Cross-listing and pricing efficiency: The informational and anchoring role played by the reference price

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Abstract

For a firm cross-listed in multiple markets, the price of the first-issued share arguably serves as a reference for pricing subsequently issued shares. We argue that this reference role contains both an informational and anchoring aspect. We examine a group of Chinese firms that first issued foreign shares and then domestic A-shares. Other than its informational role in this sample, the foreign share price is hypothesized to anchor down the A-share offer price so that the difference in the costs of capital between two markets contributes to the A-share underpricing. The empirical results support this dual-role hypothesis.

Key words: cross-listing, segmented market, anchoring, IPO underpricing

JEL classification: G12, G14, G15, G24

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1 Introduction

Cross-listings are becoming an important financing strategy for companies and stock exchanges alike. Our study investigates an important issue raised in cross-listings: do the prices revealed in one market, as a reference, enhance the pricing efficiency in the other market? In this paper, we propose that the reference role includes both an informational and anchoring aspect.

For the same security traded in multiple markets, the price from one market, as an important and obvious reference, naturally helps to price the same security listed in another market (Hasbrouck, 1995; Eun and Sabherwal, 2003, among others). However, the referred price may not be a perfect reference. Cross-listing normally involves cross-border listing, and the home market is often mildly or even severely segmented from the foreign market (Foerster and Karolyi, 1993; Stulz, 2005; Chan et al., 2008, among others). Thus, although the foreign and domestic shares are entitled to identical cash flow rights and voting rights, there are still differences in the rates of returns required by respective investors. As a result, their fair prices are usually different. Thus, the price from one market can be a noisy reference to the asset pricing in another market.

The noisiness of the reference price is often associated with the behavioral bias of investors. The anchoring effect (Tversky and Kahneman, 1974) may be relevant in this scenario. With an existing class of share traded in one market as reference, in setting up the target price in the second market, market participants have a tendency to put more than the fair weight on the possibly noisy reference price and thus insufficiently adjust for the underlying differences between two markets that are not fully integrated. In this way, the target price may be somewhat anchored to the reference price and contain biases.

We formalize the foregoing reasoning and propose a dual-role hypothesis. For firms sequentially listed in two markets that are not fully integrated, we argue that the price of the first-issued share plays a dual role — with an informational and anchoring aspect — in pricing the subsequently-issued security in the other market.

The informational hypothesis suggests that across firms, the relative prices of the first-issued share predict the relative fair prices of the subsequently-issued shares.

Within the anchoring framework, in determining the offer prices of subsequently issued shares, participants are assumed to use the first-issued share prices as starting points and then make directional adjustments. In determining the magnitude of adjustments, rational participants are expected to take appropriate consideration of the differences between the costs of capital in the two markets. The anchoring hypothesis, however, predicts insufficient adjustment. Consequently, the pricing errors are part of the valuation differences between two shares, which is positively associated with the differences in the costs of capital. Pricing errors are thus positively associated with the differences in the costs of capital. Moreover, according to Tversky and Kahneman (1974) and Chapman and Johnson (2002), we hypothesize that when more information is made available or when participants are motivated by stronger incentives, the anchoring bias is reduced so that the abovementioned association between the differences in the costs of capital and pricing errors is weaker.

In this study, we utilize the IPO data of cross-listed Chinese firms to examine the dual-role hypothesis. As of December 31, 2008, 93 Chinese firms had at some point first issued foreign shares (either on the Hong Kong exchange as H-shares or in the Chinese B-share market) and then issued Chinese A-shares. This data set is appropriate for testing the dual-role hypotheses for four reasons. First, due to tight controls on capital accounts by the Chinese government, the segmentation between the Chinese domestic market and the foreign market results in substantial differences between the two markets. Second, on average the rates of returns required by domestic A-share investors are lower than those requested by foreign investors (Fernald and Rogers, 2002). This translates to higher asset valuations in the A-share market than in the foreign market. Thus, the foreign listed share prices, when given too high a weight, usually serve as downside anchors, which consistently bias A-share offer prices downward. Thus, for this specific sample, the pricing errors can be proxied by the A-share underpricing. Third, the primary market has arguably higher uncertainty and less available information than the secondary market. This makes both the informational and anchoring roles played by the reference price more important. Finally, the Chinese securities market is still underdeveloped, and relatively unsophisticated investors are arguably more vulnerable to cognitive biases. Thus, the IPOs of Chinese dual-listed firms are ideal cases that allow the two roles played by reference prices to be more obviously demonstrated.

In the empirical tests, we use three proxies to measure the differences in the rates of returns: firm-level price-to-earnings (PE) ratios in the two markets, the long-term realized returns in the two markets, and the ex-post domestic-foreign price spreads. The empirical results show strong supports to the hypotheses. Foreign share valuations are shown to predict the cross-sectional variation in fair valuations of A-shares', supporting the informational hypothesis.

In addition, we find that in determining the A-share offer prices, within the anchoring framework, market participants indeed refer to the foreign share prices and adjust the offer price upward according to the differences in the costs of capital. However, consistent with the anchoring hypothesis, we discover the existence of insufficient adjustments. The evidence is that the differences in the costs of capital are positively associated with the A-share underpricing. Moreover, this positive association is found to be weaker in larger issuances in which more information is made available, or in IPOs where the state disposes of a higher percentage of state ownership so that issuers have stronger incentives to bargain hard over the offer price. This lends further support to the anchoring hypothesis. Our results remain robust in the subsample analysis, tests using alternative proxies for the costs of capital, and multivariate regression analyses.

The final test examines the net effect of the competing informational and anchoring roles in this sample. We match cross-listed sample firms with control firms that do not have foreign shares but have A-shares with similar IPO characteristics. Consistent with the anchoring hypothesis, we find no evidence that the A-share underpricing of cross-listed firms is lower then that of firms without foreign shares. However, cross-listed sample firms have a lower variance in the underpricing than control firms, supporting the informational role played by foreign share prices.

Our study contributes to the international finance literature by innovatively advocating the dual-role played by the reference price in pricing the same security listed in another not-fully-integrated market. Due to the possible anchoring effect, we alert market participants to carefully examine potential differences between markets when referring to the reference, as the anchoring role can work against the beneficial informational role, and hence reduce the pricing efficiency.

This study also contributes to the behavioral finance literature that investigates the anchoring bias (Shafir et al., 1997; Campbell and Sharpe, 2008; Cen et al., 2008; George and Huang, 2004, among others). Our study adds to the literature by providing additional evidence from the primary securities market.

Our study is related to the extensive IPO literature. Our study takes a behavioral standpoint and documents an additional factor that may contribute to the underpricing of A-shares issued by cross-listed firms. Our argument is consistent with the anchoring arguments of Loughran and Ritter (2002) and Krigman et al. (1999). Specifically, the study is related to the comparable IPO pricing literature. For example, Kim and Ritter (1999) and Purnanandam and Swaminathan (2004) emphasize that the valuation levels of comparable firms are reasonable benchmarks for the pricing of new shares. Our study, however, focuses on the "misuse" of references when investors fail to adjust sufficiently for the underlying differences.

Our study has important practical implications for the Chinese economic reform. First, as shown in newspapers, quite a few Chinese investors, issuers, and regulators fail to fully understand the barriers between domestic and foreign markets so that the anchoring bias is expected to be rather strong. Our study can help Chinese market participants to better understand the market segmentation and improve pricing efficiency. Second, policy-makers are currently discussing the application of a so-called "arbitrage mechanism" to eliminate the A-H price spread. However, no such mechanism can effectively "arbitrage" away the A-H pricing difference if the Chinese financial market is not fully liberalized. Third, some Chinese firms have been contemplating an "A+H" IPO mechanism by issuing A- and H-shares simultaneously at the same price. We argue that this design is theoretically inferior, as issuers could have raised more funds by offering different prices in the two markets.

2 Literature Review

2.1 Cross-listings

The global capital market has experienced accelerating cross-border capital flows over the last twenty years. At the same time, cross-listings have become an important financing strategy for companies and stock exchanges alike. Firms list on multiple exchanges for various reasons. Export-oriented firms may use cross-listing as a way of advertising their products (Pagano et al., 2002). Firms that face stringent financial restraints in the domestic market gain access to capital sources abroad. Firms that are listed in foreign markets, especially in developed markets, may enjoy lower costs of capital through better liquidity, better order-execution quality, lower transaction costs, the better ability of foreign investors to diversify portfolios (Errunza and Miller, 2000), an expanded shareholder base and increased investor recognition (Foerster and Karolyi, 1999), or improved investor protection and a reduced private benefit of control (Coffee, 2002; Doidge et al., 2002; Reese and Weisbach, 2002, among others). However, cross-listings also incur additional costs (Pagano et al., 2002), including the direct costs of higher listing charges and fees for professional advice, and the indirect costs such as share underpricing and the actions needed to comply with higher disclosure requirements and to reduce the risk of lawsuits. In particular, Huang et al. (2008) postulate that the political needs are major reasons for Chinese enterprises going into the global financial market. Empirical tests show that for an average firm choosing to cross-list, the benefits usually outweigh the additional costs incurred.

Fernandes and Ferreira (2008) report a sample of 2,955 foreign firms that had been listed in the U.S. markets by 2003 via ordinary listings, ADRs, OTC listings, or Rule 144a private placements. Among them, some were true IPOs in the United States, some were listed in their home market before going to the U.S. exchanges, and some were cross-listed in the home market after the listing in the United States. When a firm sequentially issue shares in multiple markets, existing shares undoubtedly become references for pricing new shares. It is thus important to investigate the role played by the reference price in the international context.

2.2 The informational role by the reference price

Hayek (1945) states that "we must look at the price system as such a mechanism for communicating information if we want to understand its real function ... by a kind of symbol, only the most essential information is passed on..." (p. 527) It indicates that the price (symbol) is a concise and useful reference. This intuitive argument is widely supported by prior literature.

For example, for a firm that sequentially offers shares in the same market, the information produced in previous offerings arguably helps to reduce the valuation uncertainties in later offerings. This view is consistent with the fact that seasonal offerings are usually much less underpriced than initial public offerings (IPO). For example, in the United States, the average underpricing level of IPOs is 18% (Loughran et al., 2007). In contrast, the seasonal equity offerings are on average underpriced by only 2.2% (Corwin, 2003). Another example is the multiple trading of the same security in integrated markets. Hasbrouck (1995) and Harris et al. (1995), among others, shows that the simultaneous trading of a security in multiple U.S. exchanges provides mutual reference to the price discovery in each exchange. Across borders, Eun and Sabherwal (2003) find that for a firm cross-listed on U.S. and Canadian exchanges, its stock prices in the U.S. exchange are mutually adjusting to the prices in the Canadian exchange.

Thus, it seems obvious that for a cross-listed firm, its share price in one market, as a concise and useful reference that conveys important information, helps to promote the pricing efficiency in another market.

2.3 Market segmentation

Cross-listing normally involves cross-border listing, and the home market is often mildly or even severely segmented from the foreign market. Foerster and Karolyi (1993) show that even the Canadian market is segmented from the U.S. market to a certain extent. As Stulz (2005) points out, inter-market barriers still exist, either explicitly or implicitly.

For cross-listed securities, although the foreign and domestic shares are entitled to the same cash flow rights and voting rights, there are still substantial differences between them. At the institutional level, the legal environment, government regulations, and the degree of financial market development may differ. At the individual level, there are differences in investors' preferences, risk attitudes, and their degree of sophistication. As a result, shares with identical fundamental business and financial risks, but listed in two different markets, may command different expected returns, and thus differ in their costs of capital.

We argue that this severe market segmentation is an important reason for the lower rates of returns required by Chinese domestic investors than by foreign investors. The Chinese B-share market and the Hong Kong market are integrated with the global market with few barriers to the capital flows. Thus, the rates of return required for foreign shares are determined by the risk and time-value compensations required by average international investors. [1]

In contrast, the Chinese equity market is only semi-liberalized, and the most pronounced barriers are the tight controls on inward and outward capital accounts. The domestic capital cannot freely flow to foreign financial markets at a reasonably low cost, and domestic investors cannot conveniently seek better investment opportunities in overseas markets. Consequently, the A-share securities market is one of the few investment opportunities available to them, especially because the deposit interest rate has often been suppressed at a low level, sometimes even below the rate of inflation. In the meantime, motivated by global risk diversification, a large amount of foreign capital has flowed into the A-share market through mechanisms

[1] The B-share market differs from the H-share market in several aspects. First, the B-share market was established along with the A-share market in the early 1990s, and it is regulated and operated by Chinese government agencies. In comparison, the Hong Kong market is independent from the Chinese government. Second, the B-share market is small with only 114 firms listed, shares usually have thin trading, and stock prices are often volatile. Finally, since 2001 B-shares have been open to Chinese domestic investors as well, although the A- and B-shares of the same firm are not interchangeable.

such as Qualified Foreign Institutional Investors (QFII). Taken together, these factors mean that the demand for securities in the Chinese market is high. But the supply is rather limited. In the 1990s, the scale of the stock market was restricted by limited issuance quotas, and the procedures for obtaining the listing approval or to verify the eligibility for qualification were usually very time-consuming. No foreign firms were able to list shares in the Chinese securities market as of December 2008, and some Chinese firms still only list shares abroad, further limiting the supply of securities. The excessive demand for securities relative to the limited supply pushes domestic Chinese investors to request relatively low average returns from investing in A-shares. Our argument here is consistent with that of Fernald and Rogers (2002) and Sun and Tong (2000).

Besides the market segmentation argument, other risk factors such as higher information asymmetry faced by foreign investors (Chan et al., 2008), illiquidity driven by inactive trading in the B-share market (Chen and Xiong, 2001), and speculative trading in A-shares (Mei et al., 2005) have been shown to explain the different costs of capital required by Chinese domestic and foreign investors. Tong and Yu (2008) argues that foreigners require a higher premium for weak corporate governance, which partially explains the lower valuation in foreign markets.

2.4 The anchoring effect

Tversky and Kahneman (1974) define anchoring as follows: "in many situations, people make estimates by starting from an initial value that is adjusted to yield the final answer ... adjustments are typically insufficient. That is, different starting points yield different estimates, which are biased toward the initial values. We call this phenomenon anchoring." (p. 1128) In terms of the psychological mechanisms that result in the anchoring effect, Jacowitz and Kahneman (1995) and Epley and Gilovich (2006) advocate the insufficient adjustment mechanism, holding that as adjustment is an effortful process, people stop adjusting once the estimate reaches an implicit range of plausible values. Tversky and Kahneman (1974) assert that the more ambiguous the value of a commodity, the more important anchoring is likely to be in the determination of its price. Chapman and Johnson (2002) suggest that monetary incentives help to reduce behavioral biases.

Researchers have shown the existence of the anchoring effects in various fields (Chapman and Bornstein, 1996; Dodonova and Khoroshilov, 2004; Englich and Mussweiler, 2006; Galinsky and Mussweiler, 2001; Green et al., 1998; Northcraft and Neale, 1987; Simonson, 2004; Wansink et al., 1998, among others). In finance, Shafir et al. (1997) postulate that anchoring on the nominal evaluation gives rise to the money illustration. Campbell and Sharpe (2008) find that consensus forecasts of monthly economic releases are biased towards the values of previous months' data releases, and market participants anticipate that anchoring bias. Cen et al. (2008) examine the forecast errors induced by cross-sectionally anchoring to the industry median, and such errors forecast future stock returns. George and Huang (2004) argue that traders might use the 52-week high as an "anchor" when assessing the stock price change implied by new information. Our study adds to the literature by providing evidence from the primary securities market in the international context.

2.5 IPO underpricing

We measure the anchoring effect by the IPO underpricing and thus our study is related to the extensive IPO literature. IPO underpricing is a persistent worldwide phenomenon that is wellknown both to researchers and the investing public. Loughran et al. (2007) report an average level of 18% on IPO underpricing in the United States during the long period from 1960 to 2006. A wide variation in the degree of underpricing exists across the global equity markets. However, it is the Chinese stock market that has witnessed one of the highest levels of IPO underpricing in the world. Chen et al. (2008), among others, report an average first-day return of 165% for 1,394 IPOs in China between 1990 and 2005.

Why IPOs are underpriced has long been a hot topic. Arguments relating to incomplete or asymmetric information have attracted the most empirical support. These include compensation for valuation uncertainty (Beatty and Ritter, 1986), the winner's curse story (Rock, 1986), and the information acquisition story (Benveniste and Spindt, 1989). The signaling story (Welch, 1989; Grinblatt and Hwang, 1989) and the cascade story (Welch, 1992) have also been examined. However, Ritter and Welch (1992) argue that "asymmetric information is not the primary driver of many IPO phenomena," and thus the risk-compensation stories seem insufficient to explain an average level of 18% of IPO underpricing. Some principal-agent models have been proposed and tested (Baron, 1982; Biais et al., 2002; Loughran and Ritter, 2004). Behavioral explanations, such as investor optimism (Ljungqvist et al., 2006) and prospect theory (Loughran and Ritter, 2002) have also been developed.

The abovementioned theories face an even greater challenge in explaining the tremendous profits in the Chinese primary market. Megginson and Tian (2007) cite regulatory constraints, and particularly the cap ever imposed on price-to-earning ratios, as an important determinant of IPO underpricing. Chen et al. (2008) maintain that the Chinese bureaus deliberately underprice the IPOs of state-owned enterprises to obtain a higher probability of being promoted. Fan et al. (2007) argue that non-politically-connected CEOs underprice shares to signal their credible intention of relinquishing the control of their firms.

This study takes a behavioral standpoint and documents an additional factor that may contribute to the underpricing of A-shares issued by cross-listed firms, consistent with the anchoring arguments of Loughran and Ritter (2002) and Krigman et al. (1999). Specifically, the study is related to the IPO comparable pricing literature (Kim and Ritter, 1999; Purnanandam and Swaminathan, 2004, among others), which emphasizes that the prices of comparable firms are reasonable benchmarks. However, we focus on the "misuse" of references when investors fail to adjust sufficiently for the underlying differences.

3 Data and hypothesis

3.1 Data and sample distribution

We focus on Chinese firms that sequentially first issued B- or H-shares and then domestic A-shares.[2] We manually collected the offering details on the A-, B-, and

[2] We intended to expand the cross-listing sample to the United States, Singapore, and the United Kingdom. However, most foreign securities of that kind are American Depository Receipts (ADRs), which are repackaged B-/H-shares and issued later than B-/H-shares. The

H-share issuance from IPO prospectuses, listing announcements, other public announcements, and news reports. For other A-share IPOs, we referred to the IPO database in the China Stock Market Trading Research Database (CSMAR) provided by the GuoTaiAn Company. The daily stock price and return data for the A- and B-shares were also obtained from CSMAR, complemented by daily PE data from DataStream. The daily price, return, and price-to-earnings ratio (PE) data for the H-shares were obtained from DataStream. Our data period runs from January 1992 to December 2008.

Among the final sample of 93 Chinese firms, 49 were first listed on the Hong Kong exchange as H-shares and then in the Chinese securities market as A-shares (subsample of first-H-then-A firms), and 44 firms were first listed in the Chinese B-share market and then in the A-share market (subsample of first-B-then-A firms).

Table 1 shows the distributions of sample firms across industries and years. Panel A is presented for the full sample. It shows that industrial firms comprise a large part of the sample. When dividing the 1992 to 2008 sample period into three subperiods, we notice that about half of the sample firms issued A-shares in the earliest subperiod, 1992-1997. Panels B and C are presented for the subsamples of first-H-then-A and first-B-then-A firms, respectively. The industry distributions for the two subsamples are similar. However, all A-share listings of first-B-then-A firms occurred in the first two sub-periods. To be precise, the last first-B-then-A firm issued its A-shares in 2001 before the B-share market was opened to Chinese domestic investors. [3]

B-share market and Hong Kong market are not severely segmented from foreign markets. At ADR issuance, B-/H-share prices are very likely to be the most important reference, and the informational role played by the B-/H-share price arguably dominates its anchoring role. Thus, we focus on Chinese firms that cross-listed on B-share or Hong Kong market only.

[3] At the beginning of the Chinese financial reform in the early 1990s, securities markets were in their infancy. Firms intended to extract beneficial information from the foreign share issuance to promote the pricing efficiency of the subsequent A-share issuance. Recently, reputable Chinese firms have tried to boost their firm values by making commitment to the higher listing requirements in Hong Kong. For more institutional details on the development of Chinese financial system, please refer to Allen et al. (2005) and Megginson and Tian (2007).

3.2 The dual-role hypothesis

We have briefly argued that the foreign share price plays both an informational role and an anchoring role in setting up the A-share offer prices for the Chinese firms that first issued foreign shares and then A-shares. In this subsection, we formally develop the dual-role hypotheses for this specific sample.

Following the literature, we hypothesize that the first-issued foreign shares serve as informative references for the pricing of the A-share. However, due to the market segmentation, this is not a direct reference. Instead, the informational role is manifested through a relative way. Across segmented markets, investors require different risk premia. However, we argue that the relative riskiness of a firm is stable across markets. Thus, for a group of firms cross-listed in two markets, a firm with relative higher valuation in the foreign market tends to also have relatively higher valuation in the A-share market. We formalize this reasoning in the following informational hypothesis:

Hypothesis 1 *For Chinese firms that first issue foreign shares and then A-shares, the relative valuation of the foreign share in the foreign financial market at the A-share issuance, ceteris paribus, predicts the relative valuation of the corresponding A-share in the A-share market.*

However, when market participants fail to fully acknowledge the differences between the Chinese domestic market and the foreign market, they tend to refer to the foreign share valuations in an absolute way. In other words, participants tend to adopt an anchoring-and-adjustment heuristic in that they start from the foreign share prices and then make directional adjustments to yield values for A-share offer prices. In determining the magnitude of adjustment, we argue that the differences in costs of capital are positively associated with the valuation differences between cross-listed shares.

The anchoring effect refers to people's tendency to assign too high a weight to the starting point, to the extent that later adjustments tend to be insufficient. Thus, the pricing errors are usually part of the valuation differences between two share classes. Because the valuation differences are positively associated with the differences in costs of capital, the pricing errors are also predicted to be positively associated with the differences in costs of capital. For this specific sample, the foreign share prices tend to be downside anchors, and thus, the pricing errors induced by the anchoring bias can be conveniently proxied by the A-share underpricing. We predict that across firms, when the difference in costs of capital for cross-listed shares is larger, the valuation difference between two share classes is larger, and due to the partial adjustment, the A-share offer price is expected to be downward biased to a larger extent. In short, we have the following anchoring hypothesis:

Hypothesis 2 *For Chinese firms that first issue foreign shares and then A-shares, with the presence of anchoring effect, the larger the difference in the costs of capital between the A-share and the foreign share, ceteris paribus, the greater is the A-share underpricing.*

It will be interesting to elaborate how decision-making parties interact with each other in the IPO pricing process so that the anchoring bias comes into the scenario in the first place. There are three parties in this game. Investors, as potential buyers, may produce information and selectively reveal information to underwriters to help price the new shares. Issuers, as share sellers, aim to maximize the issuing proceeds. However, a failed IPO brings potential losses such that issuers are very risk-averse. Underwriters, as the intermediates, incur substantial marketing cost and obtain direct compensation as a fixed percentage of IPO proceeds.

In the setting of a possible anchoring effect, we reason that on the buy-side, some investors may make insufficient adjustments unintentionally. Others may intentionally use the observed foreign price to increase their bargaining power in negotiating the offer price with the issuer.[4] Thus, by anchoring on the foreign share prices,

[4] The anchoring bias may persist in the Chinese primary market. Early Chinese IPOs usually adopted the fixed-price method. Most recent IPOs have adopted the book-building method, but because underwriters seldom have the discretion to induce investors to truthfully reveal information, the positive information elicited is often limited (Benveniste and Spindt, 1989). As a result, investors often effectively depress the offer price. This effect

investors incorporate downward biases into the A-share offer price.

On the sell-side, the salient foreign share price may also serve as an anchor for issuers. Similar to Loughran and Ritter (2002), we argue that issuers tend to be easily pleased by a proposed A-share offer price that is already much higher than the foreign-share price, even though it may not have been adjusted to a sufficiently high level. Anchoring bias, it if exists, reduces the issuers' incentive to bargain hard with potential investors. As most Chinese listed firms are state-owned rather than privately owned, the principal-agent problem can even aggravate the A-share underpricing.

Underwriters, as intermediaries, may take advantage of the anchoring behaviors of investors and issuers. They are expected to propose an A-share offer price that is only moderately higher than the corresponding foreign share price but substantially lower than the A-share's fair price. By underpricing the A-shares, underwriters may minimize their marketing efforts, induce positive cascades, and reduce the probability of IPO failure. Issuers that anchor on the foreign share price will still be pleased. Underwriters may leave room for an upward revision of the offer price to satisfy issuers and leave room for underpricing to satisfy investors. Hence, the anchoring role of foreign share prices exacerbates the A-share underpricing.

The psychological literature argues that anchoring bias can exist because the anchoring heuristic helps to solve complex problems in a cost-effective way. Tversky and Kahneman (1974) suggest that when more information is available to help determine the A-share offer price, market participants are expected to rely less on heuristics. For example, a larger-scale share issuance tends to gain higher media coverage and wider promotion and thus more information is produced. In addition, Chapman and Johnson (2002) suggest that monetary incentives help to reduce behavioral biases. A related scenario is when state-owned firms dispose of a larger proportion of state-owned equity. In this situation, the monetary incentive from the

has been particularly prominent since retail investors have obtained more bargaining power over the Chinese governance bodies in recent years. In the secondary market, the buying pressure of underpriced shares soon pushes prices to a "fair" level.

potential "dollar left on the table" is strong enough to offset the satisfaction from the potential appreciation of the retained shares. Consequently, when participants have less incentive to appeal to the anchoring heuristic, one would expect the association between the differences in the costs of capital and underpricing to be weaker. This reasoning is formalized as the second anchoring hypothesis:

Hypothesis 3 *For Chinese firms that first issue foreign shares and then A-shares, when participants are less likely to resort to the anchoring heuristic, ceteris paribus, the positive association between the difference in the costs of capital and the A-share underpricing is weaker.*

4 Baseline results

In this section we empirically examine the dual-role played by the foreign share price in determining the A-share offer price.

4.1 Proxies for differences in required rates of return

First, we propose three firm-level proxies to measure the differences in the rates of return required for the A-shares and the foreign shares.

The first proxy follows the comparable firm method proposed by Purnanandam and Swaminathan (2004). Assuming that the offer price is determined five days before the A-share listing, we use the PEs of the corresponding foreign share (*PE_Foreign*) observed at that time as a proxy for the rates of return required by foreign investors.[5] We use the PEs of a comparable firm's A-share (*PE_Peer*) around the same time to proxy for the rates of return required by Chinese domestic investors. In particular, we follow the three-step matching procedures of Purnanandam and Swaminathan (2004) (industry, total sale, and operating profit margin) to identify a unique matching firm in the A-share market for each sample firm.[6]

[5] For each sample firm, we scan around five days before A-share listing (with a maximum window of $[-50,-1]$ days, whichever is nearest to -5 days) to identify the *PE_Foreign*. Some B-shares do not have timely PE data due to the serious thin-trading in the B-share market.
[6] The matching procedures are as follows. First we categorize all A-shares into 112 industries according to the NINDCD code provided by CSMAR. The number of firms within each industry varies from only one to more than one hundred. On each trading day, within each

The PE proxy has several advantages. First, it is ex-ante and forward-looking. Second, it is straightforward as it is largely the multiplicative inverse of the cost of capital. Third, it is directly comparable to the offer PE, which is an important indicator widely quoted in the offering process and tightly regulated by the Chinese government (Megginson and Tian, 2007).

We managed to successfully identify 72 out of 93 sample firms with a comparable firm's PE available as a reference in the A-share pricing. We also have 85 firms with corresponding foreign share prices available. As presented in Panel A of Table 2, the mean *PE_Peer* is 36.1 (Column 1), while the *PE_Foreign* for the whole sample is 17.6 (Column 2). The pattern is similar for subsamples of first-H-then-A and first-B-then-A firms. Untabulated results from paired t-tests show that *PE_Foreign* significantly differs from *PE_Peer* for both the full sample and the two subsamples.

Following Errunza and Miller (2000) we propose a second proxy: the long-term realized buy-and-hold returns for the A-share (*BHRet_A*) and for the foreign share (*BHRet_Foreign*), respectively. Both returns are calculated during the one-year period after the first day of A-share listing. This measure essentially uses the ex-post realized return to proxy for the ex-ante expected return. Panel A of Table 2 shows that the average one-year holding period return for A-shares is only 7% (Column 4), whereas it is 27% (Column 3) for the corresponding foreign shares.[7] Untabulated

industry, we divide the A-shares into three portfolios (upper 30%, middle 40% and bottom 30%) according to the sales amount (with item code B001100000) recorded in the previous year's financial statements. For simplicity, we assume that all firms publish the annual reports at the end of March in each year. Within each industry-sale subcategory, we further divide firms into three categories (upper 30%, middle 40% and bottom 30%) according to the operating profit margin (defined by item B001300000 divided by sales) calculated from the previous year's financial statements. Thus, within each industry shares are divided into 3*3 portfolios, and each sample firm is assigned into a specific industry-sale-profit margin portfolio in each trading day. We assume that the final offer price is decided at five days before A-share listing. For each sample firm, we identify a peer firm that is within the same industry-sale-profit margin portfolio with the closest sales level. Then, we scan around five days before the A-share listing (with a maximum window of $[-9,-1]$ days, whichever is nearest to -5 days) to identify a PE_Peer. If we cannot find the price of a peer firm in this way, we reconstruct only two portfolios (upper 50% and bottom 50%) within each industry-sale category, which is an industry*3*2 criterion. If we still cannot identify a comparable firm, we adopt an industry*2*2 criterion.

[7] The reduction in the available number of observations is not due to survivalship bias, but because some firms are newly-listed and thus do not have sufficiently long trading

t-test results show that average one-year realized return for A-shares is significantly lower than that for their corresponding foreign shares. [8]

The last proxy is the ex-post "fair" price spread (*Spread_Fair*) between the A-share and the foreign share. We assume that the prices of the A- and foreign shares six months after the A-share listing are fair prices within their respective markets. We calculate the price spread at that time as the A-share price over the corresponding foreign share price after the adjustment for exchange rates and then minus one. We denote this price spread as the fair spread (*Spread_Fair*). [9] As shown in Panel A of Table 2, the median *Spread_Fair* for the whole sample is 147%, and the mean is 204% (Column 5), both of which are significantly positive. This spread is significantly positive for both subsamples.

In Table 3, we report the correlation among major variables. It is worth noting that the correlation between *PE_Foreign* and *PE_Peer* is rather low, with a Pearson correlation coefficient of only 0.04 (Column 1). *BHRet_A* has a Pearson correlation coefficient of 0.52 with *BHRet_Foreign* (Column 3), which is significantly positive. *PE_Foreign* is significantly correlated with *BHRet_Foreign* (Column 2). The Spearman correlation coefficients confirm the above results.

To summarize, we use three measurements to proxy for the different rates of return required for A- and foreign shares at the firm level. In following analysis, we alternatively use one set of proxies. In the major discussions we use *PE_Peer* and *PE_Foreign* as the proxy, and the other two proxies are used in robustness checks.

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histories with which to calculate the one year buy-and-hold returns. Only one sample firm was delisted from one market, but it was later than three years after the A-share listing.

[8] The difference is not significant for the first-H-then-A subsample, but is significant for the first-B-then-A subsample. The Chinese A-share market experienced an extraordinary boost in 2006 and 2007, whereby it doubled in market value in *each* year. Such conditions are rare. We observe 17 firms with H-shares that issued A-shares in 2006 or 2007.

[9] The justification of choosing six-month's time is as follows. We align price spreads by the event time relative to the A-share listing and aggregate them cross-sectionally by taking the median. We find that the median price spread varies from one to two times and remains positive throughout the first year after the A-share listing. It seems that the median spread stabilizes after 130 trading days following the A-share listing. The price spread at that time is used as the "fair" spread.

4.2 The informational role played by foreign share prices

First we align our research with the literature on the informational role played by the reference price.

4.2.1 The informational contribution to the A-shares' fair prices

In the absence of a cross-listed share price, the comparable firm approach is commonly used in determining the offer price of a typical A-share IPO, and the price of the peer firm usually provides the most useful information for pricing A-share. Thus, when gauging the information content in foreign share valuations, we control for peer firm valuations. Empirically, we examine the information contained in *PE_Foreign* and *PE_Peer*, because PE ratios reflect the relative valuation after controlling for the variation in profitability between the sample and the comparable firms.

To gauge the informational contribution of these two references, we need a measure of a "fair" valuation (PE) of the subsequently issued A-share, which is less subject to behavioral bias. Empirically, we use the A-share's ex-post PE at six months after the A-share listing and denote it as *PE_Fair*. Panel A of Table 2 shows that for the full sample, the average "fair" PE is 42.6 (Column 6). An untabulated paired t-test reveals that, for the full sample, *PE_Fair* is significantly higher than *PE_Foreign*, but that the differences between *PE_Fair* and *PE_Peer* are insignificant. Panel A of Table 3 shows that both *PE_Peer* and *PE_Foreign* are significantly correlated with the fair PE measure, with Pearson correlations of 0.35 (Column 1) and 0.36 (Column 2), respectively.

We next use the following model to test Hypothesis 1:

$$PE\_Fair_i = \alpha + \beta_1 DFBTA_i + \gamma_1 PE\_Peer_i + \gamma_2 PE\_Foreign_i + \varepsilon_i, \quad (1)$$

where i represents sample firms. In this and the following regressions, when running the regression for the full sample, we add a dummy variable *DFBTA*, which takes the value of one for the first-B-then-A subsample and zero for the first-H-then-A subsample. In this and the following regressions, we take the log of PEs to reduce the influence of extreme values. According to the comparable firm IPO pricing literature, the coefficient on the control variable *PE_Peer*, γ_1, should be positive. By Hypothesis 1, the coefficient on *PE_Foreign*, γ_2, is also expected to be positive.

The estimation results are reported in Table 4. In Panel A, we observe that *PE_Peer* has a significantly positive coefficient in the univariate regression (Column Eq. 1a), which is consistent with the IPO comparable firm literature. Consistent with our informational Hypothesis 1, *PE_Foreign* has a significantly positive coefficient in the univariate regression (Column Eq. 1b). When we allow two references to compete with each other, both have significantly positive coefficients (Column Eq. 2c). This indicates that the foreign share valuations do provide information in addition to the peer firm valuations. These results are robust in the subsample tests, with results reported in Panels B and C. For brevity we omit the detailed descriptions. Overall, Hypothesis 1 gains strong support.

4.2.2 The contribution to the A-shares' offer prices

Next, we examine how participants actually utilize these two valuation references in the IPO practice. Thus, we examine the contribution of two PEs to the offer price setting in the primary market and perform analysis based on the offer PE (*PE_Offer*), which is possibly subject to the contamination of behavioral biases. *PE_Offer* is often cited by the media as the relative "expensiveness" of stocks. Market participants and the governance body typically pay great attention to it. [10]

As shown in Panel A of Table 2, the average *PE_Offer* for the full sample is 21.7 (Column 7), which is between the foreign share's average PE of 17.6 and the comparable firm's average PE of 36.1. The subsamples show a similar pattern. In Panel A of Table 3, the Pearson correlation coefficient between *PE_Offer* and *PE_Foreign* is as high as 0.56 (Column 2) for the full sample and it is significant. In contrast, *PE_Offer* is insignificantly correlated with *PE_Peer*, with a Pearson coefficient of

[10] This PE is self-reported by issuers in most issuances. Chinese firms can selectively choose to report either the fully-diluted PE after issuance, the weighted-average PE after issuance, or the fully-diluted PE before issuance. We assign value to the offer PE according to these priorities.

only 0.11 (Column 1).

To examine whether the pricing rule as specified in model (1) is adopted by market participants, we run a simple cross-sectional regression with the following model specification:

$$PE\_Offer_i = \alpha + \beta_1 DFBTA_i + \gamma_1 PE\_Peer_i + \gamma_2 PE\_Foreign_i + \varepsilon_i, \quad (2)$$

where the independent variables are defined in the same way as in model (1). Rational participants are expected to at least partially acknowledge the pricing rule as specified in model (1). Thus, both γ_1 and γ_2 are expected to be positive.

The regression results are reported in Columns (Eq. 2a) to (Eq. 2c) of Table 4. Consistent with our expectation, in both the univariate and multivariate regressions, the coefficients on *PE_Foreign* are significantly positive (Columns Eq. 2b and Eq. 2c). Again, the evidence suggests that the information of the observable *PE_Foreign* has been incorporated in setting the *PE_Offer* in practice. However, contrary to our expectations, in both the univariate and multivariate regressions, the coefficients on *PE_Peer* are insignificantly different from zero (Columns Eq. 2a and Eq. 2c). This evidence suggests that market participants attach too much weight to the foreign firm prices while ignoring the rich information contained in peer firms' valuations in the A-share market.

4.3 The anchoring role by foreign share prices

The evidence discussed in the previous section offers an indication of the existence of anchoring bias. Within the anchoring framework, to price a seemingly new share, decision makers first decide on a starting point. The estimation results of model (2) suggest that the A-share market participants are more likely to choose the foreign share valuation than the peer firm valuation as the starting point. Although not fully rational, such behavior is natural. The foreign share is easily observable and is entitled to the exact same cash flow distributions as the A-share. In contrast, the price of a peer firm is more difficult to determine. In this section, we perform analysis within the anchoring-and-adjustment framework and investigate the extent of insufficient adjustments.

4.3.1 Upward adjustment

We offer further evidence of some, but not necessarily sufficient, adjustment in response to the difference between the costs of capital in setting up the A-share offer price, which is consistent with the informational Hypothesis 1 within the anchoring framework. Assuming that the A-share offer price is determined five days before the A-share listing, we calculate *Spread_Offer* as the A-share offer price over the foreign share closing price five days before the listing time and then minus one. *Spread_Offer* directly measures the magnitude of upward adjustment made. We use *PE_Foreign* and *PE_Peer* as proxies of differences in the costs of capital.

Panel A of Table 2 shows that, on average, the A-shares are offered at prices 75% (Column 8) higher than the corresponding foreign share prices. This spread is statistically significantly positive. It is lower than the mean of *Spread_Fair* ((204%). Panel A of Table 3 shows that the Pearson correlation coefficient between *Spread_Offer* and *PE_Peer* is only 0.07 (Column 1). In contrast, the Pearson correlation coefficient between *Spread_Offer* and *PE_Foreign* is as high as −0.48 (Column 2). The subsample tests reported in Panels B and C of Tables 2 and 3 provide similar results.

Next, we use the following model specification to examine the determinants of the adjustment:

$$Spread\_Offer_i = \alpha + \beta_1 DFBTA_i + \gamma_1 PE\_Peer_i + \gamma_2 PE\_Foreign_i + \varepsilon_i, \quad (3)$$

where the independent variables are defined in the same way as in model (1). Within the anchoring framework, the lower the required rate of return for the A-share and the higher that for the foreign share, *ceteris paribus*, the larger the offer spread will be. As the PE level is negatively associated with the required rate of return, we expect γ_1 to be positive and γ_2 to be negative in model (3) in a rational setting.

The regression results are reported in Column (Eq. 3) of Table 5. We find that the coefficient on *PE_Peer* (γ_1) is insignificantly positive, whereas the coefficient on *PE_Foreign* (γ_2) is significantly negative. The subsample of first-H-then-A firms replicates the pattern in the full sample, shown in Panel B. For the first-B-then-A subsample, the coefficients on both *PE_Peer* and *PE_Foreign* are significant with correct signs, shown in Panel C. These results partially support Hypothesis 1 in the sense that *PE_Foreign* offers useful information in adjusting *Spread_Offer* in the right direction. However, the results also indicate that the informational role of *PE_Peer* is rather limited in the adjustment, especially in the first-H-then-A subsample. The insufficient attention to *PE_Peer* strongly hints that the foreign share price is an anchor.

4.3.2 Insufficient adjustments

In this subsection, we show the evidence of insufficient adjustments, and thus the evidence of anchoring bias, in these cross-listed Chinese sample firms. According to Hypothesis 2, if the anchoring bias indeed affects the offer price, which in turn is due to excessive weighting on the readily observable foreign share price, we would expect that the difference in the cost of capital will be associated with the A-share underpricing. For empirical purposes, we measure the underpricing (*IR_A*) by the IPO first-day return, calculated as the A-share closing price at the first trading day over the offer price and then minus one.

Table 2 provides the statistics for the A-share IPO underpricing for the 93 sample firms. Column (9) in Panel A shows that, on average, these firms that already had foreign shares traded still suffer from 117% underpricing in the A-share IPOs. Panels B and C show that the underpricing is severe for both subsamples. To illustrate the economic significance of such underpricing, we take year 2007 as an example, when 12 First-H-then-A sample firms issued A-shares. For these 12 A-share IPOs, untabulated results show that the mean *Spread_Offer* is −17%, ranging from −53% to 7%. In comparison, *Spread_Fair* has a mean of 62%, ranging from 22% to 128%. Not surprisingly, these IPOs are, an average, underpriced by 117%. They have average issuing proceeds of 30.4 billion RMB. Thus, the total amount of money left on the table in 2007 was 427 billion RMB, equivalent to about US$56 billion according to the average exchange rate of 7.6 in 2007.

Next, we test anchoring hypotheses 2 and 3 using the following model:

$$
\begin{aligned}
IR\_A_i = {} & \alpha + \beta_1 DFBTA_i + \beta_2 Resid\_PE_i + \beta_3 Resid\_Spread_i \\
& + \gamma_1 PE\_Peer_i + \gamma_2 PE\_Foreign_i \\
& + \delta_1 DLarge_i + \delta_2 PE\_Peer_i \times DLarge_i + \delta_3 PE\_Foreign_i \times DLarge_i \\
& + \delta_4 D\Delta SO_i + \delta_5 PE\_Peer_i \times D\Delta SO_i + \delta_6 PE\_Foreign_i \times D\Delta SO_i + \varepsilon_i,
\end{aligned} \tag{4}
$$

where *Resid_PE* and *Resid_Spread* are residuals from models (2) and (3), respectively. We use the residuals rather than the levels of *PE_Offer* and *Spread_Offer* to mitigate the multicollinearity problem brought about by the structural relationships that are modeled in equations (2) and (3). Because the foreign share price is usually a downside anchor, we expect that the effort of adjusting the A-share offer price upward from the foreign share price will reduce the A-share underpricing. Thus, β_2 and β_3 are predicted to be negative. Further, by Hypothesis 2, the difference between *PE_Peer* and *PE_Foreign* is expected to be positively associated with *IR_A*. Because *PE_Peer* is on average larger than *PE_Foreign*, γ_1 is expected to be positive and γ_2 is predicted to be negative. Adding *DLarge* and its interaction terms with *PE_Peer* and *PE_Foreign* is designed to test Hypothesis 3, which examines the impact of information availability on the anchoring bias. The dummy *DLarge* takes the value of one when the amount of gross proceeds collected in the A-share issuance is larger than the sample/subsample median, and zero otherwise. A large-scale issuance is expected to have lower underpricing, and thus δ_1 should be negative. By Hypothesis 3, we expect the coefficients on the interaction terms, δ_2 and δ_3, to be negative and positive respectively. Adding $D\Delta SO$ and its interaction term with PEs allows us to test Hypothesis 3 from another angle, focusing on the impact of the monetary incentives imposed on issuers. The dummy $D\Delta SO$ takes the value of one when the change of state-ownership in the A-share issuance is larger than the sample/subsample median and zero otherwise. $D\Delta SO$ is also widely documented to be negatively associated with underpricing, and thus δ_4 should be negative. By Hypothesis 3, we expect the coefficients on interaction terms δ_5 and δ_6 to be negative and positive, respectively.

The regression results are reported in Columns (Eq. 4a) to (Eq. 4f) of Table 5. First we control for the offer PEs and the offer spread and examine whether *PE_Peer* and *PE_Foreign* contribute to the A-share underpricing. In Column (Eq. 4a), the coefficient for *PE_Peer* (γ_1) is significantly positive, consistent with Hypothesis 2, whereas the coefficient for *PE_Foreign* (γ_2) is only insignificantly negative. This pattern even persists in Columns (Eq. 4b) to (Eq. 4f) after the interaction terms are included. The results strongly support anchoring Hypothesis 2, in that participants underreact to differences in the costs of capital between two markets. This evidence is also consistent with the argument that participants anchor on the foreign share valuation and at least partially ignore the information contained in the peer firm's valuations.

The empirical results also lend support to anchoring Hypothesis 3. Columns (Eq. 4b) and (Eq. 4d) show that, if we include *DLarge* and $D\Delta SO$ without interaction terms, the coefficients on these two dummies (δ_1 and δ_4) are negative. This is consistent with the prior IPO literature. In Column (Eq. 4c), we control for *DLarge* and its interaction with the two PEs. We observe that the coefficient for (γ_1) is 0.69 and significantly positive, which means that when the A-share issuance is small, market participants tend to underreact to the information contained in the peer firm valuation. However, if the issuance is large, the coefficient on *PE_Peer* (δ_2) is significantly reduced by 0.38. These results are consistent with Hypothesis 3 in that when more information is made public available, the under-reaction to peer firm valuation (the anchoring bias) is weaker. In Column (Eq. 4e), we control for $D\Delta SO$ and its interaction with PEs. The coefficient for *PE_Peer* is 0.79 (γ_1), which is significantly positive. It represents the degree of underaction when a state-owned enterprise disposes of a small stake. For an issuance in which the state disposes of a large stake, the coefficient for *PE_Peer* is significantly reduced by 0.65 (δ_5). This evidence further supports Hypothesis 3 in that when issuers are motivated by greater monetary incentives, the anchoring bias is reduced. Even if we control for the two dummies and their interaction terms with PEs together, the pattern remains robust as presented in Column (Eq. 4f).

Subsample results for the first-H-then-A firms are presented in Panel B. For this subsample, we observe similar results to the full sample and find strong support for Hypotheses 2 and 3. HOwever, the pattern for the subsample of first-B-then-A firms, shown in Panel C, is lightly different. In Column (Eq. 4a), both *PE_Peer* and *PE_Foreign* have significantly positive coefficients, which suggests that in the primary market, participants underreact to the information contained in the peer firm prices whereas overreact to the information contained in foreign share prices. In Column (Eq. 4e) we find that if the firm disposes of a large percentage of state ownership, the overreaction to the foreign share price is greatly reduced.[11] The above evidence is consistent with the hypothesis that the foreign share price plays an anchoring role.

In summary, the empirical evidence in Sections 4.2 and 4.3 supports the dual-role hypothesis. For cross-listed firms, the corresponding foreign share prices provide important information for pricing the A-shares. Foreign share prices predict the A-shares fair prices, and in determining the A-share offer price, the foreign share prices are indeed used in practice. Within the anchoring framework, participants start from the foreign share price and adjust upward according to differences in the costs of capital. In addition, we find strong evidence that differences in the costs of capital contribute to the A-share underpricing. This evidence supports the argument that the noisy foreign price anchors the A-share offer price and that this anchoring effect contributes to the pricing errors in the A-share primary market for dual-listed firms.

4.4 The net effect of competing informational role and anchoring role

In this section, we offer evidence of a net beneficial information role of the foreign listed stocks to the domestic primary market at the aggregate level.

As has been illustrated, the foreign share price has a dual influence on the A-share pricing. The information contained in the foreign-share price history is expected to mitigate the subsequently issued A-share underpricing. However, in imperfectly integrated financial markets such as the sample used in this study, the foreign share price anchors the A-share offer price, exacerbating the A-share underpricing. As the

[11] As illustrated in Footnote 5, the B-share market is rather illiquid and that we observe quite a few firms have only stale B-share prices. Thus, the cash-flow news may not be reflected in the B-share price in a timely way, which contributes to the seemingly insufficient adjustment to B-share prices. Also, the sample size for the first-B-then-A firms with available data is only 28, which limits the model's explanatory power.

two effects offset each other in our sample, it will be interesting to know empirically whether the existence of the foreign share price enhances the net pricing efficiency of the domestic primary market.

In addition, we argue that while foreign share prices tend to bias the A-share offer prices, the biases tend to be consistently downward. While A-share underpricing is a fact of life with and without the dual-listed foreign share prices, we argue that the uncertainty of the degree of underpricing is different between the two markets. With a group of dual-listed firms with readily observable foreign share prices, including the foreign share price of the target firm, the degree of underpricing is more predictable for these A-shares than that for A-share IPOs when no such reference prices are available. Evidence supporting of this claim will attest to the beneficial informational role of dual-listed stock prices from a different perspective.

We construct a group of matching firms without foreign shares but with similar A-share IPO characteristics. First, we divide all A-share IPOs (including the A-share offering of the sample firm) into deciles by gross proceeds. Then, for each sample firm we try to identify a single firm without foreign shares that satisfies four criteria: (1) it has the same industry code (INDCD) as the sample firm, (2) it issued its A-shares no earlier than six months before the sample firm's A-share offering, (3) it is in the sample firm's proceeds decile, and (4) its proceeds are closest to that of the sample firm within the available matching firms that satisfy the above three criteria. Finally, we identify 77 matching firms.

The comparison results of the level and variance of the A-share underpricing between two groups are shown in Table 6. In Panel A, the average A-share underpricing of First-foreign-then-A sample firms is 111% (Column 1), slightly lower than that of No-foreign-only-A matching firms of 139% (Column 2). The paired t-test indicates that the difference is not statistically significant (Column 3). For the subsample of first-H-then-A firms presented in Panel B, the underpricing does not significantly differ between two groups either. For the subsample of first-B-then-A firms presented in Panel C, the underpricing of sample firms is significantly higher than that of matching firms. Overall, the comparison results concerning the underpricing level are mixed, and this indirectly confirms the existence of anchoring bias.

Our main focus, however, is on the degree to which the existence of the foreign share helps reduce uncertainty of the A-share underpricing. Panel A shows that the cross-sectional variance of underpricing for the first-foreign-then-A sample is 137%, which is significantly less than that of no-foreign-only-A matching firms (302%). We perform Bartlett's test of homogeneous variance and present the results in Column (4). The comparison results show that the difference is significant at the 1% level. A similar pattern exists for both subsamples. The fact that the underpricing of sample firms has a lower variance than that of matching firms strongly supports the beneficial informational role played by the foreign share price at the aggregate market level.

5 Robustness tests

5.1 Alternative proxies for differences in the costs of capital

In this subsection, we use another two proxies for the differences in the costs of capital to test the dual-role hypothesis. Specifically, with the buy-and-hold returns as the proxy, we use the following model specification:

$$Spread\_Offer_i = \alpha + \beta_1 DFBTA_i + \gamma_1 BHRet\_Foreign_i + \gamma_2 BHRet\_A_i + \varepsilon_i, \quad (5)$$

where, according to Hypothesis 1, γ_1 is expected to be positive and γ_2 is expected to negative. Moreover,

$$\begin{aligned} IR\_A_i = {} & \alpha + \beta_1 DFBTA_i + \beta_2 Resid\_PE_i + \beta_3 Resid\_Spread_i \\ & + \gamma_1 BHRet\_Foreign_i + \gamma_2 BHRet\_A_i \\ & + \delta_1 DLarge_i + \delta_2 BHRet\_Foreign_i \times DLarge_i + \delta_3 BHRet\_A_i \times DLarge_i \\ & + \delta_4 D\Delta SO_i + \delta_5 BHRet\_Foreign_i \times D\Delta SO_i + \delta_6 BHRet\_A_i \times D\Delta SO_i + \varepsilon_i, \end{aligned} \quad (6)$$

where γ_1 is expected to be positive and γ_2 is expected to negative according to Hypothesis 2, and δ_2 (δ_3) and δ_5 (δ_6) are expected to have signs opposite to γ_1 (γ_2) according to Hypothesis 3. Alternatively, using the ex-post price spread as the proxy, we run a regression based on the following model:

$$Spread\_Offer_i = \alpha + \beta_1 DFBTA_i + \gamma_1 Spread\_Fair_i + \varepsilon_i, \tag{7}$$

where, according to Hypothesis 1, γ_1 is expected to be positive. Moreover,

$$\begin{aligned} IR\_A_i = \alpha &+ \beta_1 DFBTA_i + \beta_2 Resid\_PE_i + \beta_3 Resid\_Spread_i + \gamma_1 Spread\_Fair_i \\ &+ \delta_1 DLarge_i + \delta_2 Spread\_Fair_i \times DLarge_i \\ &+ \delta_4 D\Delta SO_i + \delta_5 Spread\_Fair_i \times D\Delta SO_i + \varepsilon_i, \end{aligned} \tag{8}$$

where γ_1 is expected to be positive according to Hypothesis 2, and δ_2 and δ_5 are expected to negative according to Hypothesis 3.

The regression results are reported in Table 7. As shown in Panel A, using buy-and-hold returns as the proxy for differences in the required rates of return, the support for the dual-role hypotheses remains strong. In deciding on the offer spread, market participants take into consideration the variation in the required rates of return for both foreign shares and A-shares. However, the underpricing is still strongly correlated with the proxy for the A-share's cost of capital. In addition, when the issuance has a larger scale and the state disposes of a larger stake, we observe offsetting coefficients on the interaction terms of dummy variables with *BHRet_A*. When we use *Spread_Fair* as the proxy, the evidence presented in Panel B also supports the dual-role hypotheses.

5.2 Regulatory underpricing

Megginson and Tian (2007) argue that the pricing cap and strict quota system in China lead to "regulatory underpricing", contributing to the extremely high underpricing level. In particular, they argue that "in several internal guidelines issued during different periods, the CSRC [China Securities Regulatory Commission] sets the ceiling of the [PE] multiplier as 15 to 20 times earnings, which is the pricing cap of IPO shares." The empirical association between the existence of this regulatory cap and the level of underpricing, however, is uncertain.

To control for the possible effect of regulatory constraints, we check the offer PE of our samples. We consider firms with the offer PE around 15, 16, 18, and 20 times to be capped by regulation.[12] Using this method, only 13 out of 93 sample firms are potentially capped. We assign the dummy variable *DCap* to take a value of one for capped firms and zero otherwise. Specifically, we assign dummies *DCap15*, *DCap16*, *DCap18*, and *DCap20*. We control for these dummies and re-run model (4) and examine whether the results reported in subsection 4.3.2 are robust.

The regression results are reported in Table 8. The regressions with the results reported in Columns (Eq. 4a) to (Eq. 4d) have *DCap* controlled, and the regressions with the results reported in Columns (Eq. 4e) to (Eq. 4h) have cap dummies individually controlled. All of the results supporting the anchoring hypotheses are qualitatively unchanged after we control for these dummies. Interestingly, as revealed by our results, setting the offer price equal to the capped multiple does not directly cause more severe underpricing, but is associated with less underpricing.

It is of interest to note that the Security Law that took effect in July 1999 stipulated that the share offer price should be decided through consultation between the issuer and the underwriter. Therefore, although the regulatory constraints may still exist in a less noticeable form, we expect them to be less relevant in the recent period. In summary, we argue that the regulatory constraints are not enough to drive the results in Table 5.

5.3 Additional control variables

In this subsection, besides *DCap*, we control for several variables identified in the IPO literature as having cross-sectional explanatory power for the underpricing.

Following Megginson and Tian (2007), among others, we include *Llag_ann_list*,

[12] These multiples are the PE caps historically prevalent according to Megginson and Tian (2007). We treat PEs within the range of [14.9,15.1), [15.9,16.1), [17.9,18.1), or [19.9, 20.1) as being capped. According to Megginson and Tian (2007), the pricing cap is time-variant and applicable to all issuing firms at that time. Thus, our measure is very rough and may mistreat some firms that just happen to issue at those multiples. Also, even if a firm issues at a PE multiple that is higher than the cap, it may still be affected by the cap. Chinese issuing firms even have a certain degree of freedom in choosing the PE ratio to report to CSRC (see Footnote 10), which means that if the offer PE exceeds the regulatory cap, the issuing firm can to some extent circumvent the cap by reporting another measurement of PE that is seemingly lower.

the log of the time lag in calendar days between the announcement of a prospectus and the actual listing date. This lag can be very long in China, and it has been shown to reflect the lock-up risk faced by Chinese primary market investors. Thus, the A-share underpricing is expected to be positively associated with this variable. Titman and Trueman (1986) show that the choices of auditor and underwriter influence the amount of information produced before listing. We expect reputable auditors to help reduce information incompleteness and/or asymmetry, and/or signal the firm's high quality and thus mitigate underpricing. We include a dummy *DAuditor* for auditor identity, where one represents a Big Four auditing firm and zero otherwise. The role of underwriters, however, is undecided because recent literature has tended to reveal the dark side of underwriters as agents (Loughran and Ritter, 2004, among others). We include *Fee*, the flotation fee as a percentage of gross proceeds. Following Welch (1989), we expect that the underpricing level of previous foreign share issuance helps to leave a good taste in the mouth of investors and thus mitigates the A-share underpricing. *SO%* is the percentage of state ownership before the A-share issuance. High state ownership tends to indicate separation of ownership and management, and is often associated with low efficiency and thus higher underpricing. Finally, Loughran and Ritter (2002) argue that issuers underreact to public information such as market returns. Hence, we control for *CRetM*, which is the market return cumulated from three weeks to one week before A-share listing. We expect *IR_A* to be positively associated with *CRetM*.

We include the above variables in model (4) and present the multivariate regression results in Table 9. These multivariate regression results almost replicate the baseline results in Table 5, and the evidence supporting Hypotheses 2 and 3 seems rather strong. Further, *Llag_ann_list* has a positive coefficient, as expected. Hiring a Big Four auditing firm is associated with less underpricing. A higher flotation fee, however, is associated with even more severe underpricing. We find no evidence supporting the use of underpricing of previous foreign share issuance as a signal to help mitigate the underpricing of subsequent A-share issuance. We find weak evidence that high state ownership contributes to underpricing. Finally, we find no evidence of under-reaction to market returns.

In addition, we add the aforementioned control variables in regression models (6) and (8). We report the estimation results in Table 10. *COC1* and *COC2* represent *BHRet_Foreign* and *BHRet_A*, respectively, in Columns (Eq. 6a) to (Eq. 6d), and *COC1* represent *Spread_Fair* in Columns (Eq. 8a) to (Eq. 8d). In general, the results are robust and support the dual-role hypotheses.

5.4 The impact of QDII

The Qualified Domestic Institutional Investor (QDII) scheme was approved by the Chinese government to allow specific domestic financial institutions to invest in foreign markets. On 13 April 2006, the Chinese government announced the QDII scheme, allowing Chinese institutions and residents to entrust certain Chinese commercial banks to invest in financial products overseas, but the investment was limited to fixed-income and money market products. On 11 May 2007, Chinese government announced a widening scope for QDII investment. With certain restrictions banks can now offer stock-related products.

Although the effects may be marginal due to various restrictions of the scheme, QDII to certain extent mitigates the investment barriers between the Chinese domestic market and the foreign market. Thus, the anchoring effect brought by foreign prices may be weaker after the implementation of the QDII scheme. In our data, only 7 firms listed their A-shares after 11 May 2007, and it would be quite difficult to perform meaningful tests on such a small sample. Thus, we rerun regression models (1) to (4) using sample firms that issued A-shares before 11 May 2007 and present the regression results in Table 11. Totally we have 86 sample firms.

In Panel A of Table 11, we present the regression results of models (1) and (2). The results are qualitatively the same as those in Panel A of Table 4, consistent with Hypothesis 1. In Panel B, we present the regression results of models (3) and (4). Again, the results are consistent Hypotheses 2 and 3. These results are consistent with the argument that before the Chinese stock markets was partially liberalized through the QDII scheme, the foreign share valuation played both an informational and anchoring role.

5.5 *Skewed Spread_Offer and IR_A*

In our sample, *Spread_Offer* and *IR_A* are skewed to the left, with skewness of 3.44 and 3.31. Thus, the distributions of these variables do not resemble a normal distribution. Our regression model is a classical regression model correcting the heterogenous variance. To partially address the econometric problems brought about by non-normal distributions of variables, we use the log version of those two variables ($log(variable + 1)$) on the left-hand sides of equations (3) and (4) and show the regression results in Table 12.

In Table 12, we observe that the results are quite similar to Panel A of Table 5. The coefficients on *PE_Peer* are significantly positive in columns (Eq. 4a) to (Eq. 4f), strongly supporting the anchoring Hypothesis 2. Moreover, the coefficients on the interactions terms *PE_Peer*$\times$*DLarge* and *PE_Peer*$\times D\Delta SO$ are significantly negative, offsetting the coefficients on *PE_Peer*. Besides, coefficients on the interactions term *PE_Foreign* $\times D\Delta SO$ are positive, offsetting the coefficients on *PE_Foreign*. This evidence strongly support the anchoring Hypothesis 3. The major results presented in Table 5 are robust after correcting the non-normal distribution of the dependent variables.

6 Conclusion

We have argued that for firms cross-listed in multiple markets, in the pricing process of the subsequently issued share the price of the first-issued share plays a dual role with both an informational and anchoring aspect. Ample existing studies offer evidence of the informational role. Our study contributes to the literature by revealing the anchoring role. Based on analysis using a special group of Chinese firms that first issued foreign shares and then domestic A-shares, we show that the A-share offer price anchors on the foreign share price such that market participants insufficiently adjust in response to differences in the rates of return required for the A-shares and the foreign shares.

Our study also has important implications for the international financing literature. As global integration becomes a more obvious trend, more foreign firms will strive to raise capital in both foreign and domestic financial markets. In the cross-listing process, the reference role played by existing share may be limited. Due to inter-market barriers in implicit or explicit forms, the two markets in which the firm is cross-listed may differ substantially, and thus the anchoring role of the reference may weaken its informational role.

Our findings and their implication can be generalized to other IPOs. The process of collecting information in the primary market is notoriously challenging. Faced with an ambiguous asset valuation, market participants have to rely on several heuristics to simplify the valuation process. In this situation, informative references can help to reduce valuation uncertainty. However, decision-makers need to be cautious about the underlying differences between the target and the reference. As demonstrated in both the literature and this paper, insufficient adjustment to new information leads to the anchoring effect, offsetting the information content of the reference. The recent realized return in the primary market or secondary market may also be a potential anchor that leads investors to naively request the same level of initial return for subsequent IPOs, even though the risk factors that are compensated for by IPO underpricing may be different. Alternatively, investors may naively compare the primary and secondary markets and expect the momentum in the secondary market to pervade the primary market. The anchoring story has the potential to partially explain why the average IPO underpricing level is strongly autocorrelated, and why the IPO offer price is only partially revised in line with public information such as market returns.

References

Allen, F., Qian, J., Qian, M., 2005. Law, finance, and economic growth in China. Journal of Financial Economics 77 (1), 57C116.

Baron, D. P., 1982. A model of the demand for investment banking advising and distribution services for new issues. Journal of Finance 37 (4), 955-976.

Beatty, R. P., Ritter, J. R., 1986. Investing banking, reputation, and the underpricing of initial public offerings. Journal of Financial Economics 15 (2), 213-232.

Benveniste, L. M., Spindt, P. A., 1989. How investment bankers determine the offer price and allocation of new issues. Journal of Financial Economics 24 (2), 343-361.

Biais, B., Bossaerts, P., Rochet, J. C., 2002. An optimal IPO mechanism. Review of Economic Studies 69 (1), 117-146.

Campbell, S.D., Sharpe, S.A., 2008. Anchoring bias in consensus forecasts and its effect on market prices. Journal of Financial and Quantitative Analysis, forthcoming.

Cen, L., Wei, K.C. J., Zhang, J., 2008. The cross-sectional anchoring of forecasted earnings per share and expected stock returns. Unpublished working paper, Hong Kong University of Science and Technology.

Chan, K., Menkveld, A. J., Yang, Z., 2008. Information asymmetry and asset prices: Evidence from the China foreign share discount. Journal of Finance 63 (1), 159-196.

Chapman, G. B., Bornstein, B. H., 1996. The more you ask for, the more you get: anchoring in personal injury verdicts. Applied Cognitive Psychology 10 (6), 519-540.

Chapman, G.B., Johnson, E.J., 2002, Incorporating the irrelevant: Anchors in judgments of belief and value. The psychology of judgment: Heuristics and biases, Cambridge University Press, New YorK.

Chen, Z., Choi, J. J., Jiang, C., 2008. Private benefits in IPOs: evidence from state-Owned firms. Unpublished working paper, Temple University.

Chen, Z., Xiong P., 2001, Discounts on illiquid stocks: Evidence from China. Unpublished working paper, Yale University.

Coffee, J. C., 2002, Racing towards the top? The impact of cross-listings and stock market competition on international corporate governance. Columbia Law Review 102 (7), 1757-1831.

Corwin, S. A., 2003. The determinants of underpricing for seasoned equity offers. Journal of Finance 58 (5), 2249-2279.

Dodonova, A., Khoroshilov, Y., 2004. Anchoring and transaction utility: Evidence from on-line auctions. Applied Economics Letters 11 307-310.

Doidge, C., Karolyi, G. A., Stulz, R. M., 2004. Why are foreign firms listed in the U.S. worth more? Journal of Financial Economics 71 (2), 205-238.

Englich, B., Mussweiler, T., Strack, F., 2006. Playing dice with criminal sentences: The influence of irrelevant anchors on experts' judicial decision making. Personality and Social Psychology Bulletin 32 (2), 188-200.

Epley, N., Gilovich, T., 2006. The anchoring-and-adjustment heuristic: Why the adjustments are insufficient. Psychological Science 17 (4), 311-318.

Errunza, V. R., Miller, D. P., 2000. Market segmentation and the cost of capital in international equity markets. Journal of Financial and Quantitative Analysis 35 (4), 577-600.

Eun, E.S., Sabherwal, S., 2003. Cross-border listings and price discovery: Evidence from U.S.-listed Canadian stocks. Journal of Finance 58 (2), 549-575.

Fan, J.P.H., Wong, T.J., Zhang, T., 2007. Politically connected CEOs, corporate governance, and post-IPO performance of China's newly partially privatized firms. Journal of Financial Economics 84 (2), 330-357.

Fernald, J., Rogers, J. H., 2002. Puzzles in the Chinese stock market. Review of Economics and Statistics 84 (3), 416-432.

Fernandes, N., Ferreira, M. A., 2008. Does international cross-listing improve the information environment. Journal of Financial Economics 88 (2), 216-244.

Foerster, S. R., Karolyi, G. A., 1993. International listings of stocks: The case of Canada and the U.S. Journal of International Business Studies 24(4), 763-784.

Foerster, S. R., Karolyi, G. A., 1999. The effects of market segmentation and investor recognition on asset prices: Evidence from foreign stocks listing in the United States. Journal of Finance 54 (3), 981-1013.

Galinsky, A. D., Mussweiler, T., 2001. First offers as anchors: The role of perspective-taking and negotiator focus. Journal of Personality and Social Psychology 81 (4), 657-669.

George, T., Hwang C.Y., 2004. The 52-week high and momentum investing. Journal of Finance 59 (5), 2145-2176.

Green, D., Jacowitz, K. E., Kahneman, D., McFadden, D., 1998. Referendum contingent valuation, anchoring, and willingness to pay for public goods. Resource and Energy Economics 20 (2), 85-116.

Grinblatt, M., Hwang, C. Y., 1989. Signalling and the pricing of new issues. Journal of Finance 44 (2), 393-420.

Grossman, S. J., Stiglitz, J. E., 1980. On the impossibility of informationally efficient markets. American Economic Review 70 (3), 393-408.

Harris, F. H., Mclnish, T. H., Shoesmit, G. L., Wood, R. A., 1995. Cointegration, error correction, and price discovery on informationally linked security markets. Journal of Financial and Quantitative Analysis 30 (4), 563-579.

Hasbrouck, J., 1995. One security, many markets: Determining the contributions to price discovery. Journal of Finance 50 (4), 1175-1199.

Hayek, F. A., 1945. The use of knowledge in society. American Economic Review 35 (4), 519-530.

Hung, M., Wong, T.J., Zhang, T., 2008. Political relations and overseas stock exchange listing: Evidence from Chinese state-owned enterprises. Unpublished working paper, University of Southern California.

Jacowitz, K. E., Kahneman, D., 1995. Measures of anchoring in estimation tasks. Personality and Social Psychology Bulletin 21 (11), 1161-1166.

Kim M., Ritter, J., 1999. Valuing IPOs. Journal of Financial Economics 53 (3) 409-437.

Krigman, L., Shaw, W. H., Womack, K. L., 1999. The persistence of IPO mispricing and the predictive power of flipping. Journal of Finance 54 (3), 1015-1044.

Ljungqvist, A., Nanda, V., Singh, R., 2006. Hot markets, investor sentiment, and IPO pricing. Journal of Business 79 (4), 1667-1702.

Loughran, T., Ritter, J. R., 2002. Why don't issuers get upset about leaving money on the table in IPOs? Review of Financial Studies 15 (2), 413-443.

Loughran, T., Ritter, J. R., 2004. Why has IPO underpricing changed over time? Financial Management 33 (3), 5-37.

Loughran, T., Ritter, J.R., Rydqvist, K., 2007. Initial public offerings: International insights, Pacific-Basin Finance Journal, updated on Ritter's website.

Mei, J., Scheinkman, J. A., Xiong, W., 2005. Speculative trading and stock prices: Evidence from Chinese A-B share premia. Unpublished working paper, Princeton University.

Megginson, W. L., Tian, L., 2007. Regulatory underpricing: Determinants of Chinese extreme IPO returns. Unpublished working paper, University of Oklahoma.

Northcraft, G. B., Neale, M. A., 1987. Experts, amateurs, and real estate: An anchoring-and-adjustment perspective on property pricing decisions. Organizational Behavior and Human Decision Process 39 (1), 84-97.

Pagano, M., Roell, A. A., Zechner, J., 2002, The geography of equity listing: Why do companies list abroad? Journal of Finance 57 (6), 2651-2694.

Purnanandam, A., Swaminathan, B., 2004. Are IPOs really underpriced? The Review of Financial Studies 17 (3), 811-848.

Ritter, J., Welch I., 1992. A review of IPO activity, pricing, and allocations. Journal of Finance 57 (4), 1795-1828.

Reese, W. A., Weisbach, M. S., 2002. Protection of minority shareholder interests, cross-listings in the United States, and subsequent equity offerings. Journal of Financial Economics 66 (1), 65-104.

Rock, K., 1986. Why new issues are underpriced. Journal of Financial Economics 15(2), 187-212.

Shafir, E., Diamond, P., Tversky, A., 1997. Money illusion. Quarterly Journal of Economics 112 (2), 341-374.

Simonson, I., Drolet, A., 2004. Anchoring effects on consumers' willingness-to-pay and willingness-to-accept. Journal of Consumer Research 31 (3), 681-690.

Stulz, R. M., 2005. The limits of financial globalization. Journal of Finance 60 (4), 1595-1638.

Sun, Q., Tong, W. H.S., 2000. The effect of market segmentation on stock prices:

The China syndrome. Journal of Banking and Finance 24, 1875-1902.

Titman, S., Trueman, B., 1986. Information quality and the valuation of new issues. Journal of Accounting and Economics 8 (2), 159-172.

Tong, W. H.S., Yu, W. W., 2008. A corporate governance explanation of the A-B share discount in China. Unpublished working paper, Hong Kong Polytechnic University.

Tversky, A., Kahneman, D., 1974. Judgment under uncertainty: Heuristics and biases. Science 185 (4157), 1124-1131.

Wansink, B., Kent, R. J., Hoch, S. J., 1998. An anchoring and adjustment model of purchase quantity decisions. Journal of Marketing Research 35 (1), 71-81.

Welch, I., 1989. Seasoned offerings, imitation costs, and the underpricing of initial public offerings. Journal of Finance 44 (2), 421-449.

Welch, I., 1992. Sequential sales, learning, and cascades. Journal of Finance 47 (2), 695-732.

Table 1
Sample distributions.
This table reports the distributions of A-share issuances by first-foreign-then-A sample firms across industries and years. The industry classification follows CSMAR's "INDCD" classification. The year refers to the time at which the sample firm issued its A-share. Each subperiod is a five- to six-year horizon. Panel A is presented for the full sample, and Panels B and C are for the subsamples, first-H-then-A and first-B-then-A firms, respectively.

Industry	1992-1997	1998-2002	2003-2008	Total
Panel A: Full sample of first-foreign-then-A firms				
Finance	-	-	5	5
Utilities	4	7	8	19
Properties	-	-	1	1
Conglomerates	2	1	-	3
Industrials	38	14	8	60
Commerce	5	-	-	5
Total	49	22	22	93
Panel B: Subsample of first-H-then-A firms				
Finance	-	-	5	5
Utilities	2	4	8	14
Properties	-	-	1	1
Conglomerates	1	1	-	2
Industrials	14	5	8	27
Total	17	10	22	49
Panel C: Subsample of first-B-then-A firms				
Utilities	2	3	-	5
Conglomerates	1	-	-	1
Industrials	23	10	-	33
Commerce	5	-	-	5
Total	31	13	-	44

Table 2
This table reports the descriptive statistics of major variables in the A-share listing for first-foreign-then-A firms. *PE_Peer* is the price-to-earnings ratio (PE) of the matching firm at five days before A-share listing, where the matching follows Purnanandam and Swaminathan (2003)'s industry-sale-profit margin procedure. *PE_Foreign* is the PE of corresponding foreign share five days before A-share listing. *BHRet_A* and *BHRet_Foreign* are the one-year buy-and-hold returns for A- and foreign shares, respectively, since the second day of A-share listing. *Spread_Fair* refers to the fair price spread, calculated by the A-share price over the corresponding foreign share price at the close of the sixth trading month of the A-share listing and then minus one. *PE_Fair* is the "fair" PE, proxied by the A-share's PE six months after listing. *PE_Offer* is the A-share offer PE reported by the issuer in the offering. *Spread_Offer* is calculated by the A-share offer price over the corresponding foreign share price at five days before A-share listing and then minus one. *IR_A* is the A-share underpricing level, calculated by the closing price on the first day of A-share listing over the offer price and then minus one. Panel A is presented for the full sample, and Panels B and C are for the subsamples, first-H-then-A and first-B-then-A firms, respectively.

	PE_Peer (1)	PE_Foreign (2)	BHRet_Foreign (3)	BHRet_A (4)	Spread_Fair (5)	PE_Fair (6)	PE_Offer (7)	Spread_Offer (8)	IR_A (9)
Panel A: Full sample of first-foreign-then-A firms									
N	72	85	86	86	91	77	79	93	93
Mean	36.1	17.6	27%	7%	204%	42.6	21.7	75%	117%
Std. Error	2.9	1.5	12%	8%	21%	4.3	1.6	14%	12%
Maximum	130.2	73.1	895%	440%	1015%	230.1	97.8	915%	879%
Median	26.6	13.2	5%	-16%	147%	35.0	18.0	33%	83%
Minimum	6.9	2.8	-82%	-67%	-36%	5.5	7.5	-53%	0%
Panel B: Subsample of first-H-then-A firms									
N	37	49	42	42	47	47	49	49	49
Mean	34.6	18.0	17%	14%	209%	48.2	24.1	69%	98%
Std. Error	3.9	1.8	8%	14%	35%	6.70	2.32	22%	11%
Maximum	126.3	56.5	151%	440%	1015%	230.1	97.8	915%	349%
Median	25.3	14.0	16%	2%	94%	37.0	19.0	10%	79%
Minimum	6.9	2.8	-82%	-67%	-36%	5.5	7.5	-53%	0%
Panel C: Subsample of first-B-then-A firms									
N	35	36	44	44	44	30	30	44	44
Mean	37.6	17.2	36%	1%	198%	33.8	17.8	81%	139%
Std. Error	4.4	2.4	22%	9%	24%	2.54	1.35	16%	22%
Maximum	130.2	73.1	895%	259%	547%	61.9	36.0	406%	879%
Median	29.1	13.0	-9%	-18%	151%	31.1	15.4	47%	91%
Minimum	6.9	2.8	-66%	-40%	-29%	10.0	10.0	-46%	0%

Table 3

Correlations among major variables.

This table reports the correlation coefficients among the major variables defined in Table 2. The only difference is that *PE_Offer*, *PE_Peer*, and *PE_Foreign* are taken natural log. The lower left triangle reports the Pearson correlation coefficients, and the upper right triangle reports the Spearman correlation coefficients. ***, **, and * denote significance at the 1%, 5%, and 10% levels respectively. Panel A is presented for the full sample, and Panels B and C are for the subsamples, first-H-then-A and first-B-then-A firms, respectively.

	PE_Peer (1)	PE_Foreign (2)	BHRet_Foreign (3)	BHRet_A (4)	Spread_Fair (5)	PE_Fair (6)	PE_Offer (7)	Spread_Offer (8)	IR_A (9)
Panel A: Full sample of first-foreign-then-A firms									
PE_Peer		0.02	0.08	-0.07	0.15	0.31**	0.04	0.12	0.24**
PE_Foreign	0.04		-0.10	-0.02	-0.55***	0.29**	0.54***	-0.64***	-0.02
BHRet_Foreign	-0.04	-0.20*		0.55***	-0.12	0.45***	0.20*	0.25**	-0.22**
BHRet_A	-0.07	-0.04	0.52***		0.1	0.46***	0.03	-0.17	-0.16
Spread_Fair	0.20*	-0.5***	-0.01	0.03		0.22*	-0.12	0.41***	0.41***
PE_Fair	0.35***	0.36***	0.24**	0.37***	0.22*		0.44***	-0.19*	0.25**
PE_Offer	0.11	0.56***	0.02	0.05	-0.12	0.57***		-0.04	-0.27**
Spread_Offer	0.09	-0.59***	0.25**	-0.11	0.41***	-0.14	0.01		-0.24**
IR_A	0.21*	0.02	-0.14	-0.27**	0.41***	0.22*	-0.25**	-0.29***	
Panel B: Subsample of first-H-then-A firms									
PE_Peer		-0.06	0.12	-0.08	0.18	0.4**	-0.25	-0.13	0.64***
PE_Foreign	-0.01		0.13	0.27*	-0.68***	0.29*	0.52***	-0.77***	-0.12
BHRet_Foreign	0.09	0.07		0.62***	-0.02	0.6***	0.34**	-0.11	-0.08
BHRet_A	-0.1	0.16	0.61***		0.03	0.58***	0.27*	-0.4***	-0.25
Spread_Fair	0.19	-0.65***	0	-0.07		0.21	-0.13	0.56***	0.4***
PE_Fair	0.40**	0.36**	0.57***	0.43***	0.2		0.46***	-0.31**	0.23
PE_Offer	-0.08	0.57***	0.33**	0.13	-0.12	0.59***		-0.1	-0.24
Spread_Offer	-0.12	-0.74***	0.05	-0.26*	0.64***	-0.16	0.00		0.00
IR_A	0.64***	-0.15	-0.18	-0.34**	0.42***	0.2	-0.21	0.01	
Panel C: Subsample of first-B-then-A firms									
PE_Peer		0.12	-0.03	-0.12	0.17	0.15	0.45**	0.30*	-0.20
PE_Foreign	0.09		-0.26	-0.34**	-0.27	0.34*	0.72***	-0.44***	0.13
BHRet_Foreign	-0.10	-0.35**		0.52***	-0.22	0.22	-0.14	0.51***	-0.28*
BHRet_A	-0.01	-0.4**	0.68***		0.19	0.15	-0.35*	0.04	-0.06
Spread_Fair	0.24	-0.21	-0.03	0.26*		0.30	-0.11	0.02	0.44***
PE_Fair	0.30	0.37**	0.19	0.10	0.27		0.45**	0.02	0.32*
PE_Offer	0.45**	0.56***	-0.13	-0.28	-0.18	0.45**		-0.04	-0.13
Spread_Offer	0.33*	-0.34**	0.37**	0.16	0.01	-0.05	0.12		-0.65***
IR_A	-0.17	0.28	-0.16	-0.21	0.41***	0.32*	-0.31	-0.66***	

Table 4
The informational role of the foreign share price.
This table reports the estimation results of models (1) and (2). Variables are identified in the same way as in Table 3. In addition, *DFBTA* is a dummy variable, which takes a value of one if the firm first issue B- and then A-shares, and zero if the firm first issue H- and then A-shares. The numbers reported in parentheses under the coefficients are t-statistics calculated using White standard errors. ***, **, and * on the coefficients denote significance at the 1%, 5%, and 10% levels, respectively. Panel A is presented for the full sample, and Panels B and C are for the subsamples, first-H-then-A and first-B-then-A firms, respectively.

Dependant Variable	PE_Fair			PE_Offer		
	(Eq.1a)	(Eq.1b)	(Eq.1c)	(Eq.2a)	(Eq.2b)	(Eq.2c)
Panel A: Full sample of first-foreign-then-A firms						
Intercept	2.60***	2.66***	1.67***	2.78***	2.07***	1.88***
	(8.12)	(9.16)	(3.88)	(8.59)	(9.20)	(4.40)
DFBTA	-0.24*	-0.14	-0.25**	-0.15	-0.18**	-0.16**
	(-1.96)	(-1.18)	(-2.28)	(-1.53)	(-2.36)	(-2.03)
PE_Peer	0.32***		0.32***	0.07		0.07
	(3.55)		(3.94)	(0.71)		(0.80)
PE_Foreign		0.36***	0.36***		0.37***	0.35***
		(3.07)	(3.41)		(4.57)	(3.86)
Adj.R^2	13.9%	11.8%	30.1%	1.2%	33.5%	29.2%
N	65	77	65	65	79	65
Panel B: Subsample of first-H-then-A firms						
Intercept	2.32***	2.56***	1.24**	3.23***	1.99***	2.24***
	(5.01)	(6.41)	(2.12)	(6.52)	(7.00)	(3.30)
PE_Peer	0.40***		0.40***	-0.06		-0.06
	(2.99)		(3.69)	(-0.37)		(-0.43)
PE_Foreign		0.39**	0.41***		0.40***	0.38***
		(2.47)	(2.84)		(3.90)	(2.79)
Adj.R^2	13.6%	10.9%	31.7%	(2.2%)	30.6%	25.5%
N	37	47	37	37	49	37
Panel C: Subsample of first-B-then-A firms						
Intercept	2.71***	2.71***	1.96***	2.07***	2.06***	1.30***
	(6.24)	(7.24)	(3.29)	(7.23)	(7.71)	(4.24)
PE_Peer	0.22*		0.21*	0.24***		0.23***
	(1.90)		(1.83)	(2.84)		(3.07)
PE_Foreign		0.28**	0.29**		0.31**	0.30***
		(2.14)	(2.17)		(2.75)	(3.05)
Adj.R^2	5.5%	11.0%	17.9%	16.8%	28.5%	45.0%
N	28	30	28	28	30	28

Table 5

The anchoring role of the foreign share price: Insufficient adjustment.

This table reports the cross-sectional estimation results of models (3) and (4). Variables are identified in the same way as in Table 3. In addition, *Resid_PE* and *Resid_PE* are the residual terms from models (2) and (3), respectively. *DLarge* is a dummy variable, which takes a value of one if the amount of gross proceed collected in the A-share issuance is larger than the sample median, and zero otherwise. $D\Delta SO$ a dummy variable, which takes a value of one if the state ownership disposed of in the A-share issuance is larger than the sample median, and zero otherwise. The numbers reported in parentheses under the coefficients are t-statistics calculated using White standard errors. ***, **, and * on the coefficients denote significance at the 1%, 5%, and 10% levels, respectively. Panel A is presented for the full sample, and Panels B and C are for the subsamples, first-H-then-A and first-B-then-A firms, respectively.

Dependant Variable	Spread_Offer	IR_A					
	(Eq.3)	(Eq.4a)	(Eq.4b)	(Eq.4c)	(Eq.4d)	(Eq.4e)	(Eq.4f)
Panel A: Full sample of first-foreign-then-A firms							
Intercept	2.92**	-0.49	-0.52	-1.38	-0.49	-0.99	-2.14**
	(2.09)	(-1.01)	(-1.20)	(-1.59)	(-1.03)	(-1.23)	(-2.34)
DFBTA	0.20	-0.05	-0.34*	-0.35*	0.10	0.36*	0.03
	(0.70)	(-0.30)	(-1.81)	(-1.91)	(0.55)	(1.79)	(0.11)
Resid_PE		-0.87***	-0.64***	-0.60**	-0.85***	-0.65**	-0.54*
		(-3.68)	(-3.07)	(-2.30)	(-3.66)	(-2.05)	(-1.75)
Resid_Spread		0.06	0.04	0.01	0.06	0.00	0.00
		(0.78)	(0.55)	(0.15)	(0.81)	(0.06)	(-0.03)
PE_Peer	0.19	0.49***	0.51***	0.69***	0.48***	0.79***	1.03***
	(0.83)	(3.71)	(4.31)	(3.67)	(3.70)	(3.43)	(5.00)
PE_Foreign	-1.06***	-0.04	0.11	0.21	-0.01	-0.24	0.01
	(-3.67)	(-0.30)	(1.16)	(1.05)	(-0.11)	(-1.02)	(0.02)
DLarge			-0.64***	0.93			1.02
			(-3.46)	(0.92)			(1.02)
PE_Peer×DLarge				-0.38*			-0.47*
				(-1.82)			(-1.84)
PE_Foreign×DLarge				-0.11			0.01
				(-0.43)			(0.04)
DΔSO					-0.75	0.51	1.12
					(-1.67)	(0.54)	(1.53)
PE_Peer×DΔSO						-0.65**	-0.65***
						(-2.37)	(-2.79)
PE_Foreign×DΔSO						0.47*	0.29
						(1.73)	(1.24)
Adj.R^2	17.9%	21.2%	33.8%	34.1%	21.6%	30.1%	39.8%
N	69	65	65	65	65	65	65

Dependant Variable	Spread_Offer	IR_A					
	(Eq. 3)	(Eq. 4a)	(Eq. 4b)	(Eq. 4c)	(Eq. 4d)	(Eq. 4e)	(Eq. 4f)
Panel B: Subsample of first-H-then-A firms							
Intercept	5.31**	-0.87	-1.57***	-1.90*	-0.71	0.48	-1.09
	(2.67)	(-1.68)	(-2.82)	(-1.75)	(-1.12)	(0.45)	(-0.71)
Resid_PE		-0.34	-0.44	-0.52	-0.35	-0.10	-0.31
		(-1.05)	(-1.50)	(-1.64)	(-1.02)	(-0.24)	(-0.85)
Resid_Spread		0.03	0.03	0.03	0.04	0.02	0.02
		(0.33)	(0.43)	(0.40)	(0.35)	(0.16)	(0.21)
PE_Peer	-0.20	0.76***	0.83***	0.99***	0.73***	0.58**	0.86***
	(-0.71)	(4.96)	(5.44)	(4.43)	(3.66)	(2.36)	(2.81)
PE_Foreign	-1.47***	-0.26	0.02	-0.07	-0.24	-0.50	-0.21
	(-3.38)	(-1.35)	(0.10)	(-0.22)	(-1.25)	(-1.68)	(-0.53)
Dlarge			-0.54**	0.32			0.23
			(-2.49)	(0.23)			(0.16)
PE_Peer×Dlarge				-0.50*			-0.39
				(-1.86)			(-1.26)
PE_Foreign×DLarge				0.30			0.19
				(0.78)			(0.56)
DΔSO					-0.10	-2.25	-1.52
					(-0.38)	(-1.47)	(-1.03)
PE_Peer×DΔSO						0.26	0.19
						(0.64)	(0.53)
PE_Foreign×DΔSO						0.47	0.34
						(1.17)	(0.81)
Adj.R^2	29.4%	34.4%	38.8%	39.6%	32.3%	32.7%	34.7%
N	37	37	37	37	37	37	37
Panel C: Subsample of first-B-then-A firms							
Intercept	0.40	-1.09	-1.02	-1.16	-1.06	-2.98**	-3.13**
	(0.30)	(-1.68)	(-1.54)	(-1.04)	(-1.68)	(-2.23)	(-2.53)
Resid_PE		-1.34***	-1.22***	-1.33**	-1.45***	-1.65***	-1.71***
		(-3.59)	(-3.01)	(-2.22)	(-3.67)	(-5.14)	(-3.14)
Resid_Spread		-0.23**	-0.22**	-0.20**	-0.21**	-0.21**	-0.15**
		(-2.70)	(-2.42)	(-2.28)	(-2.57)	(-2.50)	(-2.13)
PE_Peer	0.58*	0.33**	0.33**	0.43*	0.37**	0.49**	0.61**
	(1.98)	(2.23)	(2.12)	(1.84)	(2.17)	(2.30)	(2.83)
PE_Foreign	-0.54*	0.34**	0.34**	0.27	0.32**	0.87***	0.82***
	(-2.01)	(2.65)	(2.78)	(1.15)	(2.77)	(2.90)	(3.06)
Dlarge			-0.19	-0.03			-1.06
			(-1.07)	(-0.02)			(-0.65)
PE_Peer×Dlarge				-0.16			-0.09
				(-0.51)			(-0.31)
PE_Foreign×DLarge				0.15			0.41
				(0.44)			(1.39)
DΔSO					-0.15	2.34	3.63**
					(-0.75)	(1.67)	(2.73)
PE_Peer×DΔSO						-0.17	-0.29
						(-0.62)	(-1.13)
PE_Foreign×DΔSO						-0.72**	-0.99***
						(-2.19)	(-3.36)
Adj.R^2	9.9%	45.6%	45.2%	40.9%	44.4%	49.1%	47.2%
N	32	28	28	28	28	28	28

Table 6

The net impact of the foreign share price.

This table reports the comparison results of A-share underpricing between first-foreign-then-A firms and matched no-foreign-only-A firms. The matching procedure is as follows. We divide all A-share IPOs into deciles by the gross proceeds. For each sample firm, within in the same industry and in the same proceeds decile, we identify a matching firm without foreign shares but issued its A-shares no earlier than six months before the sample firm's A-share offering. Columns (1) and (2) report the descriptive statistics for A-share underpricing of first-foreign-then-A sample firms and no-foreign-only-A matching firms, respectively. Column (3) reports the results of the paired t-tests that examine the equality of sample means. Column (4) reports the results of Bartlett's test that examines the equality of sample variance. ***, **, and * on the statistics denote significance at the 1%, 5%, and 10% levels, respectively. Panel A is presented for the full sample, and Panels B and C are for the subsamples, first-H-then-A and first-B-then-A firms, respectively.

	First-foreign-then-A (1)	No-foreign-only-A (2)	T-test (3)	Bartlett's Test (4)
Panel A: Full sample of first-foreign-then-A firms				
N	77	77		
Mean	111%	139%	-1.17	
Std. Error	13%	20%		
Variance	137%	302%		11.41***
Max	879%	735%		
Median	83%	89%		
Min	0%	-68%		
Panel B. Subsample of first-H-then-A firms				
N	40	40		
Mean	100%	87%	0.58	
Std.Error	12%	18%		7.59***
Max	349%	445%		
Median	88%	47%		
Min	0%	-68%		
Panel C. Subsample of first-B-then-A firms				
N	37	37		
Mean	124%	196%	-1.71*	
Std.Error	25%	34%		3.48*
Max	879%	735%		
Median	82%	113%		
Min	0%	2%		

Table 7
Robustness check: Using alternative proxies.
This table reports the estimation results of models (5)-(8), using alternative proxies for the required rates of return. Panel A uses *BHRet_Foreign* and *BHRet_A*, and Panel B uses *Spread_Fair*, as proxies for different required rates of return. The variables are defined as in Table 5. In model (6), *Resid_PE* (*Resid_Spread*) is the residual from regressing *PE_Offer* (*Spread_Offer*) on *DFBTA*, *BHRet_Foreign*, and *BHRet_A*. In model (8), *Resid_PE* (*Resid_Spread*) is the residual from regressing *PE_Offer* (*Spread_Offer*) on *DFBTA* and *Spread_Fair*. The numbers reported in the parentheses under the coefficients are t-statistics calculated using White standard errors. ***, **, and * on the coefficients denote significance at the 1%, 5%, and 10% levels, respectively.

Dependant variable	Spread_Offer	IR_A			
Panel A: Buy-and-hold returns as the proxy					
	(Eq. 5)	(Eq. 6a)	(Eq. 6b)	(Eq. 6c)	(Eq. 6d)
Intercept	0.87***	1.00***	1.11***	1.13***	1.12***
	(3.65)	(7.87)	(6.76)	(6.82)	(6.59)
DFBTA	-0.24	0.04	-0.09	0.60***	0.51**
	(-0.77)	(0.26)	(-0.53)	(2.82)	(2.02)
Resid_PE		-0.35**	-0.32*	-0.29*	-0.28*
		(-2.05)	(-1.83)	(-1.95)	(-1.77)
Resid_Spread		-0.05	-0.10	-0.05	-0.10*
		(-0.76)	(-1.66)	(-0.73)	(-1.75)
BHRet_Foreign	0.51**	-0.01	0.30*	-0.18	0.37
	(2.30)	(-0.23)	(1.79)	(-0.61)	(0.91)
BHRet_A	-0.58**	-0.28***	-1.42**	-0.26***	-1.75***
	(-2.32)	(-3.03)	(-2.61)	(-2.75)	(-3.15)
DLarge			-0.40**		-0.25
			(-2.43)		(-1.49)
BHRet_Foreign×DLarge			-0.04		-0.30
			(-0.13)		(-0.83)
BHRet_A×DLarge			1.22**		1.54***
			(2.21)		(2.81)
DΔSO				-0.70***	-0.65***
				(-3.43)	(-2.89)
BHRet_Foreign×DΔSO				0.08	-0.14
				(0.25)	(-0.36)
BHRet_A×DΔSO				0.35**	0.62**
				(2.11)	(2.15)
Adj.R^2	10.8%	7.6%	25.0%	14.8%	32.2%
N	84	70	70	70	70
Panel B: Ex-post price spread as proxy					
	(Eq. 7)	(Eq. 8a)	(Eq. 8b)	(Eq. 8c)	(Eq. 8d)
Intercept	0.22*	0.65***	0.85***	0.72***	0.84***
	(1.81)	(5.69)	(3.26)	(4.88)	(3.02)
DFBTA	0.12	0.17	0.04	0.47***	0.37
	(0.48)	(1.22)	(0.23)	(2.72)	(1.66)
Resid_PE		-0.16	-0.11	-0.18	-0.14
		(-1.11)	(-0.68)	(-1.25)	(-0.95)
Resid_Spread		-0.22***	-0.20***	-0.22***	-0.21***
		(-3.99)	(-2.93)	(-4.59)	(-3.45)
Spread_Fair	0.24**	0.17***	0.15**	0.17***	0.16**
	(2.32)	(3.90)	(2.39)	(3.48)	(2.34)
DLarge			-0.21		-0.13
			(-0.75)		(-0.49)
Spread_Fair×DLarge			-0.02		-0.01
			(-0.17)		(-0.07)
DΔSO				-0.15	-0.14
				(-0.66)	(-0.62)
Spread_Fair×DΔSO				-0.19**	-0.17*
				(-2.05)	(-1.90)
Adj.R^2	11.8%	24.2%	23.8%	27.9%	26.4%
N	91	77	77	77	77

Table 8
Robustness check: Controlling for the impact of regulatory constraints
We rerun model (4) after controlling for regulatory cap dummies and report the results in this table. Most of the variables are defined as in Table 5. *DCap15* is a dummy that equals one if the offer PE is within the range of [14.9,15.1). *DCap16*, *DCap18*, and *DCap20* are defined in a similar way. *DCap* equals one if any of the abovementioned dummies equal one. The numbers reported in parentheses under the coefficients are t-statistics calculated using White standard errors. ***, **, and * besides the coefficients denote significance at the 1%, 5%, and 10% levels, respectively.

	(Eq.4a)	(Eq.4b)	(Eq.4c)	(Eq.4d)	(Eq.4e)	(Eq.4f)	(Eq.4g)	(Eq.4h)
Intercept	-0.44	-1.66*	-0.78	-2.26**	-0.52	-1.79**	-0.79	-2.32**
	(-0.89)	(-2.00)	(-0.94)	(-2.48)	(-1.03)	(-2.13)	(-0.94)	(-2.47)
DFBTA	-0.08	-0.43**	0.34*	0.01	-0.07	-0.41**	0.37*	0.00
	(-0.50)	(-2.12)	(1.80)	(0.05)	(-0.39)	(-2.04)	(1.87)	(0.01)
Resid_PE	-0.87***	-0.54**	-0.62*	-0.47	-0.90***	-0.57**	-0.64*	-0.51
	(-3.60)	(-2.07)	(-1.94)	(-1.54)	(-3.74)	(-2.16)	(-1.93)	(-1.59)
Resid_Spread	0.05	-0.02	-0.01	-0.04	0.05	-0.01	-0.01	-0.03
	(0.68)	(-0.16)	(-0.19)	(-0.42)	(0.71)	(-0.11)	(-0.14)	(-0.32)
PE_Peer	0.51***	0.76***	0.80***	1.10***	0.49***	0.76***	0.79***	1.08***
	(3.64)	(3.96)	(3.34)	(5.19)	(3.57)	(3.93)	(3.12)	(4.87)
PE_Foreign	-0.06	0.26	-0.30	0.01	-0.02	0.30	-0.28	0.06
	(-0.48)	(1.37)	(-1.28)	(0.04)	(-0.14)	(1.57)	(-1.02)	(0.19)
DLarge		1.52		1.68		1.56		1.65
		(1.50)		(1.62)		(1.49)		(1.58)
PE_Peer×DLarge		-0.45**		-0.56**		-0.48**		-0.56**
		(-2.12)		(-2.17)		(-2.16)		(-2.19)
PE_Foreign×DLarge		-0.25		-0.11		-0.23		-0.10
		(-1.01)		(-0.41)		(-0.91)		(-0.39)
DΔSO			0.23	0.82			0.28	0.88
			(0.23)	(1.00)			(0.27)	(1.09)
PE_Peer×DΔSO			-0.63**	-0.63***			-0.63**	-0.60**
			(-2.28)	(-2.75)			(-2.15)	(-2.47)
PE_Foreign×DΔSO			0.54*	0.36			0.51	0.31
			(1.97)	(1.52)			(1.66)	(1.10)
DCap	-0.24	-0.34**	-0.32*	-0.37**				
	(-1.41)	(-2.02)	(-1.76)	(-2.21)				
DCap15					0.06	0.02	-0.26	-0.21
					(0.17)	(0.06)	(-0.64)	(-0.59)
DCap16					-0.61***	-0.60***	-0.59***	-0.59***
					(-5.69)	(-3.90)	(-4.67)	(-4.08)
DCap18					-0.37***	-0.64**	-0.10	-0.43**
					(-2.74)	(-2.61)	(-0.58)	(-2.13)
DCap20					-0.25	-0.36**	-0.33*	-0.35**
					(-1.45)	(-2.26)	(-1.68)	(-2.38)
Adj.R^2	21.5%	35.9%	31.7%	42.4%	19.2%	34.8%	28.6%	39.5%
N	65	65	65	65	65	65	65	65

Table 9
Robustness check: Multivariate tests.
This table reports the multivariate results of regressing the first-day return of A-share listing on alternative proxies for required rates of return, adding multiple control variables to model (4). *Llag_ann_list* is the log number of calendar days between the announcement of a prospectus and the listing day of A-share issuance. *DAuditor* is a dummy variable that equals one if the auditor is a Big Four accounting firm, and zero otherwise. *Fee* is the flotation fees as a percentage of gross proceeds. *IR_Foreign* is the first-day return of foreign share issuance. *SO%* is the percentage of state ownership just before A-share issuance. *CRetM* is the market return cumulated from three weeks to one week before A-share listing. The expected signs for coefficients are marked on the right of the respective variables. The numbers reported in parentheses under coefficients are t-statistics calculated using White standard errors. ***, **, and * besides the coefficients denote significance at the 1%, 5%, and 10% levels, respectively.

		(Eq.4a)	(Eq.4b)	(Eq.4c)	(Eq.4d)
Intercept		-1.72***	-2.53***	-3.50***	-3.95***
		(-3.12)	(-3.70)	(-3.80)	(-3.95)
DFBTA		-0.71**	-0.50	-0.50*	-0.30
		(-2.51)	(-1.66)	(-1.95)	(-0.91)
Resid_PE	(−)	-0.42**	-0.42*	-0.47**	-0.46*
		(-2.26)	(-1.70)	(-2.42)	(-1.93)
Resid_Spread	(−)	-0.02	-0.03	-0.02	-0.03
		(-0.29)	(-0.31)	(-0.50)	(-0.50)
PE_Peer	(+)	0.58***	0.77***	1.16***	1.28***
		(4.26)	(4.44)	(3.93)	(4.49)
PE_Foreign	(−)	0.10	0.12	-0.12	-0.13
		(1.01)	(0.64)	(-0.55)	(-0.44)
DLarge		-0.28	1.41	-0.15	1.26
		(-1.31)	(1.36)	(-0.86)	(1.31)
PE_Peer×DLarge	(−)		-0.57**		-0.50*
			(-2.30)		(-1.90)
PE_Foreign×DLarge	(+)		0.11		0.14
			(0.38)		(0.45)
DΔSO		-0.11	-0.29	1.90**	1.42
		(-0.48)	(-1.22)	(2.05)	(1.49)
PE_Peer×DΔSO	(−)			-0.84**	-0.78**
				(-2.47)	(-2.39)
PE_Foreign×DΔSO	(+)			0.31	0.35
				(1.18)	(1.34)
DCap		-0.26	-0.29*	-0.28*	-0.30*
		(-1.55)	(-1.68)	(-1.72)	(-1.89)
Llag_ann_list	(+)	0.24***	0.26***	0.24***	0.26***
		(3.32)	(3.58)	(3.70)	(4.20)
DAuditor	(−)	-0.43***	-0.41**	-0.30*	-0.30*
		(-2.70)	(-2.54)	(-2.01)	(-1.85)
Fee	(?)	11.45*	11.08*	13.26*	13.15**
		(1.72)	(1.76)	(2.01)	(2.17)
IR_Foreign	(−)	-0.26	-0.25	-0.16	-0.13
		(-1.21)	(-0.90)	(-0.72)	(-0.52)
SO%	(+)	0.27	0.23	0.31*	0.27
		(1.46)	(1.24)	(1.69)	(1.54)
CRetM	(+)	-0.30	-0.43	-0.48	-0.57
		(-0.28)	(-0.43)	(-0.44)	(-0.53)
Adj.R^2		39.2%	40.8%	46.3%	47.3%
N		63	63	63	63

Table 10
Robustness check: Multivariate tests using alternative proxies.
This table reports the multivariate result of regressing first-day return of A-share listing on alternative proxies for the required rates of return. As in Table 9, we add multiple control variables to models (6) and (8). Specifically, *COC1* and *COC2* represent *BHRet_Foreign* and *BHRet_A* respectively in Eq. (6a) to (6d), and *COC1* represents *Spread_Fair* in Eq. (8a) to (8d). The expected signs for coefficients are marked on the right of respective variables. The numbers reported in parentheses under coefficients are t-statistics calculated using White standard errors. ***, **, and * besides the coefficients denote significance at the 1%, 5%, and 10% levels, respectively.

		(Eq.6a)	(Eq.6b)	(Eq.6c)	(Eq.6d)	(Eq.8a)	(Eq.8b)	(Eq.8c)	(Eq.8d)
Intercept		1.28***	0.97***	1.34***	0.97***	0.74**	0.70**	0.65**	0.63*
		(2.92)	(2.77)	(3.21)	(2.87)	(2.24)	(2.05)	(2.02)	(1.85)
DFBTA		-0.41	-0.29	-0.26	-0.14	-0.18	-0.17	-0.09	-0.08
		(-1.45)	(-1.32)	(-0.85)	(-0.60)	(-0.67)	(-0.65)	(-0.32)	(-0.31)
Resid_PE	(−)	0.00	-0.09	0.03	-0.04	0.02	0.01	0.00	-0.01
		(0.02)	(-0.53)	(0.22)	(-0.26)	(0.13)	(0.08)	(-0.04)	(-0.06)
Resid_Spread	(−)	-0.06	-0.11***	-0.04	-0.12***	-0.21***	-0.19***	-0.21***	-0.20***
		(-0.99)	(-2.82)	(-0.77)	(-2.69)	(-4.51)	(-2.80)	(-4.53)	(-3.02)
COC1	(+)	-0.12*	0.41***	-0.38*	0.33	0.12**	0.12*	0.14**	0.15*
		(-1.95)	(3.10)	(-1.72)	(1.11)	(2.13)	(1.82)	(2.19)	(1.92)
COC2	(−)	-0.10	-1.84***	-0.06	-2.08***				
		(-1.01)	(-4.55)	(-0.57)	(-4.81)				
DLarge		-0.47***	-0.16	-0.44**	-0.15	-0.09	-0.02	-0.05	-0.01
		(-2.72)	(-1.28)	(-2.66)	(-1.09)	(-0.48)	(-0.10)	(-0.30)	(-0.05)
COC1×DLarge	(−)		-0.53**		-0.61*		-0.04		-0.02
			(-2.09)		(-1.87)		(-0.38)		(-0.25)
COC×DLarge	(+)		1.89***		2.08***				
			(4.53)		(4.82)				
DΔSO		-0.20	-0.24	-0.29	-0.37**	-0.28*	-0.28*	-0.12	-0.13
		(-0.45)	(-1.53)	(-1.60)	(-2.33)	(-1.84)	(-1.80)	(-0.66)	(-0.67)
COC1×DΔSO	(−)			0.27	0.04			-0.15*	-0.14*
				(1.06)	(0.13)			(-1.72)	(-1.74)
COC2×DΔSO	(+)			0.06	0.46*				
				(0.27)	(1.96)				
DCap		0.01	0.06	-0.04	0.07	-0.31*	-0.29	-0.33*	-0.31*
		(0.04)	(0.43)	(-0.24)	(0.49)	(-1.68)	(-1.63)	(-1.72)	(-1.70)
Llag_ann_list	(+)	0.05	0.07	0.06	0.07	0.10	0.11	0.11	0.11
		(0.57)	(1.02)	(0.68)	(0.99)	(1.32)	(1.41)	(1.43)	(1.49)
DAuditor	(−)	-0.54***	-0.68***	-0.51***	-0.64***	-0.56***	-0.57***	-0.54***	-0.55***
		(-3.12)	(-4.76)	(-3.18)	(-4.95)	(-3.68)	(-3.81)	(-3.52)	(-3.62)
Fee	(−)	10.30**	9.87**	8.35*	8.47**	8.01*	7.92*	7.30	7.26
		(2.15)	(2.45)	(1.96)	(2.29)	(1.75)	(1.68)	(1.62)	(1.58)
IR_Foreign	(−)	-0.17	-0.24	-0.16	-0.31**	-0.10	-0.10	-0.10	-0.10
		(-1.06)	(-1.64)	(-1.06)	(-2.22)	(-0.67)	(-0.63)	(-0.67)	(-0.64)
SO%	(+)	-0.05	0.09	-0.03	0.15	0.15	0.15	0.15	0.15
		(-0.16)	(0.36)	(-0.10)	(0.64)	(0.68)	(0.67)	(0.74)	(0.73)
CRetM	(+)	2.89**	3.05***	2.60**	2.59***	1.20	1.21	1.28	1.29
		(2.42)	(3.52)	(2.14)	(2.93)	(1.10)	(1.11)	(1.20)	(1.21)
Adj.R^2		32.1%	52.4%	32.4%	54.8%	37.2%	36.3%	37.9%	36.9%
N		68	68	68	68	75	75	75	75

Table 11
Robustness check: before the implementation of QDII.
This table reports the estimation results of models (1) to (4), using sample data before the implementation of QDII On 11 May 2007. Variables are identified in the same way as in Tables 4 and 5. Numbers reported in parentheses under the coefficients are t-statistics calculated using White standard errors. ***, **, and * on the coefficients denote significance at the 1%, 5%, and 10% levels, respectively. Panel A presents estimation results for models (1) and (2). Panel B presents estimation results for models (3) and (4).

Panel A: Estimation results for models (1) and (2)

Dependant Variable	PE_Fair			PE_Offer		
	(Eq.1a)	(Eq.1b)	(Eq.1c)	(Eq.2a)	(Eq.2b)	(Eq.2c)
Intercept	2.68***	2.57***	1.57***	2.77***	2.16***	1.96***
	(7.97)	(8.21)	(3.56)	(8.53)	(8.48)	(4.28)
DFBTA	-0.27**	-0.19	-0.33***	-0.10	-0.16*	-0.15*
	(-2.07)	(-1.42)	(-2.83)	(-1.00)	(-1.93)	(-1.70)
PE_Peer	0.30***		0.30***	0.06		0.06
	(3.23)		(3.62)	(0.60)		(0.66)
PE_Foreign		0.41***	0.45***		0.33***	0.33***
		(3.11)	(4.15)		(3.29)	(3.18)
Adj.R^2	13.6%	14.1%	36.4%	(0.9%)	23.4%	22.7%
N	61	72	61	61	72	61

Panel B: Estimation results for Models (3) and (4)

Dependant Variable	Spread_Offer	IR_A					
	(Eq.3)	(Eq.4a)	(Eq.4b)	(Eq.4c)	(Eq.4d)	(Eq.4e)	(Eq.4f)
Intercept	2.94**	-0.63	-0.62	-1.40	-0.63	-0.79	-1.42*
	(2.04)	(-1.24)	(-1.54)	(-1.66)	(-1.27)	(-1.58)	(-1.74)
DFBTA	0.20	-0.07	-0.36**	-0.33**	0.08	0.37	-0.06
	(0.70)	(-0.41)	(-2.21)	(-2.11)	(0.43)	(1.50)	(-0.19)
Resid_PE		-0.83***	-0.68***	-0.68***	-0.81***	-0.46	-0.49*
		(-3.41)	(-3.50)	(-2.92)	(-3.36)	(-1.42)	(-1.74)
Resid_Spread		0.05	0.08	0.07	0.05	-0.03	0.02
		(0.71)	(1.33)	(1.06)	(0.73)	(-0.44)	(0.34)
PE_Peer	0.18	0.51***	0.55***	0.73***	0.51***	0.81***	0.93***
	(0.79)	(3.76)	(5.01)	(3.96)	(3.74)	(4.46)	(4.86)
PE_Foreign	-1.06***	-0.01	0.13	0.19	0.02	-0.34	-0.11
	(-3.56)	(-0.06)	(1.38)	(1.02)	(0.15)	(-1.50)	(-0.40)
DLarge			-0.81***	0.53			0.57
			(-4.67)	(0.54)			(0.57)
PE_Peer×DLarge				-0.37*			-0.41*
				(-1.79)			(-1.85)
PE_Foreign×DLarge				-0.02			0.06
				(-0.09)			(0.24)
DΔSO					-0.76	-0.74**	-0.29
					(-1.66)	(-2.07)	(-0.66)
PE_Peer×DΔSO						-0.62***	-0.40**
						(-3.02)	(-2.16)
PE_Foreign×DΔSO						0.70***	0.48**
						(2.89)	(2.29)
Adj.R^2	15.6%	21.1%	44.8%	45.1%	21.5%	32.2%	47.1%
N	65	61	61	61	61	61	61

Table 12

Robustness check: using log versions of *Spread_Offer* and *IR_A*

This table replicates the cross-sectional estimation results of models (3) and (4) as reported in Table 5. The left-hand-side variables are log versions of *Spread_Offer* and *IR_A*. The right-hand-side variables are identified in the same way as in Table 5. The numbers reported in parentheses under the coefficients are t-statistics calculated using White standard errors. ***, **, and * on the coefficients denote significance at the 1%, 5%, and 10% levels, respectively. Panel A is presented for the full sample, and Panels B and C are for the subsamples, first-H-then-A and first-B-then-A firms, respectively.

Dependant Variable	Spread_Offer	IR_A					
	(Eq. 3)	(Eq. 4a)	(Eq. 4b)	(Eq. 4c)	(Eq. 4d)	(Eq. 4e)	(Eq. 4f)
Panel A: Full sample of first-foreign-then-A firms							
Intercept	1.45***	-0.06	-0.06	-0.46	-0.06	-0.16	-0.52*
	(2.88)	(-0.25)	(-0.28)	(-1.36)	(-0.26)	(-0.82)	(-2.00)
DFBTA	0.18	-0.01	-0.15*	-0.17**	0.07	0.23***	0.09
	(1.61)	(-0.17)	(-1.94)	(-2.10)	(0.95)	(2.77)	(0.71)
Resid_PE		-0.34***	-0.20**	-0.16	-0.33***	-0.20*	-0.10
		(-3.03)	(-2.23)	(-1.39)	(-3.13)	(-1.89)	(-0.86)
Resid_Spread		-0.02	-0.09	-0.14	-0.02	-0.11	-0.19**
		(-0.22)	(-0.88)	(-1.21)	(-0.24)	(-1.45)	(-2.10)
PE_Peer	0.09	0.21***	0.22***	0.30***	0.21***	0.34***	0.43***
	(0.76)	(3.63)	(4.37)	(4.06)	(3.63)	(4.42)	(6.45)
PE_Foreign	-0.53***	0.00	0.06	0.12	0.01	-0.12	-0.05
	(-5.47)	(-0.03)	(1.61)	(1.63)	(0.22)	(-1.45)	(-0.52)
DLarge			-0.30***	0.43			0.49
			(-3.86)	(1.00)			(1.16)
PE_Peer×DLarge				-0.16*			-0.22**
				(-1.77)			(-2.21)
PE_Foreign×DLarge				-0.07			0.01
				(-0.69)			(0.14)
DΔSO					-0.44**	-0.39**	-0.31*
					(-2.43)	(-2.45)	(-1.83)
PE_Peer×DΔSO						-0.27***	-0.24***
						(-3.47)	(-3.40)
PE_Foreign×DΔSO						0.29***	0.26***
						(3.00)	(3.00)
Adj.R^2	31.8%	23.1%	37.0%	37.3%	24.9%	35.9%	45.0%
N	69	65	65	65	65	65	65