter, and is inconsistent with the alternative argument.

In Columns (3) and (4), the relationship is measured using past work experience (*Relation_c*2) and the results are mixed. We find that related institutions bid significantly higher for IPOs with low profits (Panel A), in cold market (Panel B), with poor earnings quality issuers (Panel C), or with high bargaining power underwriters (Panel D). However, related institutions also bid significantly higher for IPOs with high profits (Panel A), or with good earnings quality issuers (Panel C).[16] Thus, the results provide weak support for our argument when the relationship is measured using past work experience.

Overall, the results suggest that higher bidding from related institutions is more consistent with our argument that related institutions provide support to the underwriter than the alternative argument that the underwriter caters to related institutions. This can alleviate the concern that our results are driven by the alternative explanation.

5. Additional analyses and robustness checks

5.1. Quid pro quo for related institutional investors

Our argument and evidence suggest that related institutions will boost up the offer price for the benefit of the underwriter. This may bring cost for related institutions. We note that the cost may not be high for two reasons. First, related institutions may not need to buy the new shares, or only need to buy a small number of shares, because the new shares are allocated by lottery. Second, the number of new shares available for offline rationing is only 20 percent of total shares issued, thus the number of shares allocated to related institutions, if any, could be small. Given that the underwriting fee is based on all the shares issued, and only a small part of the cost is born by related institutions, bidding up the offer price likely creates the opportunity for the underwriter and related institutions to grab the money from other investors.

Nonetheless, given the relationship between institutional investors and the underwriter is often mutually beneficial, it is still important to understand how related institutions can benefit if they bid higher prices to favor the underwriter. Although some benefits that related institutions (or their fund managers) receive could be under the table and thus unidentifiable, to complete the loop in terms of the quid pro quo, we explore the possible benefits that the underwriter can provide to related institutions from three aspects: (1) whether related institutions can receive more shares from more profitable IPOs? (2) whether related institutions can better time their exit from the IPO in the open market? (3) whether related institutions who bid higher in the IPO receive more optimistic forecasts or recommendations from the underwriter's analysts?

5.1.1. Can related institutions receive more shares in more profitable IPOs?

As discussed above, the new shares are allocated to institutions by lottery. Although the underwriter has no discretion of allocation, it can affect the share allocation by setting the offer price just below related institutions' bidding prices and help them enter the lottery process. Thus, one potential benefit that related institutions can receive is getting more new shares in more profitable IPOs.

To examine whether this is the case, we partition our IPO sample into two subsamples based on cumulative market-adjusted return in the 3-month lockup period. Then, for related institutions (Column (1)) and unrelated institutions (Column

[16] This suggests that the alternative argument may hold in some situations.

Table 4
Conditional Analyses: The Effect of Relationship on Bidding Optimism. This table reports the results from estimating the effect of relationship on bidding optimism in subsamples formed according to different conditional variables. The total sample includes 291 IPOs within the period from November 2010 to April 2012. Variables are defined in Appendix A. The *t*-values (in parenthesis) are based on robust standard errors. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Panel A: High/low profit IPOs
The IPO with cumulative market-adjusted return over the 3-month lockup period higher than the sample median is classified as high profit IPO; otherwise it is classified as low profit IPO.

	(1) *Optimism_c*	(2) *Optimism_c*	(3) *Optimism_c*	(4) *Optimism_c*
	Low profit IPOs	*High profit IPOs*	*Low profit IPOs*	*High profit IPOs*
*Relation_c*1	0.385***	0.080		
	(2.94)	(1.11)		
*Relation_c*2			0.078***	0.056***
			(4.21)	(3.50)
Controls	Yes	Yes	Yes	Yes
Year and Industry	Yes	Yes	Yes	Yes
N	146	145	146	145
Adj. R^2	0.512	0.352	0.553	0.396

Panel B: Hot/cold market IPOs
If the 10-day cumulative value-weighted market return before an IPO's book building deadline is higher than the sample median, the IPO is classified as hot market IPO; otherwise, it is classified as cold market IPO.

	(1) *Optimism_c*	(2) *Optimism_c*	(3) *Optimism_c*	(4) *Optimism_c*
	Cold market IPOs	*Hot market IPOs*	*Cold market IPOs*	*Hot market IPOs*
*Relation_c*1	0.307***	0.110		
	(2.82)	(1.19)		
*Relation_c*2			0.092***	0.046
			(2.60)	(1.12)
Controls	Yes	Yes	Yes	Yes
Year and Industry	Yes	Yes	Yes	Yes
N	146	145	146	145
Adj. R^2	0.393	0.402	0.458	0.433

Panel C: Good/poor earnings quality issuers
If discretionary accruals of an IPO firm calculated from performance-matched modified Jones model is higher than the sample median, then it is classified as poor earnings quality issuer; otherwise, it is classified as good earnings quality issuer.

	(1) *Optimism_c*	(2) *Optimism_c*	(3) *Optimism_c*	(4) *Optimism_c*
	Poor earnings quality issuers	*Good earnings quality issuers*	*Poor earnings quality issuers*	*Good earnings quality issuers*
*Relation_c*1	0.294**	0.151		
	(2.12)	(0.65)		
*Relation_c*2			0.052**	0.068***
			(2.57)	(4.03)
Controls	Yes	Yes	Yes	Yes
Year and Industry	Yes	Yes	Yes	Yes
N	146	145	146	145
Adj. R^2	0.432	0.359	0.431	0.423

Panel D: High/low bargaining power underwriters
If an underwriter is among the top 10 investment banks in terms of underwriting revenue in the year prior to the IPO, the IPO by this underwriter is classified as high bargaining power underwriter group; otherwise, it is classified as low bargaining power underwriter group.

	(1) *Optimism_c*	(2) *Optimism_c*	(3) *Optimism_c*	(4) *Optimism_c*
	High bargain power underwriters	*Low bargain power underwriters*	*High bargain power underwriters*	*Low bargain power underwriters*
*Relation_c*1	0.508***	0.049		
	(4.18)	(0.62)		
*Relation_c*2			0.081***	0.036
			(5.56)	(1.55)
Controls	Yes	Yes	Yes	Yes
Year and Industry	Yes	Yes	Yes	Yes
N	118	173	118	173
Adj. R^2	0.542	0.377	0.485	0.470

Table 5
Comparison of the Number of Shares Received by Related and Unrelated Institutions. This table compares the shares received by related institutions from the IPOs, as a percentage of their bidding quantities, with the shares received by unrelated institutions. We partition the sample into two subsamples based on the cumulative market-adjusted return in the 3-month lockup period. *High profit IPOs* are those with return above the sample median, and *Low profit IPOs* are those with return equal to or below the sample median. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

	Number of shares received / Bidding quantities			
			Differences	
	(1) Related institutions	(2) Unrelated institutions	(1) – (2)	*T*-value
Panel A: Related institutions classified by trading commissions				
High profit IPOs	4.35 %	2.87 %	1.48 %	2.24**
Low profit IPOs	3.58 %	3.09 %	0.49 %	0.98
Panel B: Related institutions classified by previous work experience				
High profit IPOs	6.87 %	3.63 %	3.24 %	2.58**
Low profit IPOs	3.03 %	2.82 %	0.21 %	0.30

(2)), we separately calculate the new shares received as the percentage of their total bidding quantities. As shown in Table 5, we find that for high profit IPOs (i.e., with return above sample median), related institutions on average receive more shares than unrelated institutions. For example, in Panel A when classifying related institutions based on trading commissions, the share percentage received by related institutions is about 50% higher than that of unrelated institutions. The difference is even larger if related institutions are classified based on past work experience (Panel B). The *t*-test shows that the difference between related and unrelated institutions is significant. By contrast, for low profit IPOs (i.e., with return equal to or below sample median), the difference between related and unrelated institutions is not significant, and related institutions do not receive more shares than unrelated institutions. The evidence suggests that related institutions can receive more shares from more profitable IPOs and this represents a potential benefit for their bidding support to the underwriter.

5.1.2. Do related institutions better time their exit from IPOs?

Another potential benefit for related institutions is that the underwriter can provide private information and help related institutions better time their exit from IPO in the open market. That is, if future return is lower, related institutions will be more likely to sell the IPO shares once they are allowed. To test this, we estimate the following model:

$$Post\_IPO\_Sales = \alpha_0 + \beta_1 Relation1(Relation2) + \gamma Controls + Year + Industry + \mu \quad (4)$$

Where *Post_IPO_Sales* is an indicator variable, representing whether institutional investors sell the IPO shares immediately after the 3-month lockup period. To construct this variable, we examine the IPO shares in the institution's portfolio in the first semi-annual report[17] disclosed after the lockup period. If the number of shares in the portfolio is less than the number of shares received from the IPO, *Post_IPO_Sales* is set to one, and zero otherwise. As defined in Section 3.2.1, *Relation*1 and *Relation*2 measure the relationship between the institution and the underwriter based on trading commissions and past work experience, respectively. The control variables include cumulative market-adjusted return, mean average stock turnover and standard deviation of daily stock return in the 6-month period post IPO, and revision in the offer price relative to the initial price range in the valuation report, minus one. We also include year and industry fixed effects.

A positive and significant coefficient of *Relation*1 (*Relation*2) indicates that related institutions are more likely to sell IPO shares once when they are allowed. To examine whether future return affects the selling decision of related institutions, we partition the sample into two subsamples according to future return, measured as cumulative market-adjusted return in the 6-month period after the disclosure of semi-annual report, and estimate Equation (4) separately in these two subsamples. The results are reported in Table 6.

Columns (1) and (3) show that when future return is relatively low, related institutions are more likely to sell the IPO shares immediately after the expiration of lockup period, while Columns (2) and (4) indicate that when future return is high, related institutions do not sell early. The results suggest that related institutions may acquire private information from the underwriter about future stock performance of the IPO stocks and thus can better time the exit from the IPO in the open market.

5.1.3. Do related institutions who bid higher in the IPOs receive more optimistic forecasts or recommendations from the underwriters' analysts?

As prior research (e.g., Firth et al., 2013; Gu et al., 2013) indicates, analysts can help institutional investors by providing more optimistic forecasts or recommendations for the stocks in their portfolios. If related institutions bid higher in the IPO, as a return, analysts of the underwriter may issue optimistic earnings forecasts or recommendations for their stocks.

To test this prediction, we construct the following model:

[17] In China, mutual funds disclose details about their portfolios semi-annually.

Table 6
Do Related Institutions Better Time their Exit from IPOs? This table reports the regression results from estimating the trading behavior after IPOs. The sample includes 416 IPO-institution observations within the period from November 2010 to April 2012. If the number of shares held by the institution after the 3-month lockup period is less than the shares received in the IPO, *Post_IPO_Sales* is set to one, and zero otherwise. *Low future return* includes the cases when cumulative market-adjusted return in the 6-month period after the sales is lower than the sample median, and *High future return* includes the cases when the return is equal to or higher than the sample median. *Revision* is the upward adjustment in the offer price; *CAR_6m* is the cumulative market-adjusted return over the 6-month window after the IPO; *MTO_6m* is the stock turnover; *STD_6m* is the standard deviation of daily stock return. Refer to Appendix A for the definitions of other variables. The *z*-values (in parenthesis) are based on robust standard errors. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

	(1) *Post_IPO_Sales* *Low future return*	(2) *Post_IPO_Sales* *High future return*	(3) *Post_IPO_Sales* *Low future return*	(4) *Post_IPO_Sales* *High future return*
*Relation*1	20.014**	11.732		
	(2.31)	(1.15)		
*Relation*2			0.833*	0.407
			(1.77)	(0.73)
Revision	−0.757	−2.066	−0.684	−2.303
	(-1.30)	(-1.23)	(-1.23)	(-1.37)
CAR_6m	−0.796	−0.756	−0.726	−0.765
	(-0.83)	(-0.69)	(-0.78)	(-0.70)
MTO_6m	13.402*	23.172***	11.244*	22.417***
	(1.89)	(2.76)	(1.71)	(2.69)
STD_6m	−2.878	−102.915**	−10.073	−101.929**
	(-0.07)	(-2.48)	(-0.26)	(-2.50)
Constant	−0.582	−0.286	−0.077	0.107
	(-0.54)	(-0.20)	(-0.07)	(0.08)
Year and Industry	Yes	Yes	Yes	Yes
N	208	208	208	208
Pseudo R^2	0.138	0.137	0.114	0.137

$$Forecast\ Optimism\ (Recommendation\ Optimism) = \alpha_0 + \beta_1 Relation1(Relation2) + \gamma Controls + Quarter + Industry + Institution + \mu \quad (5)$$

Where *Forecast Optimism* is the optimism in analyst forecasts issued in the quarter after the IPO, calculated as analyst forecast for one year ahead EPS minus actual EPS, scaled by stock price one day before and then timed by 100; *Recommendation Optimism* is the relative optimism in stock recommendation, equal to 1, 0 or −1 if the analyst's recommendation is higher than, equal to, or lower than, respectively, the mean consensus of recommendations concurrently issued by all other analysts. *Relation*1 and *Relation*2 measure the relationship between the institution holding the stock and the underwriter employing the analyst, based on trading commissions and past work experience, respectively.[18] All regressions include quarter, industry and institution fixed effects.

To be included in the sample, we require that (1) the institution has participated in the IPO in the previous quarter and (2) the stocks in the institution's portfolio are covered by the analysts of the underwriter. We partition the full sample into two subsamples according to whether the institution has submitted a bidding price in the top tercile of all bidding prices during the IPO process in the previous quarter (*BidOptimism*), and estimate Equation (5) separately in these two subsamples. A positive and significant coefficient of the relationship measure indicates that related institutions receive more optimistic analyst forecasts (or recommendations) from analysts of the underwriter. We compare the coefficients in these two subsamples, and examine whether the coefficient is only significant when the institution bids high.

The results are reported in Table 7. Panel A is for the results of analyst forecast optimism. In Columns (1) and (3), we find positive and significant coefficients of *Relation*1 and *Relation*2, but in Columns (2) and (4), the coefficients are not significant. This contrast suggests that related institutions receive optimistic forecasts from related analysts for their stocks only when they bid higher. Panel B shows the similar results for recommendation optimism. The results overall suggest that the underwriter can pay back related institutions for their bidding support by issuing optimistic earnings forecasts and recommendations.

To summarize, we find that related institutions (1) on average receive more shares from more profitable IPOs; (2) can better time their exit from IPOs in the open market; (3) if bid higher, can get optimistic earnings forecasts or recommendations from the underwriters' analysts for the stocks in their portfolios. The evidence suggests that higher bidding from related institutions in support of the underwriter is mutually beneficial.

[18] The controls include financial characteristics at the end of the previous quarter: the book to market ratio, firm size measured by the logged market value; (2) stock characteristics for the previous quarter: standard deviation of weekly stock return, cumulative stock return and the logged trading volume; analyst and forecast characteristics measured mostly for the forecast quarter: the logged number of analysts following the stock, the logged number of stocks followed by the analyst, the logged days between forecast date and earnings announcement date, the logged number of analysts employed by the analyst's underwriter, and whether the analyst is a star analyst in the previous year.

Table 7

Analyst Optimism after IPOs and the Relationship with Underwriters – conditional on bidding behavior in IPOs. This table reports the regression results from estimating the effect of relationship on analyst forecast optimism or recommendation optimism, conditional on institutions' bidding behavior. We partition the sample into two subsamples according to whether the institution has submitted a bidding price in the top tercile of all bidding prices of the IPO in the previous quarter, *BidOptimism*. *Forecast Optimism* is analyst forecast for one year ahead EPS minus actual EPS, scaled by stock price one day before and then timed by 100; *Recommendation Optimism* is equal to 1, 0 or −1 if the analyst's recommendation is higher than, equal to, or lower than, respectively, the mean consensus of recommendations issued by all other analysts. *MV* is the natural logarithm of market value; *STD* is the standard deviation of daily return; *Return* is the cumulative stock return; *MTO* is the average value of daily stock turnover; *Analyst Following* is the number of analysts following the stock; *Stocks Followed* is the number of stocks followed by an analyst; *Forecast Horizon* is the days between forecast date and earnings announcement date; *Broker Size* is the number of analysts employed by an analyst's underwriter; *Star Analyst* is an indicator of New Fortune star analyst. Refer to Appendix A for the definitions of other variables. Panel A uses the OLS model, and Panel B uses the Ordered Logit model. The *t*-values/z-values (in parenthesis) are based on standard errors clustered by stock. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Panel A: Analyst Forecast Optimism

	(1)	(2)	(3)	(4)
	Forecast Optimism	*Forecast Optimism*	*Forecast Optimism*	*Forecast Optimism*
	BidOptimism = 1	*BidOptimism* = 0	*BidOptimism* = 1	*BidOptimism* = 0
*Relation*1	1.437**	0.404		
	(2.17)	(0.60)		
*Relation*2			0.099**	0.039
			(2.03)	(0.92)
MV	0.078	0.059	0.078	0.059
	(0.84)	(0.65)	(0.84)	(0.65)
STD	61.333***	63.243***	61.627***	63.283***
	(3.26)	(3.44)	(3.27)	(3.44)
Return	−0.694	−0.964	−0.692	−0.965
	(-1.24)	(-1.58)	(-1.24)	(-1.58)
MTO	−9.131	−7.173	−9.300	−7.153
	(-1.43)	(-1.05)	(-1.46)	(-1.05)
Analyst Following	−0.021	−0.018	−0.021	−0.017
	(-0.36)	(-0.31)	(-0.35)	(-0.30)
Stocks Followed	−0.178	−0.126	−0.179	−0.127
	(-0.93)	(-0.60)	(-0.93)	(-0.60)
Forecast Horizon	0.138	0.345	0.139	0.347
	(0.24)	(0.58)	(0.24)	(0.59)
Broker Size	−0.016	0.022	−0.018	0.022
	(-0.38)	(0.56)	(-0.42)	(0.56)
Star Analyst	−0.126	−0.090	−0.131	−0.091
	(-0.82)	(-0.78)	(-0.85)	(-0.79)
Constant	−2.141	−3.081	−2.136	−3.093
	(-0.63)	(-0.85)	(-0.63)	(-0.85)
Quarter, Industry and Institution	Yes	Yes	Yes	Yes
N	12,497	17,529	12,497	17,529
Adj. R^2	0.170	0.167	0.170	0.167

Panel B: Analyst Recommendation Optimism

	(1)	(2)	(3)	(4)
	Recommendation Optimism	*Recommendation Optimism*	*Recommendation Optimism*	*Recommendation Optimism*
	BidOptimism=1	*BidOptimism*=0	*BidOptimism*=1	*BidOptimism=0*
*Relation*1	3.661**	−0.199		
	(2.37)	(-0.21)		
*Relation*2			0.132**	0.079
			(2.29)	(1.18)
MV	0.201***	0.145***	0.199***	0.145***
	(3.41)	(3.09)	(3.40)	(3.09)
STD	26.421**	4.448	26.209**	4.403
	(2.31)	(0.44)	(2.30)	(0.43)
Return	0.449	0.552**	0.460	0.552**
	(1.56)	(2.16)	(1.60)	(2.16)
MTO	−3.919	−4.759	−3.928	−4.678
	(-0.88)	(-1.10)	(-0.89)	(-1.08)
Analyst	*Following*	−0.050	−0.148***	−0.051
	−0.145***			(-1.18)
	(-3.78)	(-1.19)	(-3.74)	
Stocks	*Followed*	0.066	0.009	0.064
	0.009			(0.95)
	(0.17)	(0.92)	(0.16)	
Forecast	*Horizon*	0.329	0.179	0.331
	0.179			(0.95)
	(0.52)	(0.95)	(0.52)	

Table 7 (*continued*)

Panel B: Analyst Recommendation Optimism				
	(1)	(2)	(3)	(4)
Broker Size	−0.503***	−0.266***	−0.497***	−0.268***
	(-5.34)	(-3.59)	(-5.23)	(-3.60)
Star Analyst	0.172	0.387***	0.176	0.380***
	(1.19)	(3.20)	(1.22)	(3.14)
*Cut*1	4.166*	3.055	4.194*	3.063
	(1.82)	(1.40)	(1.84)	(1.40)
*Cut*2	4.335*	3.216	4.363*	3.225
	(1.90)	(1.47)	(1.91)	(1.47)
Quarter, Industry and Institution	Yes	Yes	Yes	Yes
	N	Yes	12,497	17,529
	12,497	17,529		
Pseudo R^2	0.027	0.038	0.026	0.038

5.2. Self-selection bias

In the bid level analysis of bidding optimism, we examine the effect of the relationship with the underwriter on bidding price using the sample of institutions participating in the IPO bidding process. To mitigate the concern on self-selection, we perform Heckman two stage estimation. In the first stage, we fit a Probit model to estimate the likelihood for an institution to participate in the bidding. We use *Starhotel*, the number of high-rated hotels (above four-star) in the province where the IPO firm is headquartered as the exogenous variable. The number of high-rated hotels represents the accommodation situation which may affect institutions' willingness of site visits and bidding participation. Then, we include the inverse Mills ratio from the first stage in the second stage model of bidding optimism. The first stage estimation, as shown in Panel A of Table 8, shows that the exogenous variable *Starhotel* is significantly positive. More importantly, Panel B shows that the coefficients in the second stage by regressing bidding optimism on the relationship with the underwriter, remain significantly positive and support our prediction. This suggests that the selection bias may not be a big concern to our analyses.

5.3. Alternative measures

5.3.1. Longer time span to measure business relationship

The measure of business relationship is based on trading commissions paid to the underwriter in the previous six months. To ensure that this measure does not just capture the short term effect, we expand the time span from the previous six month to the previous one year and check the robustness of the results. All the results, untabulated to save space, are not sensitive to the longer time span, which can alleviate the concern that this measure only captures short term relationship.

5.3.2. Alternative measure for business relationship

Institutional investors often rely on the brokerage firms to market their new funds. If an institutional investor has the intent to issue new funds, it can be incentivized to cater to the underwriting broker. We construct another measure of business relationship based on new fund issuance of an institution around the IPO month. The results based on this measure are robust. As an example, Table 9 presents the result for the effect of relationship on bidding optimism at the bid level. *Relation*3 is the natural logarithm of one plus the number of new funds distributed by the underwriter in the one-year period around the IPO month. The coefficient on *Relation*3 is positively significant, supporting our prediction.

6. Consequences of relationship-driven bidding

6.1. Revision in the offer price

We first investigate whether the higher bidding prices from related institutions yield any effect on the offer price. To examine this issue, we estimate the following model:

$$Revision = \alpha_0 + \beta_1 Optimism\_c1(Optimism\_c2) + \gamma Controls + Year + Industry + \mu \quad (6)$$

where *Revision* captures the relative magnitude of revision in the offer price. It is calculated as the offer price divided by the middle point of the initial price range in the valuation report and then minus one. *Optimism_c*1 and *Optimism_c*2 capture the relative bidding optimism of related institutions at the IPO firm level, measured as the quantity-weighted average bid of all related institutions divided by that of all unrelated institutions and then minus one. *Optimism_c*1 defines related institutions based on trading commissions and *Optimism_c*2 defines related institutions based on past work experience.

Table 8
The Effect of Relationship with the Underwriters on Bidding Optimism – Heckman two stage model. This table reports the Heckman two stage estimation to address the selection bias. The first stage estimates the likelihood of an institution to participate in the IPO based on the sample of 17,758 IPO-institutions over the period from November 2010 to April 2012. *Starhotel* is the natural logarithm of the number of high-rated hotels (above four-star) in the province where the IPO firm is headquartered. The second stage model estimates the effect of the relationship with the underwriter on bidding optimism from institutional investors, based on the sample of 4774 bids. *IMR* is the inverse Mills ratio estimated from the first stage. Refer to Appendix A for other variable definitions. The z-values/*t*-values (in parenthesis) are based on standard errors clustered by industry. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Panel A: First stage model of bidding participation

	(1)	(2)
	Bid	*Bid*
*Relation*1	4.554***	
	(8.42)	
*Relation*2		0.150***
		(3.90)
Starhotel	0.071***	0.070***
	(3.23)	(3.20)
Fbig	0.806***	0.896***
	(28.15)	(34.19)
UWR	−0.019	−0.020
	(-0.84)	(-0.87)
MKT	1.834***	1.828***
	(6.24)	(6.23)
NIPO	0.042	0.040
	(1.45)	(1.38)
Size	−0.014	−0.013
	(-0.62)	(-0.57)
ROE	0.093	0.090
	(0.79)	(0.76)
Lev	−0.368***	−0.382***
	(-3.83)	(-3.98)
Growth	−0.026	−0.027
	(-0.54)	(-0.58)
DAC_D	−0.006	−0.005
	(-0.25)	(-0.24)
List	−0.018	−0.018
	(-0.62)	(-0.62)
Constant	−0.473	−0.425
	(-1.11)	(-1.00)
Year, Industry and Institution	Yes	Yes
N	17,768	17,768
Pseudo R^2	0.073	0.070

Panel B: Second stage model of bidding optimism

	(1)	(2)	(3)	(4)
	*Optimism*1	*Optimism*1	*Optimism*2	*Optimism*2
*Relation*1	0.139*		0.165***	
	(1.66)		(4.96)	
*Relation*2		0.055***		0.018**
		(2.98)		(2.02)
IMR	−0.320**	−0.048	−0.101***	−0.016
	(-2.03)	(-0.56)	(-2.76)	(-0.21)
Fbig	−0.161	0.008	−0.064*	−0.012
	(-1.52)	(0.04)	(-1.82)	(-0.27)
UWR	0.032	0.029	−0.004	−0.004
	(1.53)	(1.30)	(-0.70)	(-0.86)
MKT	−0.364	−0.024	−0.211*	−0.105
	(-0.93)	(-0.04)	(-1.84)	(-0.81)
NIPO	0.101***	0.107***	0.007	0.008
	(3.38)	(3.50)	(0.92)	(1.19)
OVERSUB	0.083***	0.086***	−0.008*	−0.007*
	(3.48)	(3.39)	(-1.91)	(-1.68)
CV	0.031***	0.031***	0.002	0.002
	(3.03)	(3.02)	(1.55)	(1.54)
Size	−0.003	−0.004	0.004	0.003
	(-0.18)	(-0.24)	(1.40)	(1.29)
ROE	−0.079	−0.059	0.040	0.046*
	(-0.68)	(-0.49)	(1.49)	(1.68)
Lev	0.137	0.061	0.012	−0.012
	(1.22)	(0.44)	(0.47)	(-0.43)

Table 8 (*continued*)

Panel B: Second stage model of bidding optimism				
	(1)	(2)	(3)	(4)
Growth	−0.062	−0.064	0.001	−0.000
	(-1.40)	(-1.47)	(0.13)	(-0.01)
DAC_D	0.019	0.017	−0.001	−0.002
	(1.47)	(1.36)	(-0.35)	(-0.47)
List	−0.006	−0.009	0.010	0.009
	(-0.28)	(-0.41)	(1.20)	(1.07)
Constant	0.676	0.413	0.954***	0.872***
	(1.47)	(0.70)	(10.87)	(8.59)
Year, Industry and Institution	Yes	Yes	Yes	Yes
N	4774	4774	4774	4774
Adj. R^2	0.372	0.374	0.087	0.088

Table 9
The Effect of Relationship with the Underwriters on Bidding Optimism - alternative measure for business relationship. This panel reports the bid level regression results regarding the effect of the relationship with the underwriter on bidding optimism from institutional investors, using an alternative measure of business relationship. *Relation*3 is the natural logarithm of one plus the number of new funds marketed by the underwriter for the institution in the one-year period around the IPO month. Other variables are defined in Appendix A. The *t*-values (in parenthesis) are based on standard errors clustered by industry. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

	(1) *Optimism*1	(2) *Optimism*2
*Relation*3	0.030***	0.031***
	(3.24)	(4.77)
Fbig	0.040***	−0.003
	(3.37)	(-0.26)
UWR	0.055	−0.081
	(0.21)	(-1.51)
MKT	0.111***	0.010
	(4.14)	(1.50)
NIPO	0.083***	−0.007*
	(3.33)	(-1.76)
OVERSUB	0.031***	0.002*
	(3.06)	(1.66)
CV	−0.005	0.003
	(-0.27)	(1.20)
Size	−0.053	0.049**
	(-0.47)	(2.07)
ROE	0.049	−0.016
	(0.50)	(-1.36)
Lev	−0.069	−0.001
	(-1.53)	(-0.12)
Growth	0.031	−0.004
	(1.48)	(-0.71)
DAC_D	0.018	−0.002
	(1.36)	(-0.43)
List	−0.010	0.010
	(-0.43)	(1.00)
Constant	0.381	0.857
	(1.07)	(1.37)
Year, Industry and Institution	Yes	Yes
N	4774	4774
Adj. R^2	0.368	0.088

Table 10 reports the results of the offer price revision. In Columns (1) and (2), the coefficient of *Optimism_c*1 (*Optimism_c*2) is positive and significant. The evidence suggests that the underwriter takes advantage of the higher bidding from related institutions and is able to set the offer price at a higher level.

Chemmanur et al. (2018) document that the offer price is discounted less if related institutions' bidding is skewed to higher prices, which is consistent with our finding in this section. Below we discuss the differences and try to distinguish with their work.

Table 10
The Effect of Relationship on IPO Offer Price. This table reports the regression results regarding the effect of bidding optimism on revision in the offer price. *Revision* is the offer price divided by the middle point of the initial price range in the valuation report, minus one. *Optimism_c*1 and *Optimism_c*2 are measured as the quantity-weighted average bid of all related institutions divided by that of all unrelated institutions and then minus one, based on trading commissions and past work experience respectively. Other variables are defined in Appendix A. The *t*-values (in parenthesis) are based on robust standard errors. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

	(1) *Revision*	(2) *Revision*
*Optimism_c*1	0.412***	
	(5.59)	
*Optimism_c*2		0.197***
		(4.14)
UWR	0.015	0.017*
	(1.14)	(1.87)
MKT	0.464**	0.141
	(2.01)	(0.60)
NIPO	−0.023*	−0.037*
	(-1.92)	(-1.73)
OVERSUB	0.055***	−0.017
	(3.12)	(-1.49)
CV	0.029***	−0.007
	(3.30)	(-1.09)
Size	−0.000	−0.012
	(-0.02)	(-1.04)
ROE	−0.001	0.001
	(-1.31)	(0.80)
Lev	0.035	0.049
	(0.40)	(1.10)
Growth	0.028	0.030
	(0.88)	(0.83)
DAC_D	0.014	0.025
	(0.80)	(1.63)
List	0.019	0.019
	(1.05)	(0.67)
Constant	−0.302	0.407**
	(-1.11)	(1.99)
Year and Industry	Yes	Yes
N	291	156*
Adj. R^2	0.431	0.218

*If based on past work experience, there are no related institutions identified for some IPOs. Therefore, in calculating the relative optimism of related institutions, the lack of related institutions can reduce the sample size.

First, these two studies provide consistent results that related institutions' bidding prices are related to final offer price. However, Chemmaunur et al. (2018) do not examine whether and under what conditions related institutions would bid higher prices, which is the focus of our paper. Therefore, these two papers have different research questions.

Second, to explain their empirical evidence, Chemmanur et al. (2018) argue that the underwriter will intentionally set the offer price just below the bidding prices of related institutions, so that more related institutions are eligible for IPO allocation. That is, the underwriter is doing the favor for related institutions. In contrast, our argument is that related institutions are bidding higher so that the underwriter can issue shares at a higher price, i.e., related institutions are doing the favor for the underwriter. We believe both arguments are plausible and could co-exist in the IPO setting. The results in Table 4 can support our argument, which show that bidding optimism from related institutions is significant when the underwriter is more likely to need or receive the support from related institutions.

Third, the argument in Chemmanur et al. (2018) that the underwriter sets the offer price below bidding prices of related institutions does not necessarily imply that related institutions in general bid higher (or more optimistically) than unrelated institutions. Use a numerical example for illustration: If a related institution bids RMB10, while unrelated institutions bid RMB 12 and 9, then Chemmanur et al. (2018) will suggest that the underwriter is likely to set the offer price at RMB10. Their argument has no prediction on related institution's bidding price, but takes it as given.

6.2. Relation between bidding optimism and post-IPO stock performance

We then examine whether bidding optimism from related institutions is related to post-IPO stock performance based on the following model:

$$CAR = \partial_0 + \beta_1 Optimism\_c1(Optimism\_c2) + \gamma Controls + Year + Industry + \mu \quad (7)$$

The dependent variable is the post-IPO first-day return (*Underpricing*), defined as the first-day closing price minus the offer price divided by the offer price, and the cumulative market-adjusted return over the 3-month lockup period after the IPO (*CAR_13*) or the 9-month period after lockup expiration (*CAR_412*). *Optimism_c*1 and *Optimism_c*2 measure relative bidding optimism from related institutions, as defined previously.

Table 11 reports the results: *Underpricing* in Columns (1) and (2), *CAR_13* in Columns (3) and (4), and *CAR_412* in Columns (5) and (6). Columns (1) and (2) indicate that bidding optimism has no significant effect on the first-day underpricing. In Column (3), the coefficient of *Optimism_c*1 is positive and significant, suggesting that within the lockup period when related institutions are not able to exit from IPOs, greater bidding optimism from related institutions is associated with higher stock return. By contrast, the negative and significant coefficient of *Optimism_c*1 in Column (5) indicates that in the 9-month period following the expiration of lockup, bidding optimism from related institutions is associated with poor stock performance. Notably, in this period related institutions may have already exited. The coefficients of *Optimism_c*2 in Columns (4) and (6) have the same signs as those in Columns (3) and (5) but are not significant, probably due to lower testing power of reduced sample size. These results indicate that related institutions may not incur loss from bidding optimistically in IPO book-building as higher degree of optimism does not relate to worse stock performance during the lockup period.

6.3. Support from affiliated analysts in the lockup period

Finally, we examine whether analysts affiliated with the underwriter provide any support for the IPO share price in the lockup period. Following James and Karceski (2006), we construct the following model to test analysts' support for stock price:

$$Forecast\ Optimism = \partial_0 + \beta_1 Optimism\_c1(Optimism\_c2) + \beta_2 Affiliated + \beta_3 Optimism\_c1(Optimism\_c2) \times Affiliated + \gamma\ Controls + Quarter + Industry + \mu \quad (8)$$

Where *Forecast Optimism* is equal to one year ahead EPS forecast minus actual EPS, scaled by stock price one day before and then timed by 100. *Optimism_c*1 and *Optimism_c*2 measure relative bidding optimism from related institutions, as defined previously. *Affiliated* equals one if an analyst is affiliated with the underwriter and zero otherwise. The coefficient on *Optimism_c*1(*Optimism_c*2) × *Affiliated* captures whether affiliated analysts' forecast optimism increases with related institutions' bidding optimism.

James and Karceski (2006) find that affiliated analysts provide support for the stocks that perform poorly in the post-IPO market. Therefore, we partition our sample into two subsamples based on the stock return before the forecast issuance day (*RTF*), and estimate Equation (8) for each subsample in the lockup period. We expect that the coefficient on *Optimism_c*1

Table 11
Bidding Optimism of Related Institutions and Post-IPO Stock Performance. This table reports the regression results regarding bidding optimism of related institutions and post-IPO stock performance over the period from November 2010 to April 2012. *Underpricing* is the first day market-adjusted return; *CAR_13* (*CAR_412*) is the cumulative market-adjusted return over the 3-month lockup period after the IPO (the 9-month period after the lockup expiration); *Optimism_c*1 and *Optimism_c*2 are measured as in Table 10; *MTO* is the average daily stock turnover; *STD* is the standard deviation of daily return; *List* is the dummy for listing in SME. The *t*-values (in parenthesis) are based on robust standard errors. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

	(1) *Underpricing*	(2) *Underpricing*	(3) *CAR_13*	(4) *CAR_13*	(5) *CAR_412*	(6) *CAR_412*
*Optimism_c*1	0.079		0.229***		−0.255*	
	(0.26)		(4.68)		(-2.04)	
*Optimism_c*2		−0.252		0.151		−0.024
		(-0.83)		(1.23)		(-1.10)
MTO	0.962***	0.918***				
	(9.56)	(5.36)				
MTO_13			0.955**	0.724		
			(2.39)	(1.01)		
STD_13			8.548***	11.030***		
			(9.99)	(7.85)		
MTO_412					−1.455*	0.024
					(-1.75)	(0.02)
STD_412					21.471***	15.342***
					(5.50)	(2.64)
List	0.103**	0.127	−0.003	0.011	0.002	−0.018
	(1.98)	(1.47)	(-0.08)	(0.18)	(0.05)	(-0.40)
Constant	0.103**	−0.471	−0.158	−0.138	−0.508***	−0.418**
	(1.98)	(-1.32)	(-0.95)	(-0.58)	(-3.84)	(-2.17)
Year and Industry	Yes	Yes	Yes	Yes	Yes	Yes
N	291	156	291	156	291	156
Adj. R^2	0.257	0.203	0.427	0.416	0.172	0.085

Table 12
Analyst Forecast Optimism and Bidding Optimism. *Forecast Optimism* is analyst forecast for one year ahead EPS minus actual EPS, scaled by stock price one day before and then timed by 100. *Optimism_c*1 and *Optimism_c*2 are as defined in Table 10. *Affiliated* equals one if an analyst is affiliated with the underwriter and zero otherwise. The control variables include: *MV* is the natural logarithm of the market value; *MTO* is the average daily stock turnover; *STD* is the standard deviation of daily return; *Analyst Following* is the number of analysts following the stock; *Stocks Followed* is the number of stocks followed by an analyst; *Forecast Horizon* is the days between forecast date and earnings announcement date; *Brokerage Size* is the number of analysts employed by an analyst's underwriter; *Star Analyst* is an indicator of New Fortune star analyst. We partition the sample into two subsamples based on the stock return before the analyst forecast day (*RTF*). Panel A examines analyst forecasts during the lockup period, and Panel B investigates analyst forecasts within the 9 months after lockup expiration. The *t*-values (in parenthesis) are based on standard errors clustered by stock. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Panel A Lockup period

	(1)	(2)	(3)	(4)
	Forecast Optimism RTF < median	*Forecast Optimism* RTF>=median	*Forecast Optimism* RTF < median	*Forecast Optimism* RTF>=median
*Optimism_c*1 × *Affiliated*	2.419***	0.786		
	(5.21)	(0.29)		
*Optimism_c*2 × *Affiliated*			1.353***	0.093
			(3.14)	(0.12)
*Optimism_c*1	0.761	1.984**		
	(0.61)	(1.98)		
*Optimism_c*2			0.903	0.320
			(0.77)	(0.32)
Affiliated	0.061	0.186	0.314	0.179
	(0.29)	(1.60)	(1.37)	(0.90)
MV	0.441*	0.076	0.657*	0.245
	(1.73)	(0.45)	(1.88)	(0.90)
STD	19.803	−0.723	28.291	5.475
	(1.43)	(-0.17)	(1.37)	(0.39)
MTO	−8.284***	−3.177	−12.850***	−6.269
	(-3.20)	(-1.40)	(-2.94)	(-1.32)
Analyst Following	−0.023	−0.035	0.015	0.013
	(-0.68)	(-1.28)	(0.33)	(0.30)
Stocks Followed	−0.396***	−0.341***	−0.588**	−0.414**
	(-2.89)	(-3.31)	(-2.40)	(-2.37)
Forecast Horizon	0.444	0.069	1.135	2.746**
	(0.87)	(0.14)	(0.95)	(2.09)
Brokerage Size	0.110*	0.127**	0.121*	0.123
	(1.95)	(2.55)	(1.79)	(1.48)
Star Analyst	0.900***	−0.060	0.740*	−0.433
	(2.85)	(-0.37)	(1.79)	(-1.39)
Constant	−8.788**	−1.269	−14.385**	−15.669*
	(-2.02)	(-0.32)	(-2.07)	(-1.88)
Quarter and Industry	Yes	Yes	Yes	Yes
N	382	382	224	224
Adj. R^2	0.511	0.522	0.486	0.423

Panel B The 9-month period after the lockup expiration

	(1)	(2)	(3)	(4)
	Forecast Optimism RTF<median	*Forecast Optimism* RTF>=median	*Forecast Optimism* RTF<median	*Forecast Optimism* RTF>=median
*Optimism_c*1 × *Affiliated*	−1.002	−1.959		
	(-0.58)	(-1.39)		
*Optimism_c*2 × *Affiliated*			−0.023	−1.342
			(-0.01)	(-0.86)
*Optimism_c*1	1.175*	1.147		
	(1.97)	(1.42)		
*Optimism_c*2			0.767	−0.173
			(1.07)	(-0.25)
Affiliated	0.208	0.019	0.191	0.021
	(1.47)	(0.17)	(1.36)	(0.13)
MV	−0.291**	−0.007	−0.243**	0.063
	(-2.56)	(-0.05)	(-2.18)	(0.28)
STD	39.510***	1.944	37.772**	22.271
	(2.85)	(0.12)	(2.26)	(1.14)
MTO	−3.456	−7.021**	−0.486	−8.080**
	(-1.06)	(-2.18)	(-0.09)	(-2.49)
Analyst Following	−0.017	−0.021	0.005	−0.044*
	(-0.75)	(-0.85)	(0.19)	(-1.69)
Stocks Followed	0.000	−0.357***	0.021	−0.236**
	(0.00)	(-4.58)	(0.27)	(-2.32)

Table 12 (*continued*)

Panel B The 9-month period after the lockup expiration				
	(1)	(2)	(3)	(4)
Forecast Horizon	1.193***	1.242***	1.026***	1.173***
	(4.97)	(6.44)	(3.62)	(4.08)
Brokerage Size	0.025	0.004	−0.060	0.047
	(0.64)	(0.10)	(-1.14)	(1.01)
Star Analyst	−0.171	−0.024	−0.156	0.143
	(-1.60)	(-0.22)	(-1.10)	(0.69)
Constant	−1.207	−4.635*	−1.078	−5.228
	(-0.55)	(-1.70)	(-0.49)	(-1.34)
Quarter and Industry	Yes	Yes	Yes	Yes
N	1664	1664	927	926
Adj. R^2	0.578	0.524	0.600	0.541

(*Optimism_c*2) × *Affiliated* is significantly positive in the subsample with poor post-IPO stock performance (i.e. with *RTF* below the sample median), but is not necessarily the case in the subsample with good performance (i.e. with *RTF* equal to or above the sample median).

Panel A of Table 12 reports the results for estimating Equation (8) in the lockup period. We find that when stock performance is poor (Columns (1) and (3)), the coefficient on *Optimism_c*1(*Optimism _c*2) × *Affiliated* is significantly positive. In contrast, when stock performance is good (Columns (2) and (4)), the coefficient is insignificant. The evidence suggests that affiliated analysts tend to issue more optimistic forecasts to support the stocks with poor post-IPO performance if related institutions have bid higher in the IPO process, presumably to reduce the loss of related institutions. They, however, do not need to do so for the stocks with good post-IPO performance because related institutions may not suffer loss in this situation.

We also examine analyst forecast optimism in the 9-month period after the lockup expiration (Panel B). Different from the results in Panel A, the interaction of bidding optimism and underwriter-affiliation has no significant impact on forecast optimism in all the regressions of Panel B, suggesting that affiliated analysts do not issue optimistic forecasts to support stock price after the lockup expiration.

Overall, the results suggest that affiliated analysts provide support to boost stock price until the lockup expiration when related institutions can exit the market.

7. Conclusion

We examine whether the relationship between the underwriter and institutions induces collusive bidding from related institutions. Using a unique database of institutional investors' quantity-price bidding information, we document that related institutions are more likely to participate in the book-building process, and are more likely to submit higher bidding prices. Furthermore, bidding optimism is significant when the IPO is less profitable, when the IPO is in cold market, when the issuing firm has lower earnings quality, or when the underwriter has more bargaining power. We also show that related institutions can receive benefits from the underwriter for their bidding support. They are allocated more shares from more profitable IPOs, can better time their exit from the IPO in the open market, and if bid higher, receive more optimistic forecasts or recommendations from analysts of the underwriter.

We further find that the underwriter is able to boost the offer price with the higher bidding prices from related institutions. We also find that related institutions may not incur loss from optimistic bidding in IPO book-building, likely due to the support from analysts affiliated with the underwrite to boost stock price in the lockup period.

Overall the empirical evidence is consistent with the concerns of the regulators and the practitioners, and suggests the existence of the collusion between related institutions and the underwriter in the IPO book-building process: related institutions submit relatively optimistic bidding prices to help the underwriter set a higher offer price, and they are more likely to provide such "help" when it is in greater need or when they are more willing to do so. As a return, related institutions also receive benefits from the underwriter.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Acknowledgement

The authors appreciate financial support from National Natural Science Foundation of China (Approval No. 71802011, 71672097, 71222204 and 71272035).

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