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Who do you take to tango? Examining pairing mechanisms between underwriters and initial public offering firms in a nascent stock market

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Abstract

Research Summary: Previous studies on initial public offerings (IPOs) in mature stock markets have documented that high-reputation underwriters primarily work with high-quality firms and vice versa—that is, they are paired through a *quality-matching mechanism*. We propose that in a nascent stock market, a *pricing mechanism* may also play a role, through which pricing (the underwriting fee) sets the pairing. We examine these two mechanisms in the context of China's *ChiNext* stock exchange, which was launched in 2009 and experienced dramatic regulatory improvements in 2012–2013. With data on IPOs in 2009–2017, we find evidence to support the pricing mechanism's effect before the regulatory improvements and the quality-matching mechanism's effect after the improvements. We contribute to the literature by developing an evolutionary view on the pairing mechanisms between important capital market participants.

Managerial Summary: In a mature stock market, underwriter reputation signals the underlying quality of initial public offering (IPO) firms to external investors because high-reputation underwriters primarily work with high-quality IPO firms and vice versa. We find that in a nascent

stock market before the market experiences regulatory improvements, underwriters and IPO firms are paired through a pricing mechanism. That is, underwriters with higher reputation charge higher underwriting fees, and IPO firms with lower quality pay higher fees. Since the pricing mechanism rather than the quality-matching mechanism sets the pairing, underwriter reputation does not have a signaling effect. Instead, we find that higher underwriting fees signal lower quality of IPO firms. Our findings shed important insights on how market participants are paired in other nascent markets, nascent technology fields and industries.

KEYWORDS
earnings management, IPO, nascent market, underwriter reputation, underwriting fee

1 | INTRODUCTION

> *"Ping An Securities—a unit of financial conglomerate Ping An Insurance (Group) Co. of China Ltd. (2318.HK)—was banned for negligence in an audit of Wanfu Biotechnology (Hunan) Agricultural Development Co. (300268.SZ) ahead of an initial public offering, the China Securities Regulatory Commission said late on Friday. The prohibition "sounds an alarm to all brokerages," Capital Securities analyst in Shanghai Zhang Yuheng told* The Wall Street Journal *on Saturday. It is the first such ban, he added, saying Ping An Securities could find it hard to get approval to do new business."*
> —Wall Street Journal, *May 11, 2013*

How are individual underwriters and initial public offering (IPO) firms matched with each other? Previous studies have addressed this research question mainly in the context of mature stock markets, particularly the U.S. market, and demonstrated that high-reputation underwriters work primarily with high-quality IPO firms—namely, they are paired through a *quality-matching mechanism* (Fang, 2005; Fernando, Gatchev, & Spindt, 2005; Lee & Masulis, 2011). Based upon this important conclusion, previous studies have widely used underwriter reputation as a credible signal to convey the underlying quality of IPO firms to external investors (e.g., Beatty & Ritter, 1986; Carter & Manaster, 1990; Pollock, Porac, & Wade, 2004).

However, we need to verify a *prerequisite condition* before accepting underwriter reputation as a credible signal of IPO firms' quality in a *nascent* market, which typically starts with weak regulations and improves regulations thereafter. According to the signaling theory, for an observable action to be perceived as a credible signal, a separating equilibrium must be achieved (Bergh, Connelly, Ketchen Jr, & Shannon, 2014; Spence, 1973, 2002). Previous studies have largely taken such an equilibrium for granted, in which high-reputation underwriters work primarily with high-quality firms and vice versa (a reasonable assumption in a mature stock market). However, if a separating equilibrium has not been achieved in a market, underwriter reputation cannot serve as such a signal. Therefore, it is important to examine pairing behaviors in a nascent stock market.

We argue that in a nascent stock market, because regulations are in the process of being developed, tested, and modified, pairing between underwriters and IPO firms may change as the market's regulatory environment

evolves. Because a nascent market typically starts with weak regulations, potential penalty costs for underwriters to take low-quality firms public may not be high (or at least not perceived to be high) initially. Therefore, underwriters may work with IPO firms of varying quality and discriminate between them by charging different underwriting fees—what we call *pricing mechanism*. More specifically, we propose that underwriters with higher reputation charge higher fees, and IPO firms with lower quality pay higher fees. However, as the market's regulations improve, potential penalty costs to underwriters for taking low-quality firms public increase and outweigh the short-term benefits of charging such firms higher fees. Therefore, the pricing mechanism will be replaced by the quality-matching mechanism.

We test these predictions in the context of China's *ChiNext Board*. ChiNext Board, launched in October 2009, is China's Growth Enterprise Market (GEM), specifically targeting entrepreneurial firms. As shown in the example cited at the beginning of the paper, Ping An Securities, a former AA-level underwriter in China, was found to be associated with several problematic listings on ChiNext (Sina, 2014),[1] providing anecdotal evidence that high-reputation underwriters did work with low-quality firms in a nascent stock market. Due to several problematic listings, ChiNext experienced an IPO embargo from October 2012 to December 2013. When ChiNext reopened for IPOs in December 2013, its regulations were significantly improved. The sudden and significant regulatory improvements of ChiNext provide an appropriate and rare opportunity to test our prediction that different pairing mechanisms work at different development stages of a nascent stock market.

We use two proxies for IPO firms' quality to develop research hypotheses: their pre-IPO earnings management (EM) and pre-IPO equity owned by venture capital firms (VCs)—that is, pre-IPO VC ownership. The level of a firm's pre-IPO EM represents a reversed indicator of the firm's quality (Teoh, Welch, & Wong, 1998), whereas a higher level of pre-IPO VC ownership shows greater VC endorsement of the firm and thus indicates higher firm quality (Gulati & Higgins, 2003). We test our hypotheses using 606 IPOs on ChiNext from its founding in 2009 to the end of 2017, with 299 IPOs that debuted before and 307 IPOs that debuted after the embargo. Consistent with our predictions, we find a positive relationship between the reputation of a firm's underwriter and underwriting fee and a positive relationship between a firm's pre-IPO EM and underwriting fee, in the pre-embargo period (i.e., before the regulatory improvements) but not in the post-embargo period (i.e., after the regulatory improvements). These results support the effect of the pricing mechanism at the initial stage of a nascent stock market. Moreover, we find a positive relationship between a firm's pre-IPO VC ownership and its underwriter's reputation in the post-embargo period, but not in the pre-embargo period. These results support the effect of the quality-matching mechanism after regulatory improvements of a nascent stock market.

Our study makes important contributions to the IPO literature. First, deviating from the prior IPO literature that has focused on pairing behaviors in mature stock markets (Fang, 2005; Fernando et al., 2005; Lee & Masulis, 2011), we focus on pairing behaviors in a nascent stock market and examine two different pairing mechanisms—pricing mechanism and quality-matching mechanism. Our arguments and empirical evidence can greatly enrich the literature by investigating how underwriters and IPO firms are paired before an efficient contract, which best serves IPOs, has emerged in a capital market. Second and more importantly, we propose and empirically demonstrate that these two mechanisms work at different development stages of a nascent stock market: the pricing mechanism works primarily at the initial stage of the market when it is characterized by weak regulations, whereas the quality-matching mechanism starts to play a role after the market's regulations get improved. Our arguments and results help build an evolutionary view on pairing behaviors between important market players. Third, scholars need to verify the prerequisite condition—a separating equilibrium in which high-reputation underwriters work primarily with high-quality IPO firms—before using underwriter reputation as a quality signal. Our arguments and results demonstrate that such an equilibrium does not exist at the initial stage of a nascent stock market, which is characterized by weak regulations, and accordingly, underwriter reputation does not serve as a credible signal of IPO firms' quality. Our additional analyses demonstrate that pricing (the underwriting fee) serves as a reversed signal of IPO firms' quality in such a market.

2 | THEORY AND HYPOTHESIS DEVELOPMENT

2.1 | Assumed rationales behind underwriter-IPO firm pairing

The basic assumptions of this study are two-fold and are largely consistent with the assumptions of previous studies (e.g., Fernando, Gatchev, May, & Megginson, 2015). First, high-reputation underwriters are generally preferred by IPO firms because compared to low-reputation ones, they have superior capabilities and provide better services that can increase the chance of a successful public listing and raise a larger size of fund from the IPO (Fernando et al., 2015). Second, underwriters make client choices based on benefit–cost analyses, and high-reputation underwriters have greater discretion in choosing clients than their low-reputation counterparts because the former have access to a superior deal flow (Clarke, Khorana, Patel, & Rau, 2007).

The key difference between our study and previous studies is that we argue that the factors shaping high-reputation underwriters' benefit–cost analyses change as the regulatory environment of a capital market develops. As noted by previous studies, in a mature stock market, high-reputation underwriters' benefit–cost analyses lead them to primarily work with high-quality IPO firms. On the one hand, firms prefer to work with high-reputation underwriters, for the reasons stated above (Fernando et al., 2015). On the other hand, underwriters also prefer high-quality firms over low-quality ones because the former have a better chance for a successful stock flotation. A successful IPO can also enhance an underwriter's reputation, bringing in more future businesses (Carter & Manaster, 1990; Fang, 2005; Fernando et al., 2015). In addition, underwriters, as third parties endorsing IPO firms to external investors, put their own reputation on the line. Mature markets have well-developed and strictly enforced regulations that clearly define the penalty costs incurred for underwriters if they take low-quality firms public, for example, "legal liabilities and potential loss of reputational capital" (Gulati & Higgins, 2003, p. 131). High-reputation underwriters bear higher reputational costs compared to their low-reputation counterparts and are thus incentivized to work primarily with high-quality firms. Together, this mutual selection process results in a quality-matching mechanism between underwriters and IPO firms in a mature stock market.

However, in a nascent stock market, underwriters' benefit–cost analyses may be different from what is discussed above. A nascent stock market typically starts with weak regulations that are poorly developed and loosely enforced (Green, 2004). Moreover, few, if any, preceding cases exist to demonstrate what will happen to underwriters if they endorse low-quality firms. Therefore, the penalty costs to underwriters for taking low-quality firms public are ill-defined. As a result, the quality-matching mechanism may not work. Instead, we argue that underwriters, even high-reputation ones, may work with firms of varying quality but seek returns in other forms to compensate for the risk of undertaking low-quality firms. Based upon this logic, we develop hypotheses on how underwriters and IPO firms are paired in two different development stages of a nascent stock market—the initial stage, referring to the stage before the market significantly improves its regulations, and the stage after regulatory improvements.

2.2 | Role of pricing mechanism at the initial stage of a nascent stock market

We propose that before a nascent stock market adopts and enforces stringent regulations, a pricing mechanism plays an important role in pairing underwriters and IPO firms. Underwriting fee is the price that an IPO firm pays to its underwriter for the latter's services (Shivdasani & Song, 2011). In the U.S. market, underwriting fees converge on a similar level across different underwriters and issuers—7% of the capital raised. Chen and Ritter (2000) found that the underwriting fees were precisely 7% for more than 90% of the U.S. IPO deals from 1995 to 1998. Abrahamson, Jenkinson, and Jones (2011) confirmed that from 1998 to 2007, this convergence was even more prevalent in the United States.

However, the "7% solution" did not occur in the U.S. IPO market in earlier years. According to Hansen (2001, p. 314), "The frequency with which a 7% spread is used in IPOs has risen dramatically, from six in 1981 to hundreds per year in the 1990s." Hansen's (2001) empirical evidence suggests that the 7% spread is not caused by underwriter collusion; instead, it is the survival of the efficient contract that best suits the participants in IPO as the market develops. Therefore, it would be natural that, in a nascent stock market, a wide range of underwriting fees will exist until an efficient contract emerges. We propose that the underwriting fee paid by an IPO firm to its underwriter reflects the underwriter's reputation on the one side and the IPO firm's quality on the other.

2.2.1 | Underwriter reputation and underwriting fee

Because a nascent stock market typically starts with weak regulations, the potential penalty costs of working with low-quality firms are not perceived to be prohibitive. As a result, high-reputation underwriters may not work exclusively with high-quality firms; instead, they have incentives to increase their clientele base by including firms of varying quality. A more extensive clientele base shifts the relationship between the demand and supply of high-reputation underwriters' services in their favor because there is greater demand for such services. Meanwhile, the limited supply allows high-reputation underwriters to charge higher fees than low-reputation ones.

Moreover, when a nascent stock market starts, it may not be clear what kinds of firms should be listed on the market because there are few preceding cases. Key market participants, including regulators, may still be in the process of exploring various options before reaching a consensus (Fung, Gul, & Radhakrishnan, 2014). Because of their prior IPO experience in other markets, high-reputation underwriters are important market participants and may have opportunities to shape the design and operation of a nascent stock market. Potential IPO firms facing the great uncertainty of a nascent stock market are willing to pay a price premium to be undertaken by high-reputation underwriters. This premium price is not just for high-reputation underwriters' superior services but also for their connections with and their influence on other key market players, which may increase the firm's chance of a successful public listing. This can further increase the demand for high-reputation underwriters' services, which increases the price (the underwriting fee). Indeed, high-reputation underwriters' higher fees can be justified because it costs more to provide better services (Fernando et al., 2015). In the context of bond issuing, Fang (2005) found that reputable underwriters charge a price premium because charging a higher fee is "necessary to provide a continued incentive for the reputable underwriters to provide high-quality underwriting services" (Fang, 2005, p. 2731). In the context of equity financing, Hsu (2004) demonstrated that the higher a VC's reputation, the more discount in equity price a start-up must offer to be endorsed by the VC. Likewise, we propose the following hypothesis.

> **Hypothesis (H1).** *At the initial stage of a nascent stock market, there will be a positive relationship between the reputation of a firm's underwriter and its underwriting fee.*

2.2.2 | IPO firm quality and underwriting fee

Underwriting fees also reflect the quality of IPO firms. The lower a firm's quality, the greater effort that its underwriter needs to put in the pre-book-building process and in placing the firm's shares to institutional investors. As a result, the actual expense of serving a lower-quality firm is higher. More importantly, although the potential penalty costs of undertaking low-quality firms may not be perceived to be prohibitive in a nascent stock market, endorsing a low-quality firm nevertheless is riskier to its underwriter than a high-quality firm would be. Endorsing a low-quality firm can pose reputational, financial, and even legal risks to its underwriter that damage the underwriter's future business, including decreased market share, increased regulatory scrutiny for future offerings, and increased client

risk (Beatty, Bunsis, & Hand, 1998). Thus, low-quality firms need to pay a price premium to their underwriters not only for the extra expenses needed to take them public but also to compensate for the evaluated risks imposed on their underwriters.

We use two proxies to capture the quality of an IPO firm: its pre-IPO EM and its pre-IPO VC ownership. EM refers to the practice of distorting a firm's true financial performance (Dechow, Sloan, & Sweeney, 1995; Klein, 2002; Roychowdhury, 2006). The literature on EM has shown that managers have incentives to manipulate earnings in periods prior to equity offers, including IPOs (Teoh et al., 1998). EM[2] allows firms to meet capital market expectations, which is especially attractive to low-quality firms because this would be the most convenient way to "improve" firm performance in the short term.

However, firms with aggressive pre-IPO EM are more likely to experience dramatic declines in post-IPO stock price and earnings and even face litigations due to their misrepresentation of financial reporting (DuCharme, Malatesta, & Sefcik, 2004; Lee & Masulis, 2011). As Teoh et al. (1998) found, firms that engaged in aggressive EM in their pre-IPO stage generated 20% less aftermarket stock returns than those using conservative accounting approaches. As such, we use pre-IPO EM as a reversed indicator of firm quality. If a firm must inflate its earnings to meet the minimum requirement of going public, the firm is of low quality. The greater the magnitude of a firm's pre-IPO EM, the lower the firm's quality. Accordingly, we propose,

> **Hypothesis (H2).** *At the initial stage of a nascent stock market, there will be a positive relationship between a firm's pre-IPO earnings management and its underwriting fee.*

Following a similar logic, we propose a positive relationship between a firm's pre-IPO VC ownership and its underwriting fee. High-quality firms are attractive to VCs because more VCs want to take a share of a good firm and the VCs that have already invested in a good firm have motivations to hold onto or increase their proportions of shares to reap more benefits once the firm is listed. As sophisticated professional investors, VCs are less likely to invest or keep a large proportion of shares in low-quality firms. In addition, because VCs have accompanied their invested firms for a relatively long time, they have more inside information about the firms than underwriters would have, especially if this is the first time the underwriters work with the firms, as is the case in most IPOs. As such, a firm's pre-IPO VC ownership signals the firm's underlying quality to its underwriter. This argument is consistent with the VC literature that argues that VC ownership signals firm quality to outsiders (Gulati & Higgins, 2003). For instance, prior studies have demonstrated that external stakeholders take VC ownership as an important signal of their endorsed firms' quality because VCs provide financial resources and expertise to their endorsed firms (Megginson & Weiss, 1990) and closely monitor them after their initial investments (Gorman & Sahlman, 1989; Sahlman, 1990). Scholars have also found that firms with greater VC ownership are likely to perform better (Jain & Kini, 1994; Khurshed, 2000; Lin, 1996). As greater VC ownership indicates better firm quality, we propose,

> **Hypothesis (H3).** *At the initial stage of a nascent stock market, there will be a negative relationship between a firm's pre-IPO VC ownership and its underwriting fee.*

2.3 | Role of quality-matching mechanism after regulatory improvements

An inherent characteristic of a nascent stock market is that it is dynamic as its regulations are developed, tested, modified, and improved over time. Because the working of the pricing mechanism is contingent upon weak regulations, we expect that its role will decline once regulations are improved. Specifically, in underwriters' benefit–cost analyses, as market regulations become more stringent, the costs of associating with low-quality firms increase, and the likelihood of being caught for taking problematic firms public also increases. Suppose underwriters are found to endorse low-quality firms, especially those that disguise their true pre-IPO earnings. In that case, the underwriters

may be punished thereafter (e.g., being downgraded by the regulators or banned from the IPO business for a certain period), resulting in substantial reputational and financial losses (Lee & Masulis, 2011), as shown in the Ping An example. Such losses are particularly pronounced for high-reputation underwriters because they have much more to lose if something wrong is found with their deals (Lee & Masulis, 2011). Institutional investors represent another pressure that motivates high-reputation underwriters to stay away from problematic listings in a well-regulated market (Lee & Masulis, 2011). In order to avoid risky transactions, institutional investors are reluctant to maintain relationships with underwriters that serve low-quality IPO firms (Beatty & Ritter, 1986; Carter & Manaster, 1990; Tinic, 1988). The potential losses in their relationships with institutional investors make underwriters' future businesses harder, which can be viewed as the penalty costs from the institutional investors.

In summary, as regulations of a nascent stock market improve, the potential penalty costs of taking low-quality firms public become higher and as a result, the elevated risks and penalty costs cannot be sufficiently compensated for by charging higher underwriting fees. As Fang (2005, p. 2730) noted, "as long as the present value of future income exceeds the short-term profit from fraud, investment banks will find defrauding investors suboptimal." Underwriters, especially high-reputation ones, have stronger incentives to work with high-quality IPO firms than before. Accordingly, underwriting fees become less relevant in their choices of clients. Instead, the quality-matching mechanism will kick in as the nascent stock market starts to work more like a mature market. We expect that high-reputation underwriters prefer to work with high-quality firms whereas low-reputation underwriters would have to work with firms that are not chosen by their high-reputation counterparts. Therefore, we propose,

> **Hypothesis (H4).** *At the stage after regulatory improvements, there will be a negative relationship between a firm's pre-IPO earnings management and its underwriter's reputation.*

> **Hypothesis (H5).** *At the stage after regulatory improvements, there will be a positive relationship between a firm's pre-IPO VC ownership and its underwriter's reputation.*

In the sections above, we develop hypotheses regarding the pricing mechanism at the initial stage of a nascent stock market and the quality-matching mechanism after regulatory improvements, respectively. In our empirical analyses, we examine pricing and quality-based mechanisms in both periods for the purpose of comparison.

3 | METHODOLOGY

3.1 | Research context—ChiNext Board in China

ChiNext is the GEM that the Chinese government launched on the Shenzhen Stock Exchange in October 2009. Because entrepreneurial firms often do not meet the track record requirements of the existing stock exchange markets (e.g., the Main Board), GEM is used to bridge this gap and offer entrepreneurial firms an avenue to raise capital. Appendix A presents the summary statistics of all 712 IPOs on the ChiNext from 2009 to 2017 (Table A1), as well as those of 630 IPOs on the Small and Medium-Sized Enterprise (SME) Board (Table A2) and 558 IPOs on the Main Board (Table A3) in the same period. A comparison of these statistics reveals that the average size of IPOs on the ChiNext is comparable to those on the SME Board, but they are much smaller than that those on the Main Board, as expected. The first batch of 28 ChiNext IPOs debuted on October 30, 2009. By December 31, 2012, 355 entrepreneurial firms were listed on ChiNext, with a total market value of 873 billion RMB (Song, 2012). The weak regulations on financial disclosures, combined with the relatively lower listing requirements adopted by ChiNext compared to the Main Board or the SME Board, provided room for weak issuers to get listed on ChiNext.[3] Later, multiple listings on ChiNext were found to be problematic, which significantly damaged investors' confidence in China's stock markets overall (Cai, 2013; China Daily, 2010).

To avoid further problematic listings and to restore investors' confidence, in May 2012, the China Securities Regulatory Commission (CSRC) announced "Opinions on Issues concerning Further Improving the Quality of Financial Information Disclosure by Companies Undertaking an Initial Public Offering" (CSRC Order No. 14 [2012]). Order No. 14 stated that, "The securities regulatory authorities will establish a record system of misconduct of relevant intermediaries of IPO firms and incorporate it into a unified supervision system to form a joint regulatory force; According to the nature and circumstances of the misconduct of the relevant intermediaries, respectively, take administrative supervision measures such as ordering correction, supervision talks, issuing warning letters, and identifying as inappropriate candidates; The securities regulatory authorities will record the misconduct of the relevant intermediary institutions and the regulatory measures and administrative penalties taken by the regulatory authorities in the integrity file, and make them public to the public in due course." To achieve that, CSRC postponed all approved IPOs as well as deals under review to conduct special inspections on their financial reports, resulting in a sudden halt of China's IPO market, which started in October 2012 and lasted till December 2013.

Several problematic listings on ChiNext were identified in 2013, and their underwriters were penalized. The first ban was issued to Ping An Securities for its negligence in the IPO of Wanfu Biotechnology (Hunan) Agricultural Development Co. (300268) on ChiNext (Wall Street Journal, 2013). Before the investigation, Ping An was ranked at the level of A or AA.[4] After the investigation, Ping An was fined 76.65 million RMB, downgraded to the C level, and received a 3-month suspension of underwriting, and two of its sponsor representatives were banned for life from the securities market (Chen, 2013; Wall Street Journal, 2013). CSRC's 2012 embargo of China's entire IPO market lasted for 15 months and has been considered the most stringent regulatory action on IPOs in China. When the IPO market reopened in December 2013, regulations on financial disclosures for IPOs were significantly improved.

There are 712 IPOs on ChiNext from its debut in October 2009 to the end of 2017, when our study period ends. In the 4 years before the 2013 IPO embargo, 355 firms were listed, and 357 firms were listed in the 4 years after the embargo. Appendix B summarizes the average IPO underwriting fee by year on ChiNext. It shows a wide range of underwriting fees, from less than 1% to greater than 20% of proceeds raised. This is consistent with the premise of our study that there is no converged standard on underwriting fees in a nascent stock market. Moreover, the IPO embargo in 2013 provides a natural break that allows us to examine whether the pricing and quality-matching mechanisms may work at different development stages of a nascent market: the initial stage (2009–2012, before the embargo) versus the stage after regulatory improvements (2014–2017, after the embargo).

3.2 | Sample and data

We started with all 712 IPOs on ChiNext since its debut in October 2009 to the end of 2017. Data of these IPOs were collected from the China Stock Market and Accounting Research (CSMAR) database, one of the largest and widely-used databases on China's listed firms (Markóczy, Sun, Peng, Shi, & Ren, 2013; Zhou & Guillén, 2015). After removing observations with missing data,[5] our final sample consisted of 606 IPOs (299 IPOs before and 307 IPOs after the embargo).

3.3 | Measures of variables

3.3.1 | Variables of interest

IPO *underwriting fee* was measured by the gross spread paid to an underwriter as a percentage of the total proceeds raised, adjusted by industry and year (Chen & Ritter, 2000; Ellis, Michael, & O'Hara, 2000; Lyandres, Fu, & Li, 2018; Megginson & Weiss, 1990). The adjustment was made by subtracting the prior industry average underwriting fee from a focal IPO's underwriting fee. The prior industry average underwriting fee was calculated as follows: $\sum$ (gross spreads of IPOs in the same industry that debuted on ChiNext in the 12 months before the focal IPO)/$\sum$ (total proceeds of these

firms). In this formula, the prior industry average fee was weighted by offering size. Out of the 712 IPOs on ChiNext by 2017, 97 IPOs' prior industry average underwriting fee could not be calculated using this formula, among which 28 firms were the first batch listed on ChiNext, 52 firms were the first to go public in their respective industries, and 17 firms went public more than 1 year after their industry peers. For these cases, substitutive measures were used.[6]

Consistent with previous studies (Arthurs, Hoskisson, Busenitz, & Johnson, 2008; Certo, Holcomb, & Holmes, 2009; Lyandres et al., 2018), we measured *underwriter reputation* by the market share of the lead underwriter's new issues in the year prior to an issuing firm's IPO, except that for IPOs in 2014, we used the lead underwriter's market share in 2012 as there were no IPOs in 2013 due to the embargo.[7] In a supplementary analysis, we used *underwriter status*, measured with data on underwriter syndication for IPOs in A shares in China's stock market.

Following previous studies (Chan, Chen, Chen, & Yu, 2014;Cohen & Zarowin, 2010; Zang, 2012), we measured *pre-IPO* EM by combining two dimensions: pre-IPO accrual-based EM (AEM) and pre-IPO real EM (REM). AEM refers to a purposeful action to alter reported earnings by changing the accounting methods to present a given transaction in the financial statements (e.g., changing the depreciation method for fixed assets) (Zang, 2012). REM is operated by altering the execution of a real operation, investment, or financing transaction (e.g., boosting sales through accelerating their timing) and reducing discretionary expenses (Cohen & Zarowin, 2010; Zang, 2012).

To measure AEM, we used discretionary accruals based on a modified version of the Jones model (see Appendix C) (Dechow et al., 1995; Ding, Zhang, & Zhang, 2007; Jones, 1991; Yu, 2008). Considering the relatively small number of listed firms on ChiNext, we collected accounting information on all firms that went public between 2009 and 2017 on ChiNext and the SME Board to have a sufficient number of peer firms to calculate a focal firm's pre-IPO EM.[8] Following prior research (Dechow et al., 1995), for each combination of the calendar year and the two-digit CSRC industry code with a minimum of 15 observations, we estimated discretionary accruals from cross-sectional regressions of total accruals on changes in sales and accounts receivable and on property, plant, and equipment (PPE). As some industries had fewer than 15 firms in a year and were thus dropped, only the 10 largest industries were used (i.e., C0, C2, C3, C4, C5, C6, C7, C8, G, and I)[9] to estimate AEM of IPO firms in these industries. Consistent with prior literature, we only kept positive AEM which denotes income-increasing manipulations and is more problematic (Chen et al., 2015; Yu, 2008).

To measure REM, we used the same sample but with a different method (see Appendix C) (Cohen & Zarowin, 2010; Roychowdhury, 2006). For each combination of calendar year and two-digit CSRC industry code, we estimated abnormal cash flow from cross-sectional regressions of cash flow on sales and accounts receivable as well as on changes in sales and accounts receivable, and estimated abnormal discretionary expenses from cross-sectional regressions of discretionary expenses on sales and accounts receivable. We followed prior research (Zang, 2012) and multiplied abnormal cash flow and abnormal discretionary expenses by -1 to make REM in the same valence as AEM. Similarly, we only kept positive REM to reflect those income-increasing manipulations (Chen et al., 2015; Yu, 2008).

Recent studies suggest that using only AEM or REM is not sufficient to capture the overall scale of firms' EM activities because these two dimensions complement each other in fine-tuning financial statements (Chan et al., 2014; Cohen & Zarowin, 2010; Fields, Lyz, & Vincent, 2001; Zang, 2012). Thus, we created a composite measure of pre-IPO EM by first standardizing AEM and REM and then taking an average (Cronbach's alpha .67) (Gopalan & Jayaraman, 2012). *Pre-IPO VC ownership* was measured by the percentage of a firm's equity held by VCs before its IPO (Gulati & Higgins, 2003), based on the data of a firm's top 10 shareholders prior to IPO. Alternatively, we computed this variable using the data of all shareholders and obtained highly consistent results.

3.3.2 | Control variables

To rule out alternative explanations, we controlled for a series of IPO firm attributes, deal attributes, and macroeconomic factors that may affect the pairing between underwriters and IPO firms as well as underwriting fees. In

particular, we included the following IPO firm attributes. First, we controlled for the natural log transformation of firm sales in the year prior to IPO (*Ln*(*sales*)) since larger firms are more attractive to underwriters. Second, *firm age*, the number of years since the firm's inception to its IPO, was included because older firms tend to be more reliable than young firms (Stuart, Hoang, & Hybels, 1999).[10] Third, we used return on asset in the year prior to IPO to control for firm performance because firms that perform better are more attractive to underwriters. Furthermore, given that innovation is an important source of future growth and ChiNext specifically targets entrepreneurial firms, we controlled for *patent density*, measured by the size of a firm's patent stock divided by the number of its employees in the year prior to IPO (Arthurs, Busenitz, Hoskisson, & Johnson, 2009). Alternatively, we used the size of patent stock (i.e., the number of patents granted, either natural logged or non-logged), and the results remained the same. In addition, we included book value per share (*BVPS*), which was measured as the disclosed BVPS in a firms' IPO prospectus. BVPS articulates a firm's net asset value on a per-share basis, and when combined with other financial indicators such as earnings, they may indicate a firm's growth and return in general (Easton, 1998; Penman & Reggiani, 2013).

We also included a series of deal-level factors. Four firms were underwritten by a syndicate of underwriters whereas others were underwritten by a single underwriter. To account for the difference, we included a dummy variable, *underwriter syndication*, coded "1" if an IPO was underwritten by a syndicate, and "0" if it was underwritten by one underwriter. We also used a continuous measure of syndication size and obtained virtually the same results. In addition, because the spatial distance between the underwriter and an IPO firm may matter, we followed Sorenson and Stuart (2001) and controlled for *underwriter–firm distance* by the natural logarithm transformation of miles between the underwriter's and the firm's headquarters. Moreover, to account for the economies of scale in IPOs that larger offerings typically pay a smaller percentage of the total proceeds raised as underwriting fee (Megginson & Weiss, 1990; Ritter, 1987) and to control for the attractiveness of larger offerings to underwriters, we included the natural log transformation of the total proceeds raised, that is, *Ln*(*proceeds*).

Finally, to account for the impact of macroeconomic factors, we included *market hotness*, measured by the moving average of past 90-days' China Securities Index 300 of A shares prior to an IPO (Stuart et al., 1999). As IPO deal flow may affect the competition among underwriters and thus their pairing with firms (Lyandres et al., 2018), we controlled for ChiNext's IPO *deal flow*, which refers to the number of newly approved IPOs listed on ChiNext in a given year. In addition, *industry dummies* and *year dummies* were included in all models to account for macroeconomic conditions otherwise not captured. The definitions of all variables are summarized in Appendix D.

4 | DATA ANALYSES AND RESULTS

4.1 | MAIN ANALYSES

Panels a and b of Table 1 report the descriptive statistics and the correlation matrix for the pre-embargo period and the post-embargo period, respectively. An important assumption of our research design is that the pre-embargo and post-embargo periods represent two different development stages of ChiNext. To verify this assumption, we conducted univariate tests (results in Table 2) to compare key variables of interest between these two periods. In all statistical analyses (except Table 1), continuous variables were winsorized at the tails of 1 and 99% to reduce the influence of outliers.

As shown in Panel a of Table 2, the average pre-IPO EM changed from 0.220 before the embargo to −0.085 after the embargo, representing a reduction of 139% ($p = .000$). The average pre-IPO VC ownership changed from 13.660 before the embargo to 17.295 after the embargo, representing an increase of 27% ($p = .009$). These changes indicate that IPO firms' average quality is better after the embargo. However, the statistics show that underwriter reputation and underwriting fee do not differ significantly between these two periods. These statistics suggest that underwriters more or less remained the same after regulatory improvements on ChiNext, whereas their clients' quality got improved.

TABLE 1 Descriptive statistics[11,12]

Panel a. Pre-embargo ($N = 299$)

Variables	Mean	*SD*	Min	Max	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Underwriting fee	0.871	1.992	−5.051	6.585													
2. Underwriter reputation	3.208	3.930	0	34.381	.020												
3. Pre-IPO EM	0.290	1.390	−0.660	17.265	.021	−.031											
4. Pre-IPO VC ownership	13.663	16.698	0	74.66	−.051	.022	.030										
5. Ln(sales)	5.509	0.632	3.983	8.109	−.225	.099	.057	.101									
6. Firm age	8.813	4.483	0	24	.012	.061	−.080	.069	.062								
7. ROA	0.183	0.078	0.054	0.488	−.147	.092	−.015	−.025	−.266	−.109							
8. Patent density	0.023	0.099	0	1.642	.036	.007	−.034	−.046	−.040	.042	−.017						
9. BVPS	3.031	1.051	1.06	8.79	−.081	.233	−.041	.103	.318	.181	.023	.074					
10. Underwriter syndication	0.007	0.082	0	1	−.019	−.059	−.051	−.067	.039	−.006	−.005	.004	.052				
11. Underwriter–firm distance	6.040	1.792	0.140	7.793	−.054	.058	.121	.037	−.009	−.023	−.061	.015	.062	−.118			
12. Ln(proceeds)	6.300	0.533	5.142	7.775	−.453	.089	−.001	.122	.424	−.192	.213	−.079	.143	−.015	−.019		
13. Market hotness	2,989.551	314.425	2,312.331	3,499.970	−.026	−.107	.045	−.081	−.103	−.188	−.102	.001	−.257	−.037	.018	.286	
14. IPO deal flow	104.221	29.899	36	128	.153	−.120	−.093	−.072	.047	−.013	−.111	.050	−.084	−.009	.082	.179	.247

Panel b. Post-embargo ($N = 307$)

Variables	Mean	*SD*	Min	Max	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Underwriting fee	1.108	3.271	−6.525	13.004													
2. Underwriter reputation	3.238	3.769	0	20.408	−.042												
3. Pre-IPO EM	−0.085	0.588	−0.660	2.936	−.012	.001											
4. Pre-IPO VC ownership	17.302	17.632	0	75.07	.005	.176	−.089										
5. Ln(sales)	5.947	0.630	4.778	9.582	−.303	.098	.049	.075									
6. Firm age	13.401	4.989	2	32	.030	.036	−.045	−.006	.060								
7. ROA	0.140	0.069	0.025	0.476	−.351	.049	−.107	−.041	−.116	−.138							

(Continues)

TABLE 1 (Continued)

Panel b. Post-embargo ($N = 307$)																
Variables	**Mean**	***SD***	**Min**	**Max**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
8. Patent density	0.025	0.059	0	0.446	.078	−.018	−.068	.017	−.118	−.056	−.068						
9. BVPS	4.940	1.874	1.45	14.37	−.271	.094	.019	−.034	.317	−.067	.094	.055					
10. Underwriter syndication	0.007	0.081	0	1	.076	.027	−.034	.014	.073	.107	−.036	−.035	−.053				
11. Underwriter–firm distance	6.054	1.713	0.263	8.096	−.008	.016	.143	.075	−.101	.069	−.095	.114	.045	−.051			
12. Ln(proceeds)	5.722	0.525	4.637	7.617	−.599	.157	−.076	.036	.599	−.057	.432	−.145	.458	.065	−.091		
13. Market hotness	3,406.564	593.313	2,166.788	4,763.351	.052	.027	−.061	.033	−.020	.170	−.082	.061	−.006	.019	−.090	.059	
14. IPO deal flow	100.192	34.005	51	141	.068	.083	.032	.097	.042	.224	−.022	−.317	−.094	.097	.007	.077	.445

Abbreviation: IPO, initial public offering.

TABLE 2 Univariate tests

Panel a. Univariate tests of key variables between before and after the embargo

	Before ($N = 299$)	After ($N = 307$)	Diff. in mean (after–before)	*t*-Value of mean test	*p*-Value of mean test
Pre-IPO EM	0.220	−0.085	−0.305	−4.878	.000
Pre-IPO VC ownership	13.660	17.295	3.634	2.606	.009
Underwriting fee	0.871	1.071	0.199	0.931	.352
Underwriter reputation	3.182	3.238	0.056	0.185	.854

Panel b. Univariate tests of underwriting fee between before and after the embargo

	Firms with low-reputation underwriter (C1)	Firms with high-reputation underwriter (C2)	Diff. in mean (C2–C1)	*t*-Value of mean test	*p*-Value of mean test	Firms with low pre-IPO EM (C3)	Firms with high pre-IPO EM (C4)	Diff. in mean (C4–C3)	*t*-Value of mean test	*p*-Value of mean test	Firms with low pre-IPO VC ownership (C5)	Firms with high pre-IPO VC (C6)	Diff. in mean (C6–C5)	*t*-Value of mean test	*p*-Value of mean test
Before	0.835 ($N = 175$)	0.923 ($N = 124$)	0.088	0.376	.707	0.684 ($N = 183$)	1.167 ($N = 116$)	0.483	2.053	.041	0.925 ($N = 192$)	0.774 ($N = 107$)	−0.151	−0.628	.531
After	1.146 ($N = 193$)	0.943 ($N = 114$)	−0.202	−0.544	.587	1.020 ($N = 188$)	1.150 ($N = 119$)	0.130	0.353	.725	1.104 ($N = 203$)	1.005 ($N = 104$)	−0.098	−0.259	.796

Panel c. Univariate tests of underwriter reputation between before and after the embargo

	Firms with low pre-IPO EM (C1)	Firms with high pre-IPO EM (C2)	Diff. in mean (C2–C1)	*t*-Value of mean test	*p*-Value of mean test	Firms with low pre-IPO VC ownership (C3)	Firms with high pre-IPO VC ownership (C4)	Diff. in mean (C4–C3)	*t*-Value of mean test	*p*-Value of mean test
Before	3.434 ($N = 183$)	2.783 ($N = 116$)	−0.651	−1.467	.143	3.263 ($N = 192$)	3.036 ($N = 107$)	−0.226	−0.501	.617
After	3.324 ($N = 188$)	3.102 ($N = 119$)	−0.222	−0.501	.617	2.742 ($N = 203$)	4.206 ($N = 104$)	1.464	3.271	.001

Abbreviation: IPO, initial public offering.

Panel b reports the results of univariate tests of underwriting fee, which may inform H1–H3. First, before the embargo, the average underwriting fee paid by firms with high-reputation underwriters (0.923) is 10% higher than those with low-reputation underwriters (0.835); this is consistent with H1, albeit not significant. In comparison, after the embargo, the average underwriting fee paid by firms with high-reputation underwriters (0.943) is 18% lower than those with low-reputation underwriters (1.146), which is not significant. Second, before the embargo, the average underwriting fee paid by high EM firms (1.167) is 70% higher than that paid by low EM firms (0.684). This difference is significant ($p = .041$), providing preliminary evidence to support H2. In comparison, after the embargo, the average underwriting fee paid by high EM firms (1.150) is 13% lower than that paid by low EM firms (1.020), which is not significant. Third, before the embargo, the average underwriting fee paid by firms with high VC ownership (0.774) is 16% less than those with low VC ownership (0.925), which is consistent with H3, albeit not significant. In comparison, after the embargo, the average underwriting fee paid by firms with high VC ownership (1.005) is 9% lower than those with low VC ownership (1.104), which is not significant.

Panel c reports the results of univariate tests of underwriter reputation, which may inform H4 and H5. First, after the embargo, the average underwriter reputation of high EM firms (3.102) is 7% lower than that of low EM firms (3.324), which is consistent with H4, albeit not significant. In comparison, before the embargo, the average underwriter reputation of high EM firms (2.783) is 19% lower than that of low EM firms (3.434), which is not significant. Second, after the embargo, the average underwriter reputation of firms with high VC ownership (4.206) is 53% higher than those with low VC ownership (2.742). This difference is significant ($p = .001$), providing preliminary evidence to support H5. In comparison, before the embargo, the average underwriter reputation of firms with high VC ownership (3.036) is 7% lower than those with low VC ownership (3.263), which is not significant.

Together, the univariate tests in Panels a–c of Table 2 suggest that the pairing of underwriters and IPO firms may be different between the initial stage (before the embargo) and the stage after regulatory improvements (after the embargo). However, as univariate tests can only provide preliminary evidence for our hypotheses, we conducted formal regression analyses to test our hypotheses. Because IPO firms that debuted in the pre- and post-embargo periods differ significantly in their quality, it would not make sense to pool them together. Thus, we treat IPOs in these periods as two separate groups, which is consistent with our hypotheses.

H1–H3 examine the pairing in the pre-embargo period. They are tested using ordinary least squares (OLS) regressions with robust *SE*s, using an IPO firm's underwriting fee as the dependent variable. Table 3 presents the results. Models 1 and 2 use the sample of IPOs in the pre-embargo period for hypothesis testing. Model 1 includes controls only, and Model 2 adds the variables of interest. H1 proposes a positive relationship between the reputation of a firm's underwriter and the firm's underwriting fee. In Model 2, the coefficient for underwriter reputation is positive and significant ($b = .074$, $p = .014$), supporting H1. In terms of effect size, a one unit increase in underwriter reputation (measured by underwriter market share) would be associated with a 7.4% increase in underwriting fee (adjusted by industry and year).

H2 proposes a positive relationship between a firm's pre-IPO EM and its underwriting fee. The coefficient for pre-IPO EM is positive and significant ($b = .233$, $p = .017$), supporting H2. In terms of effect size, a one unit increase in pre-IPO EM would be associated with a 23.3% increase in underwriting fee (adjusted by industry and year). H3 proposes a negative relationship between a firm's pre-IPO VC ownership and its underwriting fee. The coefficient for pre-IPO VC ownership is not significant ($b = .005$, $p = .474$). Thus, H3 is not supported. Models 3 and 4 replicate Models 1 and 2 with IPO firms in the post-embargo period. None of these relationships were significant in the post-embargo period.

Among the controls, the coefficient for Ln(proceeds) is negative and significant in both pre- and post-embargo periods ($b = -1.737$, $p = .000$ in Model 1, and $b = -3.586$, $p = .000$ in Model 3). These results are consistent with the prior literature that economies of scale exist in IPOs, with larger offerings typically paying lower fees (Megginson & Weiss, 1990; Ritter, 1987). Moreover, the coefficient for underwriter–firm distance is negative and significant in the pre-embargo period ($b = -.125$, $p = .028$ in Model 1) but not in the post-embargo period. The results suggest that with the pricing mechanism in place, underwriters may offer fee discounts to attract distant

TABLE 3 Results of OLS models on underwriting fee[13,14]

	Model 1 Pre-embargo	Model 2 Pre-embargo	Model 3 Post-embargo	Model 4 Post-embargo	Model 5 Pre-embargo	Model 6 Post-embargo	Model 7 Piecewise model
Predictors							
Underwriter reputation		0.074* (0.030)		0.038 (0.039)			
Underwriter status (for robustness check)					0.681+ (0.393)	−0.036 (0.587)	
Pre-IPO EM		0.233* (0.097)		−0.372 (0.235)	0.218* (0.099)	−0.368 (0.233)	
Pre-IPO VC ownership		0.005 (0.007)		−0.002 (0.008)	0.004 (0.007)	−0.001 (0.008)	
Underwriter reputation before embargo							0.103** (0.034)
Underwriter reputation after embargo							0.022 (0.040)
Pre-IPO EM before embargo							0.211* (0.099)
Pre-IPO EM after embargo							−0.255 (0.225)
Pre-IPO VC ownership before embargo							0.010 (0.007)
Pre-IPO VC ownership after embargo							−0.001 (0.008)
Controls							
Ln(sales)	−0.242 (0.219)	−0.319 (0.217)	0.130 (0.330)	0.190 (0.338)	−0.270 (0.219)	0.176 (0.340)	−0.135 (0.195)
Firm age	−0.040 (0.025)	−0.037 (0.025)	−0.043 (0.031)	−0.049 (0.032)	−0.035 (0.025)	−0.048 (0.031)	−0.038+ (0.021)
ROA	−0.830 (1.600)	−0.940 (1.612)	−4.586+ (2.683)	−4.656+ (2.733)	−0.874 (1.623)	−4.765+ (2.706)	−3.363* (1.484)
Patent density	4.702 (3.976)	5.363 (4.060)	4.060 (5.051)	3.638 (5.149)	5.246 (4.029)	3.486 (5.107)	4.985 (3.349)
BVPS	0.116 (0.091)	0.065 (0.096)	0.013 (0.089)	0.020 (0.090)	0.113 (0.094)	0.023 (0.089)	−0.041 (0.069)
Underwriter syndication	−1.078*** (0.250)	−0.631 (0.383)	4.215*** (0.825)	4.160*** (0.795)	−0.723* (0.333)	4.182*** (0.799)	1.754 (1.309)
Underwriter–firm distance	−0.125* (0.057)	−0.155** (0.057)	−0.124 (0.085)	−0.105 (0.084)	−0.148** (0.057)	−0.107 (0.085)	−0.128* (0.051)

(Continues)

TABLE 3 (Continued)

	Model 1 Pre-embargo	Model 2 Pre-embargo	Model 3 Post-embargo	Model 4 Post-embargo	Model 5 Pre-embargo	Model 6 Post-embargo	Model 7 Piecewise model
Ln(proceeds)	−1.737*** (0.314)	−1.780*** (0.314)	−3.586*** (0.478)	−3.705*** (0.487)	−1.753*** (0.324)	−3.649*** (0.494)	−2.674*** (0.283)
Market hotness	−0.000 (0.001)	−0.000 (0.001)	0.000 (0.000)	0.000 (0.000)	−0.000 (0.001)	0.000 (0.000)	0.000 (0.000)
IPO deal flow	0.013** (0.005)	0.015** (0.005)	0.011 (0.008)	0.011 (0.008)	0.014** (0.005)	0.011 (0.008)	0.003 (0.005)
Constant	13.546*** (2.052)	13.993*** (2.052)	21.196*** (2.008)	21.410*** (2.021)	13.388*** (2.043)	21.294*** (2.018)	19.003*** (1.702)
Observations	299	299	307	307	299	307	606
R^2	.313	.340	.410	.416	.331	.414	.358

Note: +p < .10; *p < .05; **p < .01; ***p < .001. Two-tailed tests.
Abbreviations: IPO, initial public offering; OLS, ordinary least squares.

TABLE 4 Results of OLS models on underwriter reputation[16,17]

	Model 1 Post-embargo	Model 2 Post-embargo	Model 3 Pre-embargo	Model 4 Pre-embargo	Model 5 Post-embargo, underwriter status	Model 6 Pre-embargo, underwriter status	Model 7 Piecewise model	Model 8 DID model
Predictors								
Pre-IPO EM		0.107 (0.400)		−0.262 (0.242)	0.017 (0.023)	−0.007 (0.016)		−0.212 (0.245)
Pre-IPO VC ownership		0.035* (0.015)		−0.009 (0.012)	−0.000 (0.001)	0.000 (0.001)		−0.007 (0.011)
Pre-IPO EM before embargo							−0.212 (0.245)	
Pre-IPO EM after embargo							0.004 (0.383)	
Pre-IPO VC ownership before embargo							−0.007 (0.011)	
Pre-IPO VC ownership after embargo							0.034* (0.014)	
Pre-IPO EM × IPO embargo								0.216 (0.447)
Pre-IPO VC ownership × IPO embargo								0.040* (0.018)
Controls								
Ln(sales)	−0.285 (0.475)	−0.392 (0.492)	0.282 (0.479)	0.337 (0.473)	0.003 (0.036)	−0.035 (0.033)	0.111 (0.341)	0.111 (0.341)
Firm age	0.020 (0.057)	0.029 (0.056)	−0.011 (0.042)	−0.013 (0.042)	−0.004 (0.003)	−0.004 (0.004)	0.015 (0.036)	0.015 (0.036)
ROA	−2.854 (4.834)	−2.623 (5.012)	2.179 (3.653)	2.044 (3.708)	−0.284 (0.331)	0.127 (0.257)	0.494 (2.941)	0.494 (2.941)
Patent density	−1.633 (8.930)	−3.876 (9.401)	−6.108 (5.715)	−6.378 (5.646)	−0.195 (0.426)	−0.524 (0.481)	−4.169 (5.422)	−4.169 (5.422)
BVPS					−0.007 (0.010)	0.007 (0.016)		

(Continues)

TABLE 4 (Continued)

	Model 1 Post-embargo	Model 2 Post-embargo	Model 3 Pre-embargo	Model 4 Pre-embargo	Model 5 Post-embargo, underwriter status	Model 6 Pre-embargo, underwriter status	Model 7 Piecewise model	Model 8 DID model
	0.062 (0.128)	0.078 (0.124)	0.710* (0.323)	0.709* (0.320)			0.225+ (0.126)	0.225+ (0.126)
Underwriter syndication	0.255 (1.344)	0.256 (1.134)	−3.260* (1.538)	−3.545* (1.606)	0.350 (0.385)	−0.250** (0.081)	−1.401 (1.293)	−1.401 (1.293)
Underwriter–firm distance	−0.002 (0.143)	−0.029 (0.147)	0.144 (0.125)	0.166 (0.126)	−0.011 (0.009)	0.009 (0.008)	0.095 (0.095)	0.095 (0.095)
Ln(proceeds)	1.387* (0.697)	1.373+ (0.703)	0.704 (0.667)	0.720 (0.696)	0.110+ (0.060)	0.040 (0.043)	0.900+ (0.502)	0.900+ (0.502)
Market hotness	0.001 (0.001)	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	−0.000 (0.000)	−0.000 (0.000)	0.001 (0.001)	0.001 (0.001)
IPO deal flow	−0.010 (0.014)	−0.010 (0.014)	0.000 (0.013)	−0.002 (0.014)	0.000 (0.001)	0.002** (0.001)	−0.004 (0.014)	0.002 (0.013)
Constant	−3.367 (3.064)	−2.907 (3.125)	-8.447+ (4.485)	−8.367+ (4.636)	−0.196 (0.242)	−0.024 (0.324)	−6.244+ (3.225)	−6.464* (3.231)
Observations	307	307	299	299	307	299	606	606
R^2	.058	.083	.147	.152	.120	.213	.100	.100

Note: +p < .10; *p < .05; **p < .01; ***p < .001. Two-tailed tests.
Abbreviations: IPO, initial public offering; OLS, ordinary least squares.

client firms. In addition, the coefficient for IPO deal flow is positive and significant in the pre-embargo period ($b = .013$, $p = .006$ in Model 1) but not significant in the post-embargo period. These results suggest that with the pricing mechanism in place, underwriters may increase fees when the demand for their services is high. These results provide additional evidence to support our core argument that pricing (the underwriting fee) plays an important role in the pre-embargo period but not in the post-embargo period.[15]

H4 and H5 examine the pairing in the post-embargo period. They are tested using OLS regressions with robust *SE*s, with the reputation of an IPO firm's underwriter reputation as the dependent variable. Table 4 presents the results. Models 1 and 2 use the sample of IPOs in the post-embargo period for hypothesis testing. Model 1 includes controls only and Model 2 adds the variables of interest. H4 proposes a negative relationship between a firm's pre-IPO EM and its underwriter's reputation. In Model 2, the coefficient for pre-IPO EM is not significant ($b = .107$, $p = .789$). Thus, H4 is not supported. H5 proposes a positive relationship between a firm's pre-IPO VC ownership and its underwriter's reputation. The coefficient for pre-IPO VC ownership is positive and significant ($b = .035$, $p = .017$), supporting H5. In terms of effect size, a 1% increase in pre-IPO VC ownership would be associated with a 3.5% increase in underwriter reputation (measured by underwriter market share). Models 3 and 4 replicate Models 1 and 2 with IPO firms in the pre-embargo period. As expected, neither of these relationships were significant in the pre-embargo period.

Among the controls, the coefficient for Ln(proceeds) is positive and significant in the post-embargo period ($b = 1.387$, $p = .047$ in Model 1) but not significant in the pre-embargo period. The results suggest that with the quality-matching mechanism in place, IPO firms with larger offerings are paired with underwriters with higher reputation, which is consistent with our core argument. In comparison, BVPS is positively ($b = .710$, $p = .029$ in Model 3) related to underwriter reputation in the pre-embargo period, but not in the post-embargo period. While this result may look contradictory to our core argument, note that firms' book values, just as their earnings, were more likely to be inflated in the pre-embargo period than in the post-embargo period. Therefore, a higher BVPS in the pre-embargo period does not necessarily indicate higher firm quality.

4.2 | Supplementary analyses

4.2.1 | Alternative measure of underwriter reputation

In our main analyses, underwriter reputation was measured by the market share of the underwriter's new issues in the prior year (Arthurs et al., 2008; Certo et al., 2009; Lyandres et al., 2018). In supplementary analyses, we replaced it with *underwriter status*, measured as below. Specifically, we first developed an asymmetric network of underwriter syndication for IPOs in A shares in China's stock market following Shipilov's (2006) study. A particular matrix entry, X_{ij}, corresponds to the number of times that an underwriter in row *i* partners with another underwriter in column *j* in a syndicate during a 2-year period.[18] We calculated the Bonacich (1987) power measure (Chung, Singh, & Lee, 2000; Podolny, 1993; Shipilov, 2006) using the following formula:

$$c(\alpha,\beta) = \alpha \sum_{k=0}^{\infty} \beta^k R^{k+1} 1_i,$$

where $c(\alpha,\beta)$ is a vector of centrality scores for an underwriter, α is a scaling factor, and β is a weight set to be three-quarters of the reciprocal of the largest eigenvalue (Podolny, 1993). The correlation between underwriter status and underwriter reputation is.428. The results of the supplementary analyses are reported in Models 5 and 6 of Table 3 and in Models 5 and 6 of Table 4. Our results show that underwriter status has a positive relationship with underwriting fee in the pre-IPO embargo period ($b = .681$, $p = .084$ in Model 5 of Table 3), confirming H1. However, there is no significant relationship between indicators of IPO firm quality and underwriter status in the post-IPO embargo period.

4.2.2 | Piecewise linear regression

In the main analyses, we tested our hypotheses in the pre- and post-embargo periods separately. In a supplementary analysis, we used a piecewise linear model, which allows coefficients to be estimated separately for the different periods within the same regression. The results of Model 7 in Table 3 show a positive and significant relationship between underwriter reputation before embargo and underwriting fee ($b = .103$, $p = .002$) and a positive relationship between pre-IPO EM before embargo and underwriting fee ($b = .211$, $p = .033$), confirming H1 and H2, respectively. However, the relationship between pre-IPO VC ownership before embargo and underwriting fee is not significant ($b = .010$, $p = .162$), rejecting H3. The results of Model 7 of Table 4 show that the relationship between pre-IPO EM after embargo and underwriter reputation is not significant ($b = .004$, $p = .991$), rejecting H4. However, the results show a positive and significant relationship between pre-IPO VC ownership after embargo and underwriter reputation ($b = .034$, $p = .018$), confirming H5. Overall, the results of the piecewise linear regressions are largely consistent with those of the main analyses.

4.2.3 | Difference-in-difference analysis

We conducted a difference-in-difference (DID) analysis to show the impact of the regulatory improvements, following prior literature on DID approaches that deal with similar one-off external shocks (e.g., Fang, Lerner, Wu, & Zhang, 2018). We first examined whether the pre-embargo trends of our dependent variables (i.e., underwriting fee and underwriter reputation) are parallel between firms with low and high levels in our predictors, respectively. Note that our theoretical arguments suggest that the pre-embargo trends in underwriting fee should *not* be parallel but should vary depending upon the predictors. Empirically, our tests demonstrated that the parallel trends in underwriting fee do not exist for many cases. Thus, a DID analysis is not applicable to testing H1–H3. In contrast, the tests confirmed the existence of parallel trends in underwriter reputation. As a result, we conducted DID analysis to test our H4 and H5 (but not H1–H3). Following Fang et al. (2018), in Model 8 of Table 4, we created two interaction terms: pre-IPO EM × IPO embargo, and pre-IPO VC ownership × IPO embargo. To reduce the potential problem of multicollinearity, continuous variables were mean-centered prior to creating the interaction terms (Aiken & West, 1991). The results show that pre-IPO EM × IPO embargo is positive but not significant ($b = .216$, $p = .629$), rejecting H4. Pre-IPO VC ownership × IPO embargo is positive and significant ($b = .040$, $p = .024$), confirming H5 and indicating a stronger effect of pre-IPO VC ownership on underwriter reputation after the embargo.

4.2.4 | Additional analyses on signaling

To test whether underwriter reputation and underwriting fee may signal IPO firm quality, we examined whether they predict IPO performance—that is, IPO valuation premium and IPO underpricing, or post-IPO sales growth. Valuation premium was measured as the percentage difference between the offer price and BVPS in the year prior to IPO, divided by offer price—that is, ([offer price − BVPS]/offer price) × 100 (Bruton, Filatotchev, Chahine, & Wright, 2010; Certo et al., 2009; Certo, Daily, Cannella, & Dalton, 2003). Underpricing was measured as the percentage difference between first-day closing price and offer price, divided by offer price—that is, ([day 1 closing price − offer price]/offer price] × 100 (Arthurs et al., 2008; Heeley, Matusik, & Jain, 2007). Post-IPO sales growth was measured by the percentage change in the average sales from the 3 years immediately prior to IPO to that in the 3 years after IPO (excluding the IPO year) (Fan, Wong, & Zhang, 2007).

The results are reported in Table 5.[19] Underwriter reputation does not predict any of these dependent variables. Instead, our results show that underwriting fee has a negative relationship with valuation premium in both pre- and

TABLE 5 Results of OLS models on IPO performance and post-IPO sales growth[20,21,22]

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	DV = valuation premium		DV = underpricing		DV = post-IPO sales growth	
	Pre-embargo	Post-embargo	Pre-embargo	Post-embargo	Pre-embargo	Post-embargo
Predictors						
Underwriting fee	−0.271* (0.113)	−1.439*** (0.330)	2.555** (0.898)	−0.039 (0.041)	−0.089* (0.043)	−0.029 (0.041)
Underwriter reputation	−0.011 (0.048)	0.177 (0.148)	−0.322 (0.346)	0.006 (0.010)	0.009 (0.019)	−0.023 (0.024)
Controls						
Pre-IPO EM	−0.001 (0.011)	−0.025 (0.036)	−0.266*** (0.073)	0.003 (0.003)	0.172+ (0.093)	−0.011 (0.152)
Pre-IPO VC ownership	−0.049 (0.189)	0.586 (1.211)	0.278 (1.988)	0.188 (0.157)	0.006 (0.004)	0.004 (0.006)
Ln(sales)	−0.012 (0.339)	0.571 (1.159)	−8.944** (3.036)	−0.236 (0.216)	−0.757*** (0.171)	−0.318* (0.150)
Firm age	−0.134** (0.047)	−0.206 (0.138)	0.985* (0.412)	0.012 (0.014)	−0.020 (0.024)	−0.010 (0.015)
ROA	28.719*** (2.433)	105.299*** (13.176)	−0.734 (24.970)	−1.334 (1.604)	0.190 (1.326)	−1.190 (1.420)
Patent density	−7.885 (6.892)	−17.640 (25.332)	−11.514 (49.175)	1.566 (1.682)	−6.108** (2.327)	0.881 (2.789)
BVPS	−0.919*** (0.221)	−1.494** (0.499)	−2.126 (1.654)	−0.028 (0.024)	−0.030 (0.083)	−0.004 (0.042)
Underwriter syndication	−0.810 (3.916)	0.709 (7.093)	−19.659** (6.271)	0.175 (0.307)	−0.474+ (0.276)	0.492 (0.414)
Underwriter–firm distance	−0.143 (0.095)	0.004 (0.337)	0.802 (0.902)	0.017 (0.017)	−0.023 (0.058)	−0.038 (0.048)
Market hotness	0.005*** (0.001)	0.002 (0.002)	−0.032*** (0.009)	−0.000 (0.000)	*Not controlled*	*Not controlled*
IPO deal flow	0.005 (0.007)	−0.104** (0.034)	−0.786*** (0.080)	0.004 (0.007)	0.006+ (0.004)	−0.005 (0.003)
Constant	73.988*** (4.102)	67.478*** (8.721)	262.098*** (39.239)	45.103*** (0.708)	6.236*** (1.016)	4.664*** (1.389)
Observations	299	307	299	307	299	307
R^2	.635	.500	.417	.029	.157	.065

Note: +p < .10; *p < .05; **p < .01; ***p < .001. Two-tailed tests.
Abbreviations: IPO, initial public offering; OLS, ordinary least squares.

post-embargo periods ($b = -.271$, $p = .017$, Model 1, and $b = -1.439$, $p = .000$, Model 2). We also find that underwriting fee has a positive relationship with underpricing in the pre-embargo period ($b = 2.555$, $p = .005$, Model 3) and has a negative relationship with post-IPO sales growth in the pre-embargo period ($b = -.089$, $p = .038$, Model 5). These results will be discussed in the next section of the paper.

5 | DISCUSSION AND CONCLUSIONS

5.1 | Main findings

The role of the quality-matching mechanism in pairing underwriters and IPO firms in mature stock markets has been well documented in prior IPO literature. In this study, we examined how underwriters and IPO firms are paired in a nascent stock market, which typically starts with weak regulations and then improves its regulations. We propose an evolutionary view of pairing in the process of regulatory improvements. That is, a pricing mechanism, through which underwriters and IPO firms are paired through pricing (the underwriting fee), works at the initial stage of a nascent market, whereas the quality-matching mechanism, through which high-reputation underwriters are paired with high-quality firms and vice versa, starts to play a role after the regulations of a nascent stock market are significantly improved.

We tested these arguments in the context of China's ChiNext Board. Taking advantage of a sudden IPO embargo after which the regulations were significantly improved, we divided the study period into two parts: the pre-embargo period (i.e., the initial stage of the nascent stock market) and the post-embargo period (i.e., the stage after regulatory improvements). In the pre-embargo period, we find a positive relationship between the reputation of an IPO firm's underwriter and the firm's underwriting fee, as well as a positive relationship between an IPO firm's pre-IPO EM—a reversed indicator of firm quality—and its underwriting fee. In the post-embargo period, we find a positive relationship between a firm's pre-IPO VC ownership—an indicator of firm quality—and its underwriter's reputation. These results support our argument that the pricing mechanism works in the initial stage of a nascent stock market while the quality-matching mechanism starts to play a role after regulatory improvements in the market.

5.2 | Informational roles of underwriter reputation and underwriting fee

Previous studies have proposed and supported the idea that in mature stock markets, underwriter reputation can signal an IPO firm's underlying quality to external investors and can thus have a significant impact on important outcomes such as IPO valuation premium and IPO underpricing (e.g., Beatty & Ritter, 1986; Carter & Manaster, 1990; Pollock et al., 2004). Contrary to previous studies, we find that underwriter reputation has no significant relationship with IPO valuation premium, IPO underpricing, or post-IPO sales growth. Our results suggest that different from mature stock markets, underwriter reputation does not serve as a credible signal of IPO firms' underlying quality in a nascent stock market. This is consistent with our core argument. That is, as high-reputation underwriters work with IPO firms of varying quality in a nascent stock market, a firm's association with a high-reputation underwriter does not necessarily indicate that the firm has high quality. Instead, our results show that underwriting fee has a negative relationship with IPO valuation premium in both the pre- and post-embargo period. Furthermore, underwriting fee has a positive relationship with underpricing in the pre-embargo period and has a negative relationship with post-IPO sales growth in the pre-embargo period. These results suggest that underwriting fees play an important informational role in a nascent stock market, especially at its initial stage, with a higher fee indicating lower firm quality.

In explaining underwriting fee convergence in the U.S. market, Hansen (2001) provided multiple reasons for why a 7% spread contract has an economic edge in serving IPOs. One reason is that a fixed percentage fee narrows informational externalities in valuing speculative IPO firms. Hansen (2001, p. 315) stated, "A spread's gap from what was expected could raise suspicions about firm value and underwriter veracity. Investors will discount the speculative

firm more deeply if they suspect that an unexpected narrow spread signals a charade to inspire overvaluation, or that overvaluation is signaled by an unexpected generous spread. A uniform spread across IPOs limits doubt about what underwriter compensation is going to be."

Our results and interpretation regarding the informational role of underwriting fee in a nascent stock market are consistent with Hansen's speculation. That is, an over generous underwriting fee may raise investors' suspicions about underwriter veracity and signal that the IPO firm may be overvalued, if not problematic; as a result, institutional investors are only willing to pay a lower valuation premium to subscribe the new offerings. IPO firms that pay a high underwriting fee also need to offer a deep discount (i.e., greater IPO underpricing) to attract retail investors. Finally, our results demonstrate that IPO firms that pay a higher fee to get listed do experience slower sales growth after IPO. Overall, our results suggest that an over generous underwriting fee may be a signal of poor firm quality in a nascent stock market.

5.3 | Contributions

Our study makes important contributions to the literature. First, we contribute to the IPO literature by going beyond the well-accepted assumption that high-reputation underwriters are paired with high-quality IPO firms and by proposing an alternative pairing mechanism in a nascent stock market: the pricing mechanism. By focusing on a nascent stock market, our study provides a glimpse into how underwriters and IPO firms are paired before an efficient contract, which best serves IPOs, has emerged in a capital market.

Second and related, our study develops an evolutionary view on how important market players are paired in a capital market. We argue that the mechanism based upon which market players are paired in a capital market changes as the regulatory environment of the market evolves. In our specific context, IPO firms' pre-IPO EM on average is smaller after the regulatory improvements than before. Firms listed after the market's regulatory improvements are larger and older than those listed before the regulatory improvements. These findings are consistent with our argument that as regulations are improved in a nascent stock market, the overall quality of firms listed on the market gets better. More importantly, as regulations are improved, the potential penalty costs to underwriters, especially high-reputation ones, for endorsing low-quality firms increase. Because the potential penalty costs outweigh the short-term gains of charging high underwriting fees, the pricing mechanism will be replaced by the quality-matching mechanism.

Third, our study contributes to the research stream that uses underwriter reputation as a credible signal of IPO firms' quality (e.g., Beatty & Ritter, 1986; Carter & Manaster, 1990; Pollock et al., 2004). Our study suggests that a critical pre-condition must be met before making this argument. According to the signaling theory, a separating equilibrium must be achieved for an observable action to be used as a credible signal (Bergh et al., 2014; Spence, 1973, 2002). Previous studies on IPOs have been primarily conducted in the context of mature stock markets in which quality matching is the norm. Once such a separating equilibrium is achieved through quality-matching, underwriter reputation can serve as a credible signal of its clients' underlying quality in the eyes of external investors. However, if high-reputation underwriters work with firms of varying quality, as we have demonstrated in the context of a nascent stock market, a separating equilibrium is *not* achieved. In this case, underwriter reputation cannot and should not be used as a credible signal of their clients' quality.

Finally, our study has broader implications beyond the IPO market and can contribute to the literature on other entrepreneurial contexts, such as nascent markets (e.g., emission-reduction exchange), nascent technology fields (e.g., block chain), and nascent industries (e.g., the solar photovoltaic industry examined in Kapoor & Furr, 2015). Our study informs why suboptimal pairing mechanisms between key market players may exist in these entrepreneurial contexts and how institutional changes in these contexts may influence the pairing between key market players. A common feature of such entrepreneurial contexts is that rules are unclear and thus market player face great uncertainties (Eberhart & Eesley, 2018). Because "actors are uncertain as to the actions appropriate for a desired end," they hardly choose optimal actions (Eberhart & Eesley, 2018,p. 2646). Our study confirms this argument and

demonstrates that a suboptimal pairing mechanism—namely the pricing mechanism—between entrepreneurial firms and underwriters, which represent critical intermediaries of a capital market, could arise when the potential penalties for underwriters to work with low-quality firms are perceived to be low. It is only after significant regulatory improvements that a more efficient mechanism—the quality-matching mechanism—starts to replace the suboptimal mechanism. Thus, our arguments and findings can directly speak to the literature on institutional intermediaries in nascent or emerging markets with institutional voids (Armanios, Eesley, Li, & Eisenhardt, 2017; Zhang & Li, 2010).

In conclusion, we examined alternative pairing mechanisms between underwriters and IPO firms in a nascent stock market. Our theory and findings contribute to a better understanding of how key players are paired in a nascent market and can inspire future research to explore relevant interesting and important questions in the context of nascent markets.

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ENDNOTES

[1] The untruthful reporting issuers endorsed by Ping An Securities include Aier Eye (300015), Centre Testing International (300012), Hirisun (300277), and Wanfu Biotechnology (300268).

[2] EM can be positive (i.e., artificially increasing earnings) or negative (i.e., artificially reducing earnings). In this study, consistent with our theoretical arguments, we focus on positive EM. For a similar example, Chen, Luo, Tang, and Tong (2015) focused on positive EM and examined how it may affect the promotion prospects of interim CEOs.

[3] ChiNext applicants are required to meet the following financial requirements. First, the applicants must have been profitable in the most recent two consecutive years, with accumulated profits no less than 10 million RMB and in continued growth (in comparison, the Main Board and the SME Board require a minimum profit of 30 million RMB in the last three consecutive years.). Alternatively, the applicants must have been profitable in the most recent year with net profits of no less than 5 million RMB and revenues of no less than 50 million RMB, and their revenue growth rate for either of the most recent 2 years must have been no less than 30%. Second, the applicants must have net assets of no less than 20 million RMB at the end of the most recent reporting period with no uncovered losses (a minimum assets of 50 million RMB is required for the Main Board and the SME Board). Third, the applicants must have a total capital of no less than 30 million RMB after the IPO (a similar total capital before the IPO is required for the Main Board and the SME Board). Source: http://www.szse.cn/main/en/ListingatSZSE/ListingRequirements/.

[4] Ping An was ranked at the level of A in 2010, AA in 2011, A in 2012, C in 2013, BB in 2014, B in 2015, and A in 2016 and 2017.

[5] Here, 104 IPO firms were dropped due to insufficient industry-year observations (less than 15 firms in an industry in a year) to compute EM, and two additional firms were dropped due to missing data on other variables. *T*-tests on the means of all variables except EM between the initial sample and the final sample demonstrated no significant differences.

[6] For the first batch of 28 firms, the prior industry average fee was measured by the following formula: $\sum$ (underwriter spreads of the other 27 firms in the first batch)/$\sum$ (total proceeds of those 27 firms). For the first 52 firms to go public in their respective industries, the prior industry average fee was measured as follows: $\sum$ (underwriter spreads of all firms that went public on ChiNext in the prior 12 months before a focal firm)/$\sum$ (total proceeds of these firms). Finally, for the 17 firms that went public more than 1 year after their industry peers, the prior industry average fee was measured as follows: $\sum$ (underwriter spreads of all other firms in the same industry that went public on ChiNext before a focal firm)/$\sum$ (total proceeds of these firms).

[7] In our sample, four firms were underwritten by a syndicate of underwriters. In these cases, we used the lead underwriter's market share to measure underwriter reputation. For robustness check, we used the averaged market share of syndicated underwriters and obtained virtually the same results.

[8] We used industry peers on both ChiNext and the SME Board to estimate a ChiNext issuer's pre-IPO EM. We believe this is a reasonable approach because firms listed on ChiNext are more like those listed on the SME Board than those listed on the Main Board.

[9] According to CSRC Industry Code (2001) and (2012), C0 = food and beverage; C2 = textiles, clothing, and fur; C3 = paper and printing; C4 = petroleum, chemistry, plastics, and plastic cement; C5 = electronics; C6 = metals and non-metallic; C7 = machinery, equipment, and instruments; C8 = medicine and biologics; G = information technology; and I = information transmission, software, and information technology service.

[10] In the CSMAR database, firm age refers to the number of years from a firm's inception to its IPO year, not including the age of any of its predecessors, if exist. In this sample, one firm's age is zero in its IPO year.

[11] Correlations with absolute values equal to or greater than .120 are significant at the level of $p < .05$ (two-tailed tests).

[12] Correlations with absolute values equal to or greater than .114 are significant at the level of $p < .05$ (two-tailed tests).

[13] Estimated coefficients and robust *SE*s (in parentheses) are reported.

[14] Industry dummies and year dummies are included.

[15] The coefficient for underwriter syndication is negative and significant ($b = -1.078$, $p = .000$ in Model 1) in the pre-embargo period but turns positive and significant in the post-embargo period ($b = 4.215$, $p = .000$ in Model 3). However, because there were only four IPOs using underwriter syndicates (two in the pre-embargo period and two in the post-embargo period), we refrained from interpreting the results regarding underwriter syndicates in Tables 3 and 4. As a robustness check, we repeated all models by excluding this variable, and the results remained consistent.

[16] Estimated coefficients and robust *SE*s (in parentheses) are reported.

[17] Industry dummies and year dummies are included.

[18] A 2-year period was used in this measure because 1-year's syndication network is too sparse to generate eigenvalue in many years of interest.

[19] Ln(proceeds) is not controlled in these models because it is highly correlated with valuation premium and underpricing and is not theoretically relevant to post-IPO sales growth.

[20] Estimated coefficients and robust *SE*s (in parentheses) are reported.

[21] Industry dummies and year dummies are included.

[22] The market hotness index of 3-month prior to an IPO is not expected to affect post-IPO growth and is thus not controlled for in Models 5 and 6.

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APPENDIX A: Summary statistics of ChiNext Board in comparison with SME and Main Boards

TABLE A1 Year-distribution of IPOs in the ChiNext Board, 2009–2017

		IPO proceeds[a]		Underwriting fee (% of proceeds raised, not adjusted)		Underwriter reputation (% of market share)[b]		Firms' pre-IPO earnings management[c,d]	
	No. IPOs	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
Year									
2009	36	566.92	329.67	4.83	1.81	2.64	5.48	0.77	1.46
2010	117	823.37	502.83	5.30	1.68	2.33	3.78	0.41	1.99
2011	128	618.33	378.86	7.15	2.07	3.27	2.90	0.10	0.80
2012	74	474.99	275.51	7.57	1.96	4.30	3.82	0.23	0.91
2013	0	—	—	—	—	—	—	—	—
2014	51	312.66	200.06	9.67	3.30	3.35	4.86	−0.00	0.70
2015	87	434.39	759.49	9.40	3.23	3.57	5.07	−0.14	0.58
2016	78	330.31	173.14	9.27	3.17	2.00	2.44	−0.15	0.52
2017	141	370.10	299.70	9.77	3.25	3.55	3.03	−0.04	0.58

[a]Proceeds in million RMB.

[b]Underwriter reputation is measured by an underwriter's market share in China's stock market (including Main, SME, and ChiNext Boards) in the year prior to a focal IPO, except for 2014, which takes the value in 2012 due to market frozen in 2013.

[c]The numbers of observations that have value of pre-IPO earnings management are 28, 98, 109, 64, 0, 47, 79, 65, and 117, respectively, for each year from 2009 to 2017.

[d]Income-increasing earnings management only.

TABLE A2 Year-distribution of IPOs in the SME Board, 2009–2017

		IPO proceeds[a]		Underwriting fee (% of proceeds raised, not adjusted)		Underwriter reputation (% of market share)[b]		Firms' pre-IPO earnings management[c,d]	
	No. IPOs	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
Year									
2009	54	784.52	429.68	4.09	1.05	2.15	4.40	−0.03	0.59
2010	204	993.98	724.94	4.69	1.60	2.08	2.32	−0.09	0.67
2011	115	886.04	599.55	5.78	1.97	3.29	2.77	−0.02	0.74
2012	55	635.00	345.47	6.48	2.07	4.22	3.70	−0.22	0.48
2013	0	—	—	—	—	—	—	—	—
2014	31	637.63	1,205.62	8.18	2.55	4.78	5.67	−0.33	0.54
2015	44	413.32	237.98	9.48	2.93	3.41	5.61	−0.04	0.62
2016	46	480.89	402.26	9.43	4.71	2.05	2.40	−0.14	0.47
2017	81	497.14	357.63	8.40	2.89	3.32	3.04	−0.13	0.51

[a]Proceeds in million RMB.
[b]Underwriter reputation is measured by an underwriter's market share in China's stock market (including Main, SME, and ChiNext Boards) in the year prior to a focal IPO, except for 2014, which takes the value in 2012 due to market frozen in 2013.
[c]The numbers of observations that have value of pre-IPO earnings management are 36, 164, 87, 39, 0, 18, 29, 33, and 60, respectively, for each year from 2009 to 2017.
[d]Income-increasing earnings management only.

TABLE A3 Year-distribution of IPOs in the Main Board, 2009–2017

		IPO proceeds[a]		Underwriting fee (% of proceeds raised)		Underwriter reputation (% of market share)[b]	
	No. IPOs	Mean	*SD*	Mean	*SD*	Mean	*SD*
Year							
2009	9	13,902.75	15,003.16	2.20	0.50	8.53	10.11
2010	28	6,560.07	11,302.23	2.59	1.08	7.81	11.70
2011	39	2,694.74	2,551.52	3.93	1.54	4.52	3.13
2012	26	1,383.30	1,052.12	4.15	1.69	4.21	2.92
2013[c]	2	18,255.62	17,432.94	0.52	0.46	0.00	0.00
2014	43	725.04	690.20	7.39	3.32	3.98	4.65
2015	92	2,157.18	6,974.66	7.08	3.29	4.23	5.21
2016	103	987.60	1,509.72	6.90	3.28	2.47	2.55
2017	216	687.61	766.05	7.49	2.82	3.45	3.21

[a]Proceeds in million RMB.
[b]Underwriter reputation is measured by an underwriter's market share in China's stock market (including Main, SME, and ChiNext Boards) in the year prior to a focal IPO, except for 2014, which takes the value in 2012 due to market frozen in 2013.
[c]The two IPO firms listed on the Main Board in 2013 were Midea Group (000333) and Zhejiang Zheneng Electronic Power (600023).

APPENDIX B: Distribution of IPO underwriting fees (% of proceeds raised) by year in ChiNext

	2009	2010	2011	2012	2013	2014	2015	2016	2017	No. IPOs in total
Frequency										
<3%	7	6	0	0	—	0	2	0	0	17
3% <= and <4%	6	19	3	3	—	2	0	0	2	35
4% <= and <5%	6	27	13	3	—	0	1	3	3	56
5% <= and <6%	6	25	26	9	—	5	6	5	7	89
6% <= and <7%	6	20	24	16	—	2	9	17	20	114
7% <= and <8%	5	13	23	13	—	9	16	6	13	98
8% <= and <9%	0	5	13	14	—	3	7	8	18	68
9% <= and <10%	0	2	14	8	—	7	14	11	21	77
>=10%	0	0	12	8	—	23	32	28	57	158
Number of IPOs in total	36	117	128	74	—	51	87	78	141	712
Mean	4.8%	5.3%	7.1%	7.6%	—	9.7%	9.4%	9.3%	9.8%	8.0%
SD	1.8%	1.7%	2.1%	2.0%	—	3.3%	3.3%	3.2%	3.2%	3.2%
Min	1.7%	1.6%	3.5%	3.1%	—	3.3%	0.9%	4.3%	3.3%	0.9%
Max	7.9%	10.0%	13.3%	12.9%	—	20.1%	18.6%	20.3%	22.2%	22.2%

APPENDIX C: Estimation of Pre-IPO earnings management

Pre-IPO AEM

Drawing on a modified version of the Jones model (Dechow et al., 1995; Jones, 1991; Teoh et al., 1998), we used discretionary accruals (DA) to measure *pre-IPO AEM*. First, we ran the following cross-sectional OLS regression by the first two-digit CSRC industry code to estimate β_{1-3}:

$$\frac{TA_{it}}{A_{i,t-1}} = \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \left(\frac{\Delta REV_{it} - \Delta AR_{it}}{A_{i,t-1}} \right) + \beta_3 \frac{PPE_{it}}{A_{i,t-1}} + \varepsilon_{it}$$

where i indexes firms; t indexes time; TA_{it} equals net income (CSMAR item B002) minus cash flow from operations in year t (D100000); ΔREV_{it} is the change in revenues in year t (B110101); ΔAR_{it} is the change in accounts receivable in year t (A110637); and PPE_{it} is gross PPE in year t (A130127). All the variables are scaled by $A_{i,t-1}$, the total assets in year t-1 (A100000). Then, we used the estimated $\hat{\beta}_{1-3}$ to calculate the raw value of AEM as:

$$AEM'_{it} = \frac{TA_{it}}{A_{i,t-1}} - \hat{\beta}_1 \frac{1}{A_{i,t-1}} - \hat{\beta}_2 \left(\frac{\Delta REV_{it} - \Delta AR_{it}}{A_{i,t-1}} \right) - \hat{\beta}_3 \frac{PPE_{it}}{A_{i,t-1}}$$

Because we are only interested in positive AEM, we replaced any negative AEM with the value of 0. Finally, we computed the average of AEM in the past 2 years: $AEM_i = \frac{\sum |AEM'_{it}|}{2}$.

Pre-IPO REM

Following prior studies (Cohen & Zarowin, 2010; Roychowdhury, 2006), we used abnormal cash flow and abnormal discretionary expenses to measure *pre-IPO REM*.

To determine abnormal cash flow, we ran the following regression to estimate α_1 and β_{1-3}:

$$\frac{CFO_{it}}{A_{i,t-1}} = \alpha_1 + \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{(REV_{it} - AR_{it})}{A_{i,t-1}} + \beta_3 \frac{(\Delta REV_{it} - \Delta AR_{it})}{A_{i,t-1}} + \varepsilon_{it}$$

where i indexes firms, t indexes time, CFO_{it} is cash flow from operations in year t (D100000); REV_{it} is revenues in year t (B110101); ΔREV_{it} is the change in revenues in year t; AR_{it} is the accounts receivable in year t (A110637); and ΔAR_{it} is the change in accounts receivable in year t. We then used the estimated $\hat{\alpha}_1$ and $\hat{\beta}_{1-3}$ to calculate abnormal cash flow, EM_CFO_{it}:

$$EM\_CFO_{it} = \frac{CFO_{it}}{A_{i,t-1}} - \left[\hat{\alpha}_1 + \hat{\beta}_1 \frac{1}{A_{i,t-1}} + \hat{\beta}_2 \frac{(REV_{it} - AR_{it})}{A_{i,t-1}} + \hat{\beta}_3 \frac{(\Delta REV_{it} - \Delta AR_{it})}{A_{i,t-1}}\right]$$

To derive abnormal discretionary expenses, we ran the following regression to estimate α_1 and β_{1-2}:

$$\frac{DISEXP_{it}}{A_{i,t-1}} = \alpha_1 + \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{(REV_{i,t-1} - AR_{i,t-1})}{A_{i,t-1}} + \varepsilon_{it}$$

where i indexes firms; t indexes time; $DISEXP_{it}$ includes R&D, advertising, and SG&A (selling, general, and administrative) expenses in year t (B110404 plus B110504); $REV_{i,t-1}$ is revenues in year t-1 (B110101); and $AR_{i,t-1}$ is the accounts receivable in year t-1 (A110637). We then used the estimated $\hat{\alpha}_1$ and $\hat{\beta}_{1-2}$ to calculate abnormal discretionary expenses, EM_DISEXP_{it}:

$$EM\_DISEXP_{it} = \frac{DISEXP_{it}}{A_{i,t-1}} - \left[\hat{\alpha}_1 + \hat{\beta}_1 \frac{1}{A_{i,t-1}} + \hat{\beta}_2 \frac{(REV_{i,t-1} - AR_{i,t-1})}{A_{i,t-1}}\right]$$

Next, we compute the raw value of REM as: $REM'_{it} = -(EM\_CFO_{it} + EM\_DISEXP_{it})$.

Because we are only interested in positive REM, we replaced any negative REM with the value of 0. Finally, we computed the average of REM in the past 2 years: $REM_i == \frac{\sum |REM'_{it}|}{2}$.

Pre-IPO EM

We standardized AEM and REM, respectively, and averaged them to form a composite measure of EM:

$$EM_i = (Standardized\,AEM_i + Standardized\,REM_i)/2$$

APPENDIX D: Definitions of variables

Variables	Definitions
1. Underwriting fee	(Gross spread × 100/total proceeds raised [in %]) − prior industry average underwriting fee. Prior industry average underwriting fee is computed as the average of underwriting fees of IPOs, weighted by deal sizes, in a focal firm's industry in the 12 months prior to its IPO (in %)
2. Underwriter reputation	Market share of the lead underwriter's new issues in China's stock market (including Main, SME, and ChiNext Boards) in the calendar year prior to the focal IPO, except for 2014, which takes the value in 2012 because the market was frozen in 2013
3. Pre-IPO EM	The average of standardized positive accrual-based and standardized positive real earnings management prior to IPO (details in Appendix C)
4. Pre-IPO VC ownership	Proportion of a firm's shares held by venture capitals prior to IPO
5. Ln(sales)	Ln (firm sales in the year prior to the IPO, in million RMB)
6. Firm age	Number of years from the firm's inception to IPO year
7. ROA	Return on asset in the year prior to IPO
8. Patent density	Size of patent stock/number of employees prior to IPO
9. BVPS	Book value per share in IPO prospectus
10. Underwriter syndication	"1" if a firm was underwritten by a syndicate and "0" otherwise
11. Underwriter–firm distance	Ln (miles between a firm's and its lead underwriter's headquarters)
12. Ln(proceeds)	Ln (total proceeds raised, in million RMB)
13. Market hotness	Moving average of past 90 days' China securities index 300 of A share (including ChiNext) prior to the focal IPO
14. IPO deal flow	The number of IPOs listed on the ChiNext Board in a given year